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AGRITOURISM

STUDY ON THE NATURAL, SOCIAL AND ANTHROPIC FRAMES EXISTING IN THE BULZ COMMUNE, BIHOR

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Abstract

The commune of Bulz is situated in the east part of Bihorcounty. In this paper we present the natural, social and anthropic frames of Bulz commune. The commune of Bulz is composed of three localities: Bulz, Munteni and Remeți, to which is added the holiday village Coada Lacului.

Key words: religious edifices, hydrographic potential, demographic aspects, population structure by nationality, population structure by religion

INTRODUCTION

Fishing, hunting, outdoor walks are some of the leisure opportunities that tourists have when visiting the town of Bulz.

MATERIAL AND METHODS

General aspects. Bulz commune is located in the eastern part of Bihorcounty, at a distance of 75 km from Oradea, 37 km from Aleșd and 88 km from Cluj-Napoca. The commune includes the villages of Bulz, Munteni and Remeți. To these is added the holiday village Coada Lacului, located about 14 km from the village of Remeți.

Bulz has an area of 119 km². The perimeter of the commune is composed of 460 ha of arable land, 2915 ha of natural hay, 510 ha of natural pastures, 9939 ha of non- agricultural land (forests, streams and water mirrors, roads, swamps, etc.). A grove-type settlement commune, Bulzul is an area scattered on the gentler slopes and in the meadows of the Bihor Mountains and the Pădurea Craiului Mountains, to the right and to the left of the Valea Iadului.

The relief

The localities of Bulz commune are located, for the most part, on the slopes of the Bihor Mountains and the Craiului Forest, separated by

the Valea Iadului river, whose meadow has a maximum width of 300 meters. A small part of Bulz village (Pustă and Răstoacă hamlet) is located on the Crișul Repede river (about 3 km). The structure of the relief is varied, the meadows, the valleys, the hills and the mountains alternate.

The soil is poor, mostly arid, covered by forests and hayfields, this, first of all, due to the altitude, but also to the climatic conditions. Deep and narrow in the upper course, Valea Iadului acquires, in this area, the appearance of a gorge (Cheile Remetilor).

The relief of Bulz commune is a mountainous one, with heights between 340 m, at the confluence of Iadului Valley with Crișul Repede, and 1471 m, in Piatra Seniului Peak.

The surface hydrographic network is disorganized, being developed, instead, the underground one. As a result, the formation of caves or the appearance of impressive gorges are worth mentioning.

The karst relief is represented by caves, sinkholes, oases (Gura Dracului, Hârtoape), caves, slopes and caves, the basin of Valea Iadului being, with about 300 such formations, one of the richest in the country.

Among the most important caves, we mention: Bulz Water Cave (at 336 m altitude, on the left bank of the Hell Valley, at the foot of a steep over 200 m), accessible only to speleologists; The cave from Valea Leșului, Peștera Mică, Peștera Păstorului, Peștera Ciuhandrului - with a unique climate, of a special scientific importance, the cave from Valea Izvorului.

The most important soil resources are forests, pastures and natural meadows, which occupy about 70% of the commune's surface, and waters, used for various purposes of small and large industries (dams, mills, trout farms, etc.).

Hydrographic potential.

Crișul Repede crosses the Bulz commune for a distance of about 3-4 km, from Bucea (Cluj county) to the border with Lorău village (Bratca commune), collecting the entire hydrographic network on the territory of the commune, represented by the networks of the main tributaries (Valea Iadului and Valea Satului, the latter in Bulz- Pustă).

Valea Iadului is the most important tributary of Crișul Repede, where it flows, at an altitude of 340 m, near Halta CFR Stâna de Vale after a journey of approximately 52 km.

The river springs from the Bihor Mountains, at the western foot of Poienii Peak (1627 m), in the vicinity of Stâna de Vale resort, gathering, in a first stage, the Spring of Miracles, the Spring of Boiling, the Spring

of Peace, the Spring of the Prophet, the Spring of Narcissus and Eremitului, then collecting, along the way, the waters of numerous streams: Cârligate, Valea de Runc, Ciungi, Valea Gugii, Văile Calului, Valea Lupului, Sălătruc, Străvinoasa, Valea Izvorului, Pârâul Morii, Dişor (Valea Bisericii), Topliţa, Pliţa Lupului, Valea Dumii, Valea Curii, Valea Sărăcelului, Valea Mihăiesii, Pârâul Tocilelor on the right and on the left: Ieduţu, Murgaşu, Părăuţa, Valea cu Calea, Hodrânguşa, Valea Leşului, Valea Căuşului, Valea Rea, Valea Lungii, Valea Fatii, Pârâul Roşu.

Demographic aspects.

According to the census conducted in 2011, Bulz commune population was up to 2104 people, down from the previous census in 2002, when it had registered 2420 inhabitants.

Most residents are Romanians (94,58%). The main minorities are Romani (2,66%). For 2,76% of the population, ethnicity unknown.

By nationality, the population structure is shown in Table 1 (Source: INS 2013)

Table 1

Nationality	Number inhabitants	% Total
2104	100	
Romanians	1990	94,58
Romani	56	2,66
Unknown	58	2,76

Source: INS 2013

In terms of confessional structure, most of the inhabitants are Orthodox (85,55%), Pentecostals (11,36%). For 3,09% of the population, the religious affiliation is unknown.

Population structure based on religion is presented in Table 2 (Source: INS2013)

Table 2

Religion	Number inhabitants	%
Total	2104	100
Orthodox	1800	85,55
Pentecostals	239	11,36
Unknown	65	3,09

Source: INS 2013

The tourist objectives of Bulz commune are:

- Exploitation of bauxite and compact limestone from Remeti village;
- Lesu accumulation lake and power plant, inaugurated in 1973, respectively 1977;
- Collection of folk art from the school in Pustahamlet;
- Bulz water cave;
- Water mill and roller in the village of Bulz;
- Annual celebration of Bulz village (every September);
- Valea Lesului Cave;
- Buteasa-Boceasa Peak;
- Fire Valley with Syringa josikaea (Carpathian bat).

CONCLUSIONS

The commune of Bulz is situated in the east part of Bihor county. The commune of Bulz is composed of three localities: Bulz, Remetiș Munteni. The Bulz commune has many religious edifices, customs and crafts, natural sights very appreciated among tourists.

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PERSPECTIVES OF THE EVOLUTION OF RURAL TOURISM IN THE NW DEVELOPMENT REGION

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Abstract

The analysis of the rural tourism phenomenon at the level of the North-West Region, as a field of independent activity, but in correlation with the other main economic and social fields (agriculture, industry), highlighted the major role of tourism in the development of perspective of rural communities.

After an inventory of the tourist resources of the region as well as of the current stage of affirmation of the branch, the need to elaborate a coherent strategy for the development of rural tourism in the short, medium and long term becomes possible and urgent.

Key words: perspective, rural tourism, development region

INTRODUCTION

The region is located in northwestern Romania and borders Hungary to the west, Ukraine to the north, is the longest natural border along the Tisza River, to the south with the Central Development Region and the Western Development Region, and in the east with the North-East Development Region.

The North-West Development Region includes 6 counties, respectively Bihor, Bistrița-Năsăud, Cluj, Maramureș, Satu-Mare, Sălaj (fig.1).

The administrative-territorial units of the region are: 6 counties, 43 cities, of which 15 municipalities, 402 communes and 1800 villages (Statistical Yearbook of Romania).

Rural settlements in the North-West Development Region face the same problems at the national level: high mortality, low presence and sometimes even lack of public interest facilities, poorly developed communication networks in the territory, the aging and feminized population that determines the existence of arable land unused, etc.

The functions of rural settlements are mainly determined by natural factors, which condition primarily the profile of agricultural activities, but also of industrial activities.

The existence of rural settlements is influenced by local and regional economic development.

There are situations especially in the mountainous area where the aging population and the poor economic development can contribute to the disappearance of the respective villages.

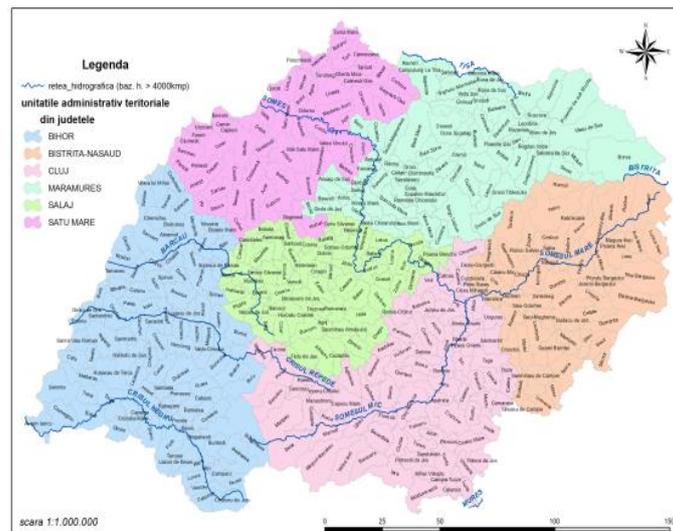


Fig.1 Map of the component counties from the NW Region

MATERIAL AND METHODS

The perspectives of rural tourism in the NW Region must start from **the priorities of rural development**, namely:

- adapting agricultural holdings to be able to ensure their economic viability in the context of sustainable rural development;
- improving and adapting production according to the market;
- increasing the quality of products;
- development of agricultural lending services;
- increasing the absorption capacity of European funds;
- reduction of production costs.

Economic dynamics will increase through **the enhancement of human, natural and cultural heritage**.

Rural tourism is poorly represented, compared to existing resources and as a result the tourism market has to suffer from inadequate basic infrastructure and lack of comfort facilities.

In order for rural tourism to be able to develop in the NW Region in the future, from my point of view it is necessary to focus on the following aspects:

- 1) the tourist potential that needs to be developed and modernized;
- 2) sustainable capitalization of natural potential and local resources;
- 3) highlighting the tourist objectives of heritage, culture and specific traditions through better information and publicity;
- 4) the existence of a well-prepared young human potential, which first of all wants to remain in the rural environment and is able to adapt to requirements corresponding to the needs of all categories of beneficiaries.

Many rural localities in the NW Region have natural and cultural values, which **can be integrated into national and international tourism**.

As a supplement to incomes for rural households, have developed, as complementary activities, rural tourism and agrotourism.

Although there are significant differences between these two forms of tourism, both emphasize an interconditioning of the traditional side with the requirements of modern tourism and imply a superior capitalization of the economic, natural and anthropic values of the area.

In the last 10 years, new houses have always been built in rural areas. Many of the new constructions can be the support for some tourist activities.

Rural tourism is a way of development and can contribute to increasing the standard of local living, primarily due to the fact that it sets in motion a wide range of local resources through several priority actions: modernization of the existing road network, ensuring water supply through pipes, sewerage for the perimeters with a higher density of dwellings, the realization of some means of district heating, the development of the activities of processing of the agricultural products.

Through the demand it manifests for a wide range of handicrafts, rural tourism offers **new perspectives of openness for the village crafts**.

Thus, the artisans from Maramureş are integrated in the tourism development strategy of the member villages of the various associations - the Maramureş Country Association and the Agro-Tur Foundation from Vadu Izei.

These associations are known for their orientation in favor of the village crafts, the orientation of the unemployed towards traditional crafts and tourism, the financing of small workshop projects.

The village's crafts contribute to the development of tourism also by triggering and retaining some tourist flows in certain areas.

It is especially about the ceramic centers, the exhibitions for sale, the ethnography and folklore collections, the demonstration lessons presented in

front of the tourists, which determine the spatial distribution of the tourist flows but also the popularization of some touristic objectives.

The development of agrotourism is based on the need to find solutions for rural households, in the sense of increasing incomes by capitalizing on their economic potential, developing services for hosting and capitalizing on their own and local products.

CONCLUSION

Rural tourism in the North-West of Romania **must first focus on the internal market and the markets in Central and Eastern Europe**, which are more accessible than targeting Western Europe or overseas countries.

Regarding domestic tourism, even if the current data show that Romanian citizens do not yet have a tradition in the field, there are evidences that viable tourism products can be developed.

The Central and Eastern European market has been neglected, although it has strong growth potential in the field.

The products should be sold to both individual tourists and groups insisting on the potential of the area for outdoor activities, accessibility and reasonable prices.

Markets in Western Europe and others more distant should be approached as a niche market for specialized tourists with the help of Romanian tour operators and seeking partnerships with international tour operators.

Another solution that can be considered for the development of rural tourism and agrotourism in the NW Region is the **flow of intellectual capital**, not financial.

Thus, the traditional command and control systems that are familiar to us must be replaced by more appropriate ones, including that of building networks between people and economic entities.

Effective management is not a matter of having more knowledge, but knowingness, ie how to use it.

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THE SITUATION OF TOURISM AND ITS RECOVERY POLICIES IN ROMANIA AND THE EUROPEAN UNION

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Abstract

Tourism contributes with 9.5% to the European Union's gross domestic product. Tourism plays an important role in the EU due to its economic and employment potential, as well as its social and environmental implications. In 2019, Europe was the main destination in the world. Along with the advent of the pandemic, with a series of restrictions on the movement of people, the population reacted in the first place, giving up the trips they proposed.

Is estimated that the EU tourism industry, on which about 13 million people depend, loses € 1 billion in monthly revenue as a result of the COVID-19 outbreak. In the major destinations, hotels were deserted also restaurants, bars, tourist attractions, theme parks and closed museums. Many EU countries have reintroduced border controls or banned certain travelers from entering their territory, leaving them to struggle to return home. The situation is particularly difficult in several EU countries that are key tourist destinations, such as Italy, Spain and France.

In 2019, tourism contributes only with 5% to GDP in Romania, being a very dynamic sector. The effects of the pandemic on Romanian tourism can be seen in the statistics: arrivals registered in the tourist reception structures decreased by 44.4% in July 2020 compared to July 2019, to 917,800 arrivals. Overnight stays decreased by 44.7%, to 2,436,500.

The EU is proposing a series of guidances to ensure a gradual and coordinated reopening of tourist services and units as soon as the health situation allows it. At the same time, the guidances provide strict conditions for the protection of the health and safety of travelers as well as of tourism workers throughout Europe.

Key words: tourist units, Coronavirus outbreak

INTRODUCTION

The development of tourism has a series of economic, social and environmental consequences, these effects can be both positive and negative. The development of tourism in destinations must be managed in such a way as to ensure economic growth, social progress and environmental protection, in the long term, in conditions of sustainability.

From the point of view of the impact that tourism has on the economy, the specialized literature has identified the existence of three approaches:

- underestimating the place and role of tourism in the economy, considering insignificant the contribution of tourism to economic development;
- overestimating the place and role of tourism in the economy, considering that tourism is the most important economic branch and the only one capable of ensuring economic recovery and / or sustainable economic development;
- realistic approach - according to which tourism is an important component of the tertiary sector of the economy, having significant effects on the economy and ensuring an economic development only through synergy with other economic sectors.

The outbreak of the coronavirus paralyzed the tourism industry, leaving travelers without the opportunity to travel to the desired places and economies in countries whose gross domestic product depended on tourism devastated.

Going through this experience I realized that tourism is an important component of our country's economy.

The decrease of the demand for products and services on the domestic market and the restriction of the international circulation are the main factors that affect the activity of the companies from the tourism sectors.

These companies are facing a continuous decline in revenue. The state has taken various measures to attenuate the economic impact of the pandemic, from delaying the current investment and reducing administrative costs to reducing staff costs.

MATERIALS AND METHODS

For this work I used statistical data offered by the national institute of statistics and the statistical department of Oradea. The paper covers well the field of qualitative research, seen as a first-order alternative, but also as a necessary complement to the quantitative methods. For the research method I used qualitative exploratory research.

RESULTS AND DISCUSSION

The pandemic divided Romanian tourists into 2 categories, some more reluctant who canceled their reservations and others who looked for some open doors to be able to travel further away from the country. The fact that most countries let you enter only with a negative covid test has significantly reduced the movement of Romanians across the border in the summer of 2020.

Holiday vouchers and cards were among the main methods of acquiring holidays that contributed to the restart of domestic tourism. Also, was observed the tendency of tourists to book holidays with caution. About 60% of them preferred last-minute holidays this year, booked less than 48 hours before the start of the holiday, contrary to the trends of previous years when reservations were made early to take advantage of early booking offers.

In the table I tried a comparison between the situation of arrivals and overnight stays in the tourist reception structures with accommodation functions in July of this year, making a comparison with July last year.

Tabel 1

Arrivals and overnight stays in the establishments of tourist reception with functions of cazare- July

	Arrivals				Overnight stays	
	July	July	July	July	July	July
	2019	2020	2020	2019	2020	2020
	-mii-	-mii-	to	-mii-	-mii-	to
			July			July
			2019			2019
			-%-			-%
Total	1651,3	917,8	55,6	4407,3	2436,5	55,3
Romanian tourists	1350,2	887,7	65,7	3809,2	2370,3	62,2
Foreign tourists **) from which:	301,1	30,1	10,0	598,1	66,2	11,1
- Europe	217,0	26,7	12,3	415,5	58,3	14,0
European Union ***)	170,1	22,6	13,3	322,1	49,4	15,3
- Asia	43,2	1,0	2,3	98,4	1,9	1,9
- North America	22,0	1,3	5,9	50,4	3,3	6,5
- South America	2,5	*	–	5,3	*	–
- Africa	2,3	*	–	4,4	1,0	22,7

Sursa:INNS

Analyzing the table we can see that both the number of arrivals and overnight stays for Romanian tourists traveling in the country is 55.6% lower in 2020 compared to 2019.

The number of foreign tourists who traveled to Romania decreased the most, from 300 thousand tourists in 2019 to 30 thousand tourists in 2020.

Table 2

The distribution of tourist arrivals in the establishments of tourists, tourist areas, in July 2020 compared to July 2019

	Jul-19	Jul-20
Bucharest and county seat cities, exclusively Tulcea	72,1	72,8
Other settlements and tourist routes	13,8	15,3
Resorts from the mountain area	8,6	5,2
Resorts from the spa area	1,7	1,2
Resorts from the seaside, exclusively Constanta city	2,7	4,6
Danube Delta area, including Tulcea city	1,1	0,9

Sursa:INNS

We also analyzed the distribution of foreign tourist arrivals in tourist reception structures in July 2020 compared to July 2019 and we noticed that foreign tourists who visited our country and wanted to go the resorts in the seaside area increased from 2.7% in 2019 to 4.6% in 2020.

Table 3

Arrivals of foreign visitors in Romania and departures of Romanian visitors abroad in July and between January and July 2020

	Jul-20	%	ian-iulie2020	%
TOTAL ARRIVALS	494331		3219168	
- Road transport	417531	84,5	2588663	80,4
- Rail transport	3551	0,7	30085	0,9
- Airline	64385	13,0	545681	17,0
- Naval transport	8864	1,8	54739	1,7
TOTAL DEPARTURES	874654		5995689	
- Road transport	663109	75,8	4189067	69,9
- Rail transport	2496	0,3	27681	0,4
- Airline	206652	23,6	1766810	29,5
- Naval transport	2397	0,3	12131	0,2

Sursa:INNS

Distribution of arrivals of foreign tourists in tourist reception structures, by tourist areas, in July 2020 compared to July 2019.

Due to these uncertain conditions, the majority of those who made a trip between January and July 2020 preferred to do it by car 84.5%.

CONCLUSIONS

The European Union (EU) acted quickly in this regard helping this sector, for example, by providing financial support to businesses, including many small and medium-sized enterprises that have suffered.

Financial support for tourism comes mostly from the European Regional Development Fund (ERDF) and the Cohesion Fund (CF). Together, these two funds allocated 4 billion EUR to the tourism sector in 2014-2020. To date, they have co-financed almost 10,000 projects covering a wide range of activities, from promotion to hospitality, infrastructure and the development of local attractions.

The EU should develop a prevention and management mechanism to protect companies and workers in the tourism sector and ensure passenger safety, MEPs said in a resolution voted on 17 April.

Since March, Parliament's Committee on Transport and Tourism insisted on firm and coordinated EU action to overcome the crisis.

Committee Chair Karima Delli welcomed the Commission's package on tourism and transport on 13 May and declared: "It is essential to assure citizens that tourism and travel will be possible and safe this year. We should use this crisis to rethink tourism across the EU. "

On 15 May, Parliament approved aid measures for the transport sector to minimize as much as possible the effects of the pandemic on airlines, railways, roads and shipping companies.

Given the fact that the entire field of tourism has been affected since the declaration of the pandemic, the executive adds, in the entire industry has been adopted a policy to postpone the holidays, and not to cancel them. "Both the airlines and our local partners offer the opportunity to change travel dates or receive travel vouchers valid for 1 or 2 years.

In our turn, we offered customers the option to choose between changing the travel dates or receiving a voucher valid for 2 years.

However, most of the tourists opted to choose a new period for their vacation, says one of the owners of a tourism company.

The best measure, in our country, has not appeared and may be a reduced working time, combined with technical unemployment paid by the state, for a period of at least 1 year from now.

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THE IMPORTANCE OF PROMOTING AND PRESERVING TRADITIONS IN THE AREA OF CÂMPIA IERULUI

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Abstract

The preservation of cultural heritage in rural area is essential to affirm our identity as a nation because it creates a comprehensive framework for the preservation of cultural heritage including cultural sites, old buildings, monuments, and landmarks that have cultural significance and historical value.

Culture and its heritage reflect and shape values, beliefs, and aspirations, thereby defining a nation's identity. It is important to preserve our cultural heritage, because it keeps our integrity as a people

Key words: rural area, traditions, preservation, cultural heritage, Câmpia Ierului

INTRODUCTION

Sites of Community Importance (SCIs) are sites that have been officially adopted by the European Commission and are therefore subject to the protection provisions (10). Special Areas of Conservation (SACs) are SCIs that have been designated by the Member States through a legal act and for which the necessary conservation measures are applied to ensure the conservation of the species and habitat types of EU importance present. (1)

Câmpia Ierului (Figure1) is a site of community importance designated for the purpose of protecting biodiversity and maintaining a favorable condition of conservation of wildlife and nature.

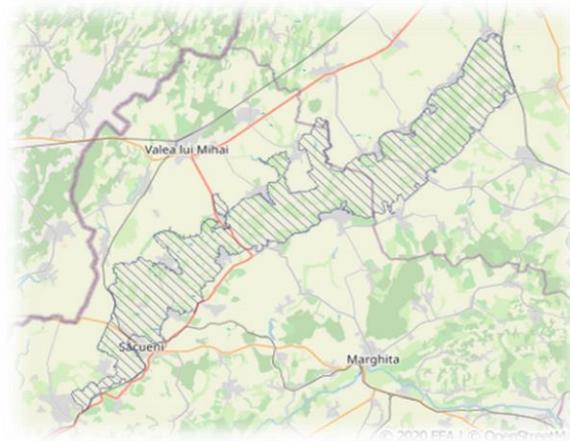


Fig. 1. Geographical location Câmpia Ierului (17)

The surface of the site has 21.283 hectares, and it is located in the north-western part of the country. The administrative regions are Bihor County 64% and Satu Mare County 36%. (11)

Located in the northern sector of Câmpiei de Vest, the valley of the river Ier crosses a distance of about 85 km, with a width of between 5 and 15 km. The Valley of the Ier has the appearance of a lower corridor between the high plain of Marghita (180 – 220 m) east, and Câmpia Careiului (140 – 160 m) west.

Câmpia Ierului was formed in the place of an ancient tectonic trench which until the early Holocene was the drainage line of the entire system of the upper section of Tisa river.

Following the hydro-improvement works carried out between 1968 and 1980, the appearance of the region changed radically. Extensive agricultural lands have appeared in place of the former swamps and ponds. As a result of anthropogenic activities, the composition of the flora and fauna has also changed a lot, not only due to desiccation but also deforestation, chemical decontamination, and so forth. (Figure 2.)

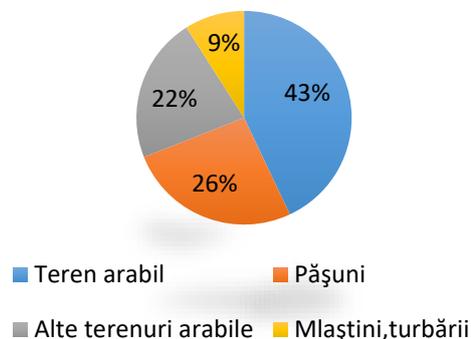


Fig. 2. Structure Site

Valea Ierului includes part of the remains of the vast wetlands in this area of the country. It is characterized by a variety of semi-natural habitats, hayfields, pastures, bushes, extensive arable land, deciduous forests, reservoirs, ponds and swamps. (12)

Currently, the old habitats characteristic of Valea Ierului with specific flora and fauna can be found only limited at some places, such as: Lacul Vărgat resort from Săcuieni, Dindești swamp (Andrid polder), Hotoan salt marshes, Sălacea-Galoșpetru swamps - Tarcea, Pheasant Lake and the Anines from Diosig, the swamp frog resort (*Rana arvalis*) from Andrid, etc.

A characteristic of the flora is the fragmentation of the area of many species, the spread of most is now limited. Thus, plants that once were common, now appear in small resorts and in a small number of specimens.

The ancient swampy character is reflected by the presence of reeds, poppies, and tall sedges. The pastures populates the low, moist and temporarily flooded lands. (20)

The most representative species are the field grass, foxtail and fescue. The most representative wood species are willow groves, meadow oaks, meadows in the marginal hilly area, bushes, respectively plantations.

The fauna in the silvo-steppe is represented by rodents: field mice, partridges, woodpeckers, rabbits; birds: partridge and quail, pheasants, woodpeckers, cuckoos, blackbirds, falcons; and other mammals: deer, wild boar, rabbits, foxes.

In the water of the rivers we find: common nase, barbel, crucian carp, carp, wels catfish and clean (*Squalius cephalus*). In the water of the lakes: carp, bream, pike, slippers, perch. (21)

MATERIAL AND METHOD

The promotion of traditions and customs in addition to the conservation of habitats and species of the natural environment is also important in the special areas of conservation of the country, such as Câmpia Ierului (4).

Cultural heritage includes tangible culture, such as buildings, monuments, landscapes, books, works of art (5). It also includes intangible culture traditions or living expressions inherited from our ancestors and passed on to our descendants, such as oral traditions, performing arts, social practices, rituals, festive events, knowledge and practices concerning nature and the universe or the knowledge and skills to produce traditional crafts intangible culture such as folklore, traditions, language, and knowledge, and natural heritage including culturally significant landscapes, and biodiversity. (2)

Preserving the cultural heritage in rural areas is essential for maintaining our identity as a nation.(13)

In the Câmpia Ierului area, traditions and customs usually mark significant moments of agricultural activities, which may coincide with different religious holidays.

These traditions and customs are known by all the component localities and neighboring localities of the area, and most of them are still practicing, both by the youth and elders.

For example, a remarkable tradition is one from the beginning of the summer, 1 May, The Day of Work, also known as "Armindeni", and it is held to celebrate the successful harvest.

On the night of April 30 to May 1, at night young men secretly decorated the gates and the fences of the houses with lilac branches, where in the household existed young ladies to marry, and sometimes they even took the door from the entrance to the yard and hid it at the nearest neighbor.

Another popular tradition was the vine harvest ball, when the people of the village gathered in the cultural hall, and celebrated the rich harvest by dancing, and by decorating the hall with bunches of grapes hanging from the ceiling. The boys cut them for a symbolic amount of money or for a kiss on the cheek (9).

The celebration of the wheat harvest is organized every year on the occasion of the celebration of the village's anniversary. A beautiful moment of the ceremony is, when the young girls dress in traditional costumes and offer the inhabitants of their baskets sweet bread and cones, which were baked with fresh-milled flour. At the same time the boys are serving palinka and wine and they encourage people to join the festivity. This event is

followed by a worship at the local church, where the locals are praying for God's to bless the harvest and to thank the richness of the soil. The first bread baked of the fresh-milled flour will be placed on the altar to express the gratitude (8).

Probably the most awaited holiday was and still is Christmas. On Christmas Eve, after the worship at the church, children of the village gathered and went to sing religious songs through the village. They stopped at houses where they could still see light from the window and there they presented a small show about the birth of Jesus in costumes with some accessories and with singing.

From the point of view of the gastronomic tradition of Câmpia Ierului, the following festivities take place:

- Autumn, after wine harvest ball, the new wine is also celebrated with a worship at the church.
- In the Garden of Zichy Castle in Diosig, a contest for wine-growers is held every year. They organize this wine tasting contest every year, where the most famous wine cellars present their wines of the noble variety.(18)
- There is another well-known village about wine activities, Sălacea. The village is known as the "Village of the 1000 cellars". Whether they are brick or cut directly into the lustrous earth of the hill, the 970 cellars form the "cellar street". The oldest of them dates back to 1803. The cellars shall have a minimum length of 30 meters. The good wines obtained from the grapes produced by the winegrowers of Valea Ierului are stored here clear, aromatic and cold (especially summer). Local winegrowers are presenting their wines annually at the contest mentioned earlier, Wine tasting in Diosig. (19)

RESULTS AND DISCUSSION

The development of Valea Ierului from the point of view of rural tourism must also take into account oenological tourism, as a niche tourism, on the route of the ancient "Wine Road" on Valea Ierului. The "Wine Road" began in Oradea, climbing north to Valea lui Mihai (68 km), from there, through the Ottomans, to Marghita (35 km) and then, along Barcău, back to Oradea (58 km). The attraction of the circuit can be multiplied and diversified by organizing folklore events and folk art exhibitions, followed by tasting local traditional products in a rustic setting (7).

Another type of tourism would be the ecological one considering the location in the Valea Ierului site. The elements of flora and fauna conserved within the botanical, forest reserves and wetlands characteristic of Valea

Ierului, support any local initiative to attract tourists, allowing the organization of hikes, excursions in nature and the practice of tourism focused on conservation of genofond, ecofund and rare or unique landscape. For an optimal capitalization of the biogeographic potential held by this territory, it is necessary to establish certain circuits / thematic routes. Attractions may be present to tourists, but it is necessary to create the image, marketing activities, making leaflets and informative guides, along with raising awareness environmental protection and environmental education. (1)

The tourist valences of the region, suitable for mixed type agrotourism are supported by the preservation of a geocultural background rich in traditions, customs, crafts and specific holidays, as a result of the long coexistence on the same territory of a human group composed of three ethnic groups (Romanians, Hungarians, Swabians).), each of them, still keeping alive the elements of territorial belonging to the mental space with which they identify. Mixed agrotourism involves the tourist to attend or be actively involved in a series of activities in traditional rural households: picking grapes and apples, mowing and gathering hay, weaving baskets from twigs, preparing local dishes, making souvenirs, making brandy , grape peeling, traditional weaving and sewing, egg decorating, etc (6).

CONCLUSIONS

In the Vail Ierului area, there is a minimum number of accommodation opportunities. Practically in this part of the county, rural tourism is underdeveloped despite the resources (vineyard culture, cellars, culture and tradition that connects the area with the eastern part of Hungary).(3)

New tourist destinations must be developed in Valea Ierului where there are the necessary resources, where the culture of vineyards and agricultural activities and products are underutilized resources for Gastronomic tourism and religious tourism / pilgrimages through effective destination management policies (14)

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OUTLINING THE CONSUMER PROFILE –DEFINING ELEMENT IN PROMOTING RURAL TOURISM AND AGRI-TOURISM

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Abstract

The study shows that the profile of the consumer of rural tourism and agri-tourism can be a young person (a student/pupil) aged between 15-24 years, with a monthly family income between 2500 and 3500 lei and who allocates, for a stay of 3-4 days, an amount between 500 and 1000 lei. The consumer wants to be satisfied, to taste the adventure, but also to relax, to have appropriate accommodation and to know the traditions.

Key words: consumer profile; rural tourism; agri-tourism

INTRODUCTION

By entering in third sector of the national economy, tourism is often defined as the most profitable industry from the end of twentieth century. Specialists refers to tourism as an important component of the services sector aimed population being one of the branches with the highest growth potential and which recorded over the time the highest growth rate.

Romania's tourist potential has always been varied, rich, offering multiple options. Agri-tourism is the act of moving a person in an unpolluted, picturesque rural locality, with an agricultural specificity, completed by staying (sojourn) for at least 24 hours in a peasant household and consuming local food and non-food products, cohabitation, observation, assistance and co-participation in the local social community (Alecă I.N., Constantin M., 2006; Ghereș M., Nistoreanu P., 2010; Ghereș M. et al., 2006, 2011).

Romania has landscapes, a variety of accommodation possibilities, special traditions, festivals, but there is no clear information about the wishes and needs of the consumer. Poor knowledge of the consumer of rural tourism and agri-tourism leads to in-depth research on this issue that requires immediate remediation. This is because the tourist in these areas is a very special one, which makes a discordant note among the other travellers. Thus, the study of the market through the study of consumers (who are they, how old are they, what are consumers looking for in rural

and agri-tourism products, what are their motivations, reluctance?) comes to shed light on this issue.

Consumer behaviour is an important part of marketing a “multidimensional concept covers all acts decision made on an individual or group directly linked to obtaining and useful utilization of goods and services, in order to meet current and future, including decision-making processes that precede and determine these acts (Teodorescu N., 2005).

The study of tourist behaviour is a fascinating journey into the world of human behaviour. The study of tourist behaviour, as a theoretical effort, must be completed in practice with concrete observations, with the experience of people who know this behaviour after direct contacts and many years of experience, with the results of research conducted systematically to highlight changes in needs, the desires and behaviours of tourists, in their lifestyle, in the social contexts they come from, in the technologies used, etc. (Coita D.C., Nedelea Al.,2006; Csoz I., 2007; Brezuleanu S. et al., 2008).

One of the results of the study of tourist behaviour is the identification of tourist classification criteria and the provision of tools used for market segmentation. Marketing people have a predisposition to classify some items in order to divide them into categories. Working with a category is more efficient than working with a heterogeneous and unorganized whole. In the case of tourists, marketers consider that each of the criteria based on which tourists can be divided is a segmentation criterion. It depends on the knowledge, experience, creativity and ingenuity of marketer within a company to identify the best suited market to offer. The following classification criteria are frequent in tourism marketing: age, motivation, tourist behaviour, lifestyle, income allocated for tourism and nationality (Ciurea I.V. et al., 2004; Coita D.C., Nedelea Al., 2006).

Although tourists get to know the country life and to prefer their vacations, there are still impediments to the development of rural tourism and agri-tourism, the problem is a general one that is insufficient prepare single tire owners pensions and personnel. In addition to this, the weak knowledge of the tourist profile comes, because in Romania not much research has been done necessary to outline this profile. And then, how do we want to practice quality tourism if we do not know what are the features of the tourist that crosses our threshold? Here is the question that launches the motivation of the study undertaken, a question that aims to formulate clear answers and constructive suggestions (Ungureanu G. et al., 2008).

As a result, the study aims to meet this need, by outlining a concise profile of the consumer of rural tourism and agri-tourism, a consumer who is visibly distinguished from others. Once shaped the tourist profile, tenders will be much simpler, will know the wishes and expectations and rural areas will get the

attention it deserves. A real loss would mean that Romania has the necessary resources to practice rural tourism and quality agri-tourism, but it lacks the information base to formulate the offers expected by tourists.

MATERIAL AND METHOD

The instrument on which the foundation of research was made was the questionnaire in which were respected the specific rules of drafting. It began with familiarity questions aiming the frequency which tourists choose rural tourism or agri-tourism and staying in tourist boarding houses accommodation, the accompanying persons, reason for travelling, booking method, means of transport used. Followed then more complex questions which put the interviewed persons in situation of ordering of factors that they have in mind when choosing a touristy or agri-tourism boarding house. This question was the most complex because it opens a series of derived questions, referring to the quality of services, the auxiliary possibilities for spending free time, menus, prices. Questions followed that verify the importance of certain factors, but also to identify the weaknesses of the pensions at which the respondents were accommodated. The last questions in the questionnaire were the identification ones. One is related to the family's income and aims to identify the amounts paid for 2-3 days of stay and the other is related to the preferred payment methods.

Respondents of the questionnaire were represented by students from specialization Engineering and management in public food service and agri-tourism within Faculty of Animal Science (UASVM Iași) during March to April 2019 and was analysed the tourist area of Vatra-Dornei from Suceava County.

RESULTS AND DISCUSSION

Initial analysis

First results shown that regarding the frequency of choosing the way of accommodation touristy or agri-tourism pensions, most of tourists choose pensions from rural areas "several times per year" (66.66% of respondents) and only 6.66% come "once in a month". The consumer tends to be greatly influenced by the internet 56.66% and friends 30%. On the other hand, agencies do not influence its choice. Such advertising via the internet seems that running operate most effective. As companions, "friends" were on first place 66.66% and family on the second place 23.33%, as a result must have in mind both the people attending with friends, as well as the ones who arrive with the family. Regarding the transport used for arriving at pension, 70% said they go by private car, 16.66% by rail and 10% by bus (only 6.66% being satisfied by the quality of access roads to the pension).

After that was analysed a series of factors with influence on decision making process. Those factors were: quality of the services, landscape area, playground for children and parking space as well as the auxiliary possibilities for and leisure and menu variety. Factor “quality of services” was considered the most important by almost 74% of those questioned, factor “landscape area” affect pretty much, factor “playground” was considered without any importance for 70% of respondents, almost 47% considered that “auxiliary possibilities for leisure” being quite important and menu variety had a quite significant influence (43.33% found it very important).

Analysis of some key factors in the decision making process

In this section of investigation were taken into consideration three factors: (quality of services, auxiliary possibilities for leisure and menu variety). Asked for their opinion regarding the quality of services at the pension in which they were accommodated, over half of respondents (66.6%) said that services have been of medium quality, 30% said they were of high quality and only 3.33% believe they were on a poor quality.

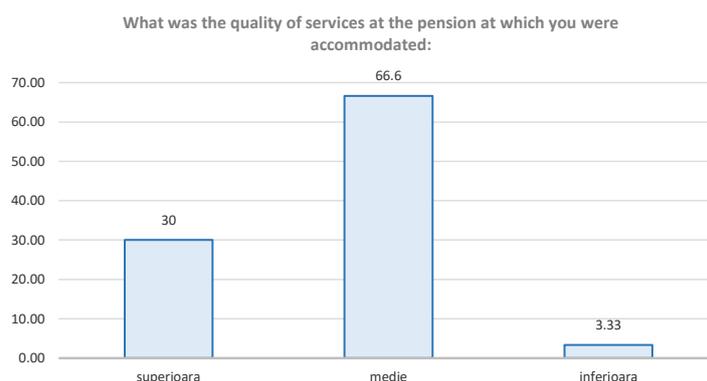


Fig. 1. Quality of services at pension

Another important aspect aimed to identify the preferences of tourists regarding the mater to spend time and the menu. As a result, regarding preferred auxiliary possibilities for leisure, tourists could choose from several options: cultural sports events, sport entertainment, trips, rentals of objects or variant “I have no preference”. Apparently trips were considered most interesting ones, this variant being chosen by 87% of respondents and cultural sport events seems to be without any attractiveness (0%), then 70% of tourists say there were satisfied by the possibilities offered by pension in which they were accommodated while 10% did not feel satisfied with the offer.

Analysis of tourists' preferences regarding the menu shows that 83% of them prefer to serve traditional menus when staying in pensions from VatraDornei area, 13% prefer the classic ones and only 7% prefer exotic menus.

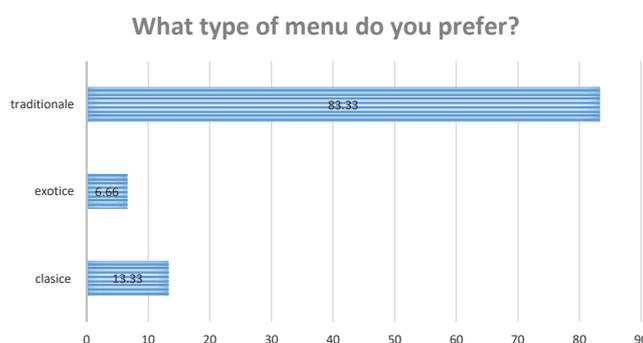


Fig. 2. Preferred type of menus

Thus there is a clear preference for traditional menus from VatraDornei area, Bucovina. This is due to the specificity of area and tourists' curiosity to taste meals specific to the area. As a result, 63% of the clients have said "pretty satisfied" by the menus offered by the pension, 33% were very satisfied and only 3% were totally dissatisfied.

When it comes to price 87% found it acceptable in relation to services and only 13% have said that prices were very good. Asked if used to attend the same pension, 40% have said "no" and they used to relocate to know other areas, 33% said that the return depends on sojourn and only 27% have said "yes", and they will be back to same pension if they are satisfied by the offered conditions. So we have a consumer who is not loyal to rural pensions, this may be due to the fact that the offers are not convincing enough or that the services do not fully meet consumers' expectations.

Analysis of the elements of authenticity and hospitality.

Weaknesses of pensions

Research continues with two factors considered important in the selection or return to the same pension, and those factors were chosen on the basis of the identity of the rural Romanian space: authenticity and hospitality. Results show that 100% of respondents consider that those 2 factors influence their decision to choose or return to pension.

Another question put the problem of combining the authentic elements with the modern ones, yet when it comes to keeping the authentic 70% of respondents considered that this item should remain intact and only 20% have choose a combination.

Taking in study an analysis of the weaknesses founded at boarding houses in which tourists were accommodated were investigated options selected at a question with multiple answers, respondents could choose more options from a list of weak points which weren't chosen by chance, a part reflects the problems related services' quality, others are connected with the area, planning, etc.

Table 1

Weaknesses of pensions	
Weaknesses	Percentage
Lack of clean	36.66%
The menu is a bit varied	40%
Lack of signal on mobile telephones	6.66%
Lack of guides	36.66%
Unfriendly staff (waiters, chefs)	26.66%

Less varied menu seems to be the most common weakness of the pensions from VatraDornei area, Suceava County (40%) followed by “lack of clean” and non-existence of guides with 37% each. The consumer seems to seek various menus and clean and also the presence of guides and the current situation tends to provide otherwise. Among the weaknesses that do not mind the tourists we can count: lack of signal for mobile phones (7%) and this because the rest it is the main reason for the stay, and communication with the people from home can go on the second place. Another weakness, easily overlooked is unfriendly staff, because hosts from VatraDornei tourist area apparently are able to communicate effectively with the guests.

Identification of respondents

Their analysis shows that 37% of tourists have a monthly household income between 2500 and 3500 lei and the majority of them allocated (63% of respondents) between 500 and 1000 lei for a stay of 2-3 days, 90% prefer cash payment. The respondents fall into the category of pupils-students. With regard to the age category 97% are between 15 and 24 years and 3% were between 25 and 49 years.

CONCLUSIONS

The profile obtained from the analyses draws a consumer who chooses to stay at the boarding houses in the VatraDornei area, Suceava County as many times a year, most often choosing the Internet as a source of information.

Majority of those questioned said they used to go on holiday with friends and family to rest, booking being made usually by telephone and preferred payment method is cash. In order to reach the pension, the tourist

uses his personal car, fact for which the quality of the access roads must be emphasized.

The quality of services is the factor that most influences the decision to choose a pension, followed by the landscape of the area and the auxiliary possibilities for spending time.

The identified consumer declares himself to be satisfied with the quality of services at the boarding house where he is staying, but a number of drawbacks such as the slightly varied menu, lack of cleanliness and lack of guidance are leading to total un-satisfaction.

The excursions organized by the pensioners seem to be interesting for the consumer of rural tourism and, as a result, a point of attraction. Moreover, the traditional meals and events of the area offer him the chance to integrate more easily among the locals.

Prices were considered acceptable, and the consumer has already formed the habit of making recommendations if is satisfied.

Authenticity and hospitality are two elements taken into account when the consumer chooses a pension.

The tourist wants to keep the authenticity, this being one of the symbols of the Romanian rural tourism, but for returning to a pension he opts for a more modern variant.

The consumer of rural tourism is a student/pupil aged between 15-24 years, with a monthly income of the family between 2500 and 3500 lei and who allocates, for a stay of 3-4 days an amount between 500 and 1000 lei.

The passenger in rural areas is characterized by a preference for holidays spent “in country” for the custom to merge with, the taste of the known traditional dishes and the traditions of the area.

However, the tourist who strictly chooses VatraDornei area often complains about the lack of a virtual symbol that refers to the attractions of the place. For them, the area must acquire a strong visual identity represented by a series of graphic elements that appear on all promotional materials, be easily recognizable and become the brand of the area.

It is necessary to satisfy the need of the rural tourism consumer to always have access to quality information.

In order to make known the materials related to VatraDornei area, they must exist and be transmitted through all channels, tourist offices, tour operators, internet.

The brand of the area could be presented on any type of promotional material.

Once choosing VatraDornei area, the tourist expects to new experiences and not just relax. Meeting the nature and countryside of the area can easily be turned into an adventure.

VatraDornei has some special symbols that must be exploited in order to develop rural tourism in the area. Those eager for adventure are tempted with hikes that can be made in Călimani National Park. Other tourists can choose to practice winter sports on the Park Slope or the Squirrel Slope. These proposals dream, in fact, to attract the tourist, but also to familiarize him with the specifics of Dorna.

Regarding the traditional atmosphere, it is recommended to focus on the sphere of authenticity. It was shown that the tourist wants to keep it, not to alter the habits, the values.

The consumer of rural tourism chooses this area with a specific reason: to live authentically. However, he wants to sleep in clean rooms and be able to benefit from the minimum conditions of comfort.

The guesthouses must be arranged in such a way as to preserve the authenticity, the traditional aspect, but also to satisfy all the requirements of the tourist.

Perhaps the most important suggestion for improving rural tourism services in VatraDornei is aimed at boarding house owners and staff. They need to attend as many training courses and workshops as possible to learn how to meet the needs of tourists who cross their threshold.

Many times, the reasons for dissatisfaction concern a poor organization, a poor management, a service that makes it so desirable. Several excursions could be organized, themed evenings, where tourists can discover the traditions of the area.

The wishes of tourists are multiple, so it is necessary to be able to achieve them all, through the variety of activities and services. For example, in order to be up to date, a calendar can be drawn up with all the events, holidays and festivals of that period, a calendar that every tourist will receive when they stay.

Feedback is also important. Conceivable short questionnaire can be administered in tourist arrivals (to find out what they want them, waiting at the hostel) and departure (to find out what they enjoyed and what didn't). Their impressions and recommendations can be signed in a guest book.

The consumer wants his wishes to be satisfied, to taste the adventure, but also to relax, to have appropriate accommodation and to know the traditions. And in all this, authenticity must be kept unaltered. Once his needs are met, the tourist in VatraDornei will start to give another idea to the idea of rural tourism and to attribute value to the vacation spent "in the country".

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FOOD SCIENCE AND TECHNOLOGY

RESEARCH ON THE BEHAVIOUR OF DRY ONION BULBS DURING STORAGE

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Abstract

Onion bulbs obtained from chives are suitable for storage, but the length of this period depends on a series of factors. Storage in undeveloped spaces is possible, however, only for a short time due to significant losses.

Key words: onion, storage, undeveloped spaces, ambiental factors, quantitative and qualitative losses

INTRODUCTION

The onion (*Allium cepa*), belonging to the Liliaceae family, is an economically important vegetable, placing 3rd in our country after cabbage and tomatoes.

Onion consumption is high in Romania, over 12kg/inhabitant/year in comparison to the European average (5-8kg/inhabitant/year).

It is cultivated for bulbes, leaves and false stemm, having nutritional, seasoning and medicinal value.

Onion has a complex chemical composition: water 86-89%, carbohydrates 7-10%, proteins 1,3-1,6%, calcium salts, potassium, magnesium, phosphorus, C, E, PP, B complex vitamins, as well as volatile substances called phytoncides with antiseptic action.

The therapeutic effect is due to the aromatic substances precursors, containing sulfur compounds with strong antibacterial and antifungal effects. Onion consumption is recommended in order to prevent atherosclerosis, coronary disease and lower the blood cholesterol levels. Onion and garlic extracts are recommended in treating diabetes, cancer and asthma.

Moreover, they inhibit more than 80 species of fungal pathogens (allicin), being used as a fungicide and fungistatic (R. Ciofu, 2004, Brewster J.L., 1994).

At the same time, onion cultures are described as economically efficient, with important incomes per unit area.

In our country, the production is mainly obtained from chives. By the end of the year, consumption is provided directly by the producers or from temporarily dried onion through simple procedures. Mechanically ventilated storages or cold storages will provide the onion supply for the following months, recording the smallest losses and ensuring good storage until next spring. Moreover, green onion is consumed between April and July.

Harvesting the bulbs for consumption is performed from the end of July to mid-August, after which the bulbs are left in the field for a couple of days in order to dry, then are cleaned from leaves, sorted and stored.

The optimal harvesting moment is of great importance and must be well established, in order to ensure a long-term storage. In this case, the bulbs should present the typical size and shape of the variety, with 2-3 characteristically colored protective layers, with 75% of the plants being laid on the ground and with yellowed leaves at the top. Harvesting should not exceed the first decade of August (Iordăchescu C., 1979, 1986) for the chives (Stuttgart Giant variety). (*sau for the onion chives?*)

If harvesting is delayed, the tunics lose their elasticity and the percentage of developed bulbs increases, with a higher risk of disease or premature start in the vegetation. The roots can remain partially functional in years with high humidity, with the existing risk of resuming the vegetative activity.

In order to be immediately consumed, harvesting can also be done in the stage of complete maturation, when the leaves are fully dried and laid on the ground. However, these bulbs cannot be well preserved.

The storage capacity is influenced by the culture conditions. Thus, only onion cultures obtained from chives or through direct sowing with a density of over 650 thousand plants/ha allow obtaining bulbs with high specific mass (density) of 65-70 g/piece, smooth and with an equatorial diameter of 40-60mm (Iordăchescu C., Nicoleta Mihăilescu, 1989).

Moreover, a fertilization threshold with N, O and K of 80:40:40 and the optimal version of 60:30:30 was established in order to ensure a proper storage. Research on this matter concluded that ammoniacal nitrogen and phosphorus fertilizations encourage the development of storage diseases (Rossier N., et al., 1994).

Bulbs intended for storage are type I quality. Bulbs out of vegetative state, soft, deformed or with flower stalks, with improper humidity or hot, muddy, double-bulbs, “ glass neck “ shape, generally speaking those atypical to the variety are excluded. Only bulbs with a diameter under 80 mm are included (Beceanu, D., 1994, 1998, 2002, 2003, Gherghi, A., et. al., 1981, 1984, 1989, 1994, Iordăchescu, C., 1986, Iordăchescu, C., et. al., 1985, Murtaza, Al., et. al., 1972, Potec, I., et. al., 1983, 1985).

MATERIAL AND METHOD

The research was conducted in Oradea.

A private land which was cultivated in the previous year with Solanaceae (peppers, tomatoes and eggplants) was used for the crop.

Land preparation started in the fall with the following: abolishing the previous culture, administrating fertilizers (manure) and deep plowing. In the spring, in order to crush the soil, a cultivator was used for multiple passes, after which the layers were established for the culture. In order to obtain a cleaner production, no chemical fertilizers were administered. Planting the chives in order to obtain the onion bulbs was carried out in the second decade of March, using the De Stuttgart variety.

Maintenance was done through destroying the weeds, loosening the soil through manual plowing, weeding and applying phytosanitary treatments against diseases and pests (manna, alternariosis, bacterial and gray rot, onion fly). Moreover, the culture was watered when necessary.

Harvesting was performed manually, during the first decade in August, on dry weather. Following this, the bulbs were gathered in piles and remained in the field for 2 days, after which were placed in the barn to dry. Prior to their placement, a sorting was performed simultaneously with a conditioning operation. Thus, inadequate specimens were excluded (undeveloped or deformed bulbs, those affected by diseases or parasites) and the dry leaves and mud were removed. The onions were placed in the barn in a layer 30 cm thick. The storage time was a month, which allowed the drying process to continue and a constant humidity was reached in the onion bulbs. In the first decade of September, the bulbs were transferred to a closed warehouse to be protected from the weather. Here, they were stored in P boxed stacked in 2 rows. The environmental factors (temperature, relative air humidity and air circulation) were solely controlled through ventilation, mostly done at night. It is worth mentioning that the walls were thermallt isolated, thus large temperature changes and frost were prevented.

The boxes were periodically checked in order to detect the eventual outbreaks of diseases.

With the current storage and climatic conditions between autumn-spring 2019, the onion was not affected by frost. Onions have a freezing point of -1.1°C .

The bulbs were stored until the end of January, when the first signs of sprouting appeared. They were sorted before being given to consumption.

Following sorting, unsuitable specimens were removed: sprouted, those affected by diseases.

Qualitativ and quantitative losses when storing onion bulbs are illustrated in table 1.

Table 1

Losses recorded on stored onion bulbs

Type of storage	Storage period months	Losses in weight %	Losses through rotting %	Qualitative losses %	Total losses %
Barn with natural ventilation	5,5	14,6	5,2	6,0	25,8

RESULTS AND DISSCUSIONS

While studying the behaviour of onion bulbs during storage, it was concluded that, when stored in close barns where climatic factors were only conducted through ventilation, the first signs of sprouting appeared after 5.5 months of storage.

Following the analysis regarding the percentage losses after the storage period, it was concluded that they referred to weight, rotting and qualitative. Qualitative losses represent the percentage of sprouted bulbs and dehydrated ones.

Weight losses are due to the fact that optimal values for the environmental factors could not be ensured: temperature, relative air humidity and circulation. Thus, the respiratory activity of the bulbs intensified, especially during the last third of the storage period, when their turgescence began to decrease. It was during this period when signs of disease began to appear: soft, watery, glasst-looking bulbs of different colours (gray, yellow-green). All these simptoms are due to development of diseases: gray rot (*Botrytis allii*), manna (*Peronospora destructor*), wet rot (*Pseudomonas cepacia*), both from the fields and storage spaces.

Thus, losses of 25.8% of the bulb mass were recorded. The highest losses recorded referred to lost weight 14.6%, followed by the qualitative ones (dehydrated and sprouted bulbs) 6%, and then those determined by the development of diseases 5.2%.

To conclude, storing onion bulbs in closed, undeveloped spaces is possible, together with a significant reduction in the retention period. Due to the fact that the management of ambiental factors can only be done through ventilation, favourable conditions for sprouting and the development of pathogens are created. As a result, this method is recommended for households, where small quantities of bulbs are involved, so that the consumption is gradual and a repeated sorting is also performed.

Of course, in order to extend the retention period, the use of spaces equipped with means to adjust the climatic factors is recommended.

CONCLUSIONS

The following conclusions can be drawn:

1. Onion bulbs intended for storage are those obtained from chives
2. The bulbs intended for storage must fulfill certain quality standards.
3. The culture technologies greatly influence the bulbs quality and the storage period.
4. During storage, significant losses were recorded
5. The highest losses are those in weight, due to the intensification of metabolic processes in the bulbs and their tendency to resume their vegetative activity during the last storage period, following a temperature rise in the storage spaces.
6. There were also considerable losses recorded due to the development of pathogens, especially during the last storage period and related to the environmental conditions, when temperature rised. Moreover, once the metabolic processes in the bulbs increased, they became vulnerable to various pathogens.
7. Storing onion bulbs in undeveloped spaces is possible for a time, however, much shorter when compared to other preserving methods.
8. Extended research is recommended on the behaviour of different onion varieties in storage spaces.

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PERSPECTIVES ON TRADE IN AGRO-FOOD PRODUCTS IN THE EU

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Abstract

The EU's trade policy is based on equity and transparency, product diversification, increasing quality and finding new partners in order to remain the world's largest economic power.

Key words: trade, export, partenership, leader, expantion

INTRODUCTION

EU trade policy must be seen in the light of two current realities: the important role that the EU plays in the world and the changes generated by globalization. The EU has the largest economy in the world, is both the largest exporter and importer, the largest recipient of foreign investment and the largest donor in the world¹.

In this context, exports continue to be one of the key factors in job creation in European agriculture and the food industry. Over the last decade, reforms of the common agricultural policy have encouraged the EU's agri-food sector to improve its market orientation and become more competitive. During this period, the EU agri-food sector benefited from the expansion of global value chains, so that the values of agri-food exports doubled and the EU secured its position as a competitive supplier at all levels of the agricultural value chain². EU exports are mainly exports of feed, wine, cereals, meat, olive oil and dairy products. One third of the export value is generated by beverages and food. Although there existed import restrictions imposed by the Russian Federation and food prices fell globally, the performance of agricultural trade in the EU was positive in 2015, with the value of agri-food exports rising to EUR 129 billion and the net trade surplus of EUR 16 billion³.

¹.Humphrey, Albert, The Father of TAM, TAM UK Retrieved 2018-06-03

² Davidovici, I., Gavrilesco, D., (coordonatori) Economia creşterii agroalimentare, Editura Expert, Bucureşti 2002

³.Brata Anca Monica, Politici agroalimentare in Romania, Editura Universitatii din Oradea, 2008,

The key word in EU agri-food trade has been the diversification of export products, which has allowed the EU to maintain a high level of exports and consequently its first position as a world exporter. In addition to finding new markets and consolidating existing ones, quality agreements have been concluded for EU products: one being the Association and Liberalization Agreements concluded between the EU and Morocco in Luxembourg on 21 December 2016, thus increasing export opportunities.

MATERIALS AND METHODS

In 2015, 70% of trade growth came from European economic leaders who witnessed increased imports. Global agricultural production in 2015 remained high due to good harvests. This pushed the basic prices of agricultural products down, with a few exceptions: coffee, cocoa whose prices rose. However, the competitiveness of some exporters remained high due to the evolution of the dollar exchange rate which supported the growth of agricultural trade⁴.

World trade in agri-food products

The ranking of the world's leading exporters of agri-food products remained unchanged in 2015, after the EU28 took the lead. EU28 exports reached 129 billion euros, an annual increase of 5.7%. The US remained an equally strong exporter, selling just 1 billion euros less than the EU28 on world markets. The gap with Brazil, the third largest exporter of agri-food products, is much larger, reaching about half the value of EU28 exports. All the top exporters expanded their exports and therefore contributed to the growth of the global agri-food sector. China has managed to increase global market supply by 21%.⁵

⁴ Hubbard, L., Borrel, B., Global economic effects of the EU Common Agricultural Policy, Economic Affairs, Vol. 20, No. 2, 2000, p. 49

⁵ <https://eur-lex.europa.eu/oj/direct-access.html?locale=ro>

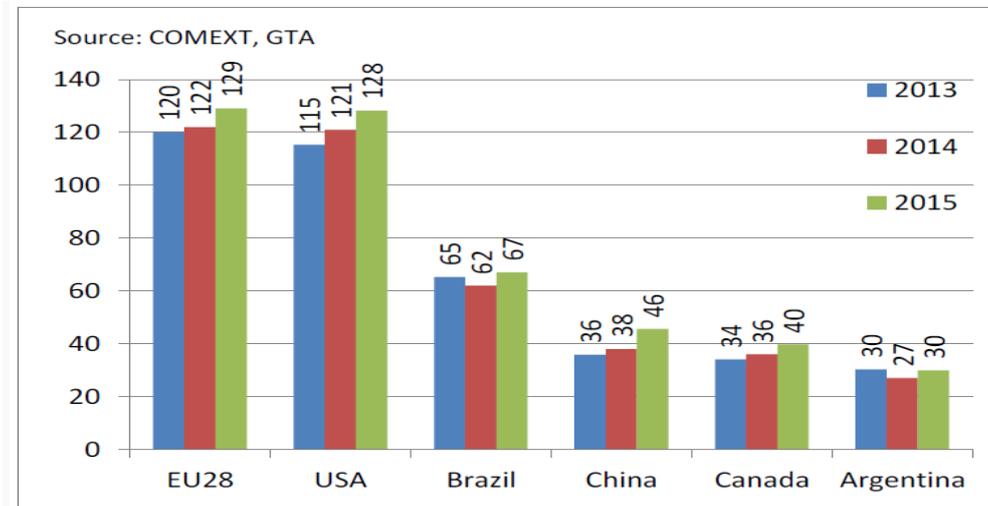


Figure nr. 1 Top exporting countries of agri-food products worldwide

The EU28 is also the largest importer of agri-food products with an import value of 114 billion euros. It is followed by the USA and China, with 110 billion euros and 98 billion euros respectively. The value of Russia's imports fell by a fifth, being overtaken by Mexico in the top importers ranking.

The profile of the main global players in the field of agri-food trade varies: EU28, USA, China and Canada have a strong domestic production of agri-food products, but are also among the top importers. Brazil and Argentina are mainly suppliers, while Japan and Russia are buyers of agri-food products, as illustrated in the figures below⁶.

⁶<https://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:194:0006:0013:RO:PDF>

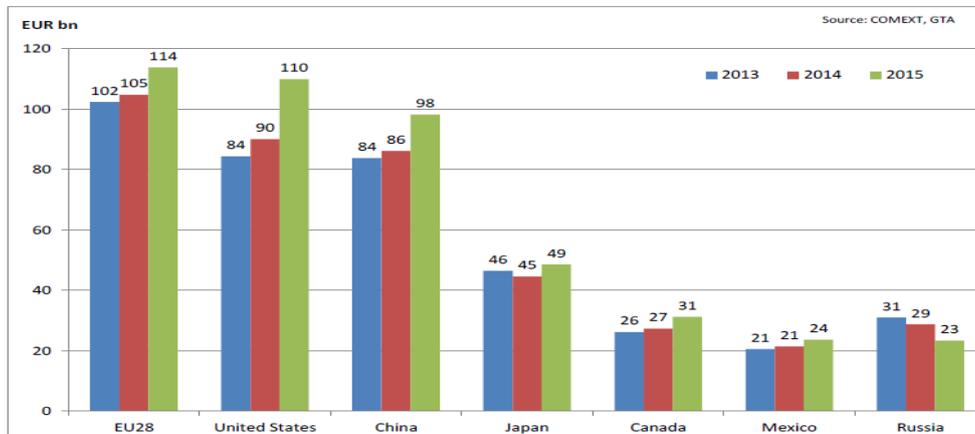


Figure nr.2 Top importing countries of agri-food products worldwide

RESULTS AND DISCUSSIONS

EU agri-food exports

A more detailed structure of the agri-food trade reveals that the EU's export portfolio includes products at various levels of quality and added value. Wine and spirits dominate the range of exported products, each accounting for 8% of total EU28 agri-food exports. In 2015, wheat is still an important product, ranking third, followed by baby food, various foods and chocolate. Compared to the previous year, there were no major changes in the categories of export products. Low market prices helped to reduce the export value for milk powder, so that they could not be offset by the increase in export volume. Exports of wines and spirits are increasingly concentrated in the United States. US consumers buy 32% (up from 30% in 2014) of all European wines exported and 37% of spirits (34% in 2014) sold to third countries⁷.

⁷ https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/trade/documents/map-2016-1_en_0.pdf

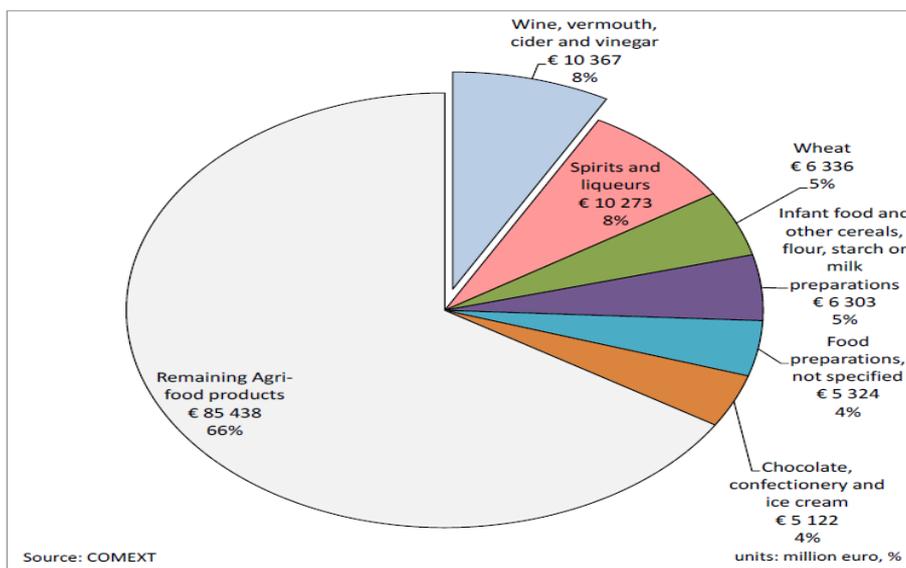


Figure nr. 3 Composition of agri-food products exported by the EU

The top five destinations (USA, Singapore, China, Russia and Canada) imported between 20% and 53% of total exports. China ranks 2nd in EU wine imports (15%) and the top 5 destinations (USA, Switzerland, China, Canada and Japan) would account for 40% of EU wine exports. In terms of EU food exports, China ranks second, and in the case of baby food China and Hong Kong together, it would represent the dominant sales on the market with a share of 33% of the total. In 2015, the highest earnings from the export of spirits and wine were obtained. The export value of these two products together reached 1.5 billion euros. A gain was recorded for a category of cereals, other than wheat and rice, by + 1.2 billion EURO (ie an increase of 68%).⁸

⁸ https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/trade/documents/map-2016-1_en_0.pdf

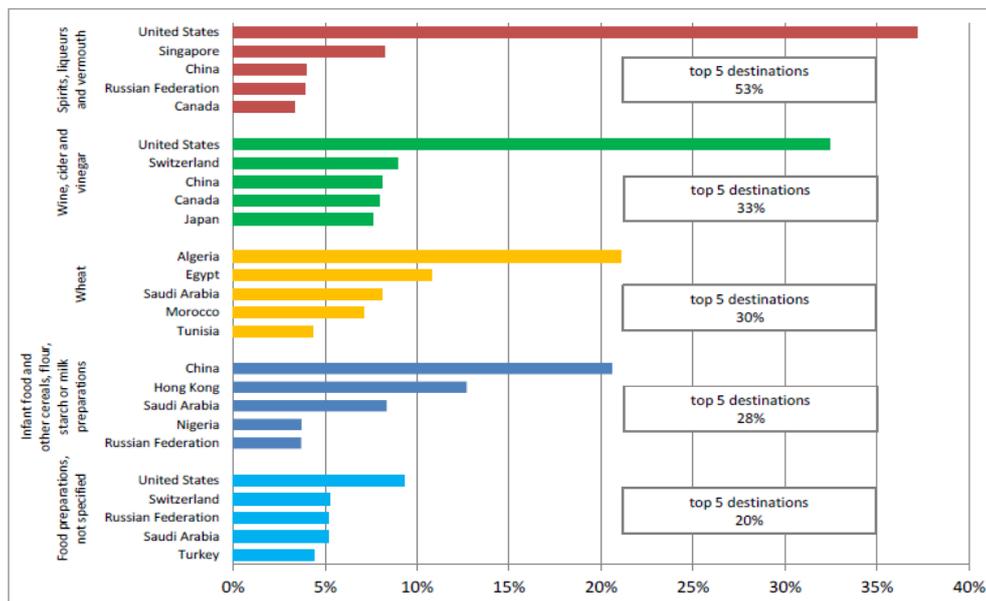


Figure nr. 4 Exports of main products by top destinations

On the other part, the largest decreases in the value of exports in 2015 were recorded for products in the category "agricultural products and feed products", namely: powdered milk, fresh fruit, oilseeds, cheese and sugar.

The largest decrease in export value was recorded for powdered milk, where the value of exports remained EUR 840 million, 17% less than in 2014. Exports of fresh fruit also decreased significantly by EUR 341 million (- 12%). Exports of fruit, vegetable and dairy products were the worst affected sectors due to Russia's import restriction. Fruit exports also suffered from both low prices and low export volumes. In the case of oilseeds, prices were much higher, but the quantity exported decreased.

Imports of agri-food products made by the EU

In essence, the EU imports three main types of products: fruits, nuts and spices; vegetable proteins and fats; Coffee.

Compared to the previous year, the first six categories of imported products remained in the same positions, only fresh fruit and palm oil changed their ranking positions. Imports of palm oil decreased by 21%. The import of palm oil is almost 93%, supplied by five countries. Indonesia delivers half of the EU's demand. Imports of vegetable protein are also very high, with Argentina and Brazil covering 75%.

EU import values in 2015 increased mainly for tropical fruits, nuts and spices. Additional imports, amounting to EUR 2.7 billion, represented a

25% increase in the value of imports of fruit and nuts. The purchase of unroasted coffee was also more than a billion euros higher than the previous year. It is worth mentioning that these are products that cannot be produced in the EU.⁹

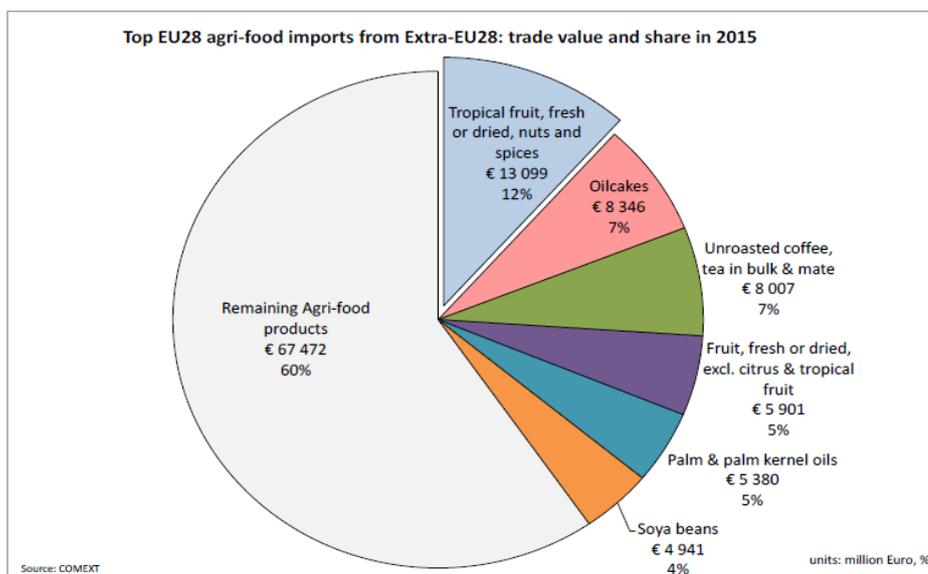


Figure nr. 5 Composition of agri-food products imported by the EU

Olive oil imports led to an increase in import volumes, which was linked to the exceptional circumstances in the olive oil market in 2015. EU olive oil production fell by 42% compared to the previous year, even stocks were low, so the EU was forced to import from countries such as Tunisia, which recorded a surplus in olive oil production. Olive oil production in the EU increased in 2016 and thus imports returned to values close to 2014. Imports of tropical fruits, coffee and vegetables, which were also among the products with the highest import value, with the mention that it remained about the same amount but the price increased.

European imports decreased the most in cereals (other than wheat and rice), oilseeds, sugar, soybeans and palm oil.

⁹ https://ec.europa.eu/info/index_en

CONCLUSIONS

Given the presented data, the EU is the world's largest trading power and will continue to pursue its current strategy based on equity and transparency. Regarding the strategy of trade in agri-food products, the EU also manages to enter an area of new markets, which has brought it into the position of world leader in exports.

The EU remains the leader in imports, but it is worth mentioning that the majority of imported agri-foods cannot be produced in the EU.

In conclusion, the EU believes in an open market and considers trade as part of the solutions for economic development and growth.

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GENERAL CONSIDERATIONS OF LEPTOSPIROSIS AMONG DOGS FROM ORADEA

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Abstract

Leptospirosis is a zoonotic disease caused by Leptospira bacteria. Pathogenic leptospire are morphologically identical, being thin, helical, mobile gram-negative bacteria with one or both ends usually hooked. Leptospire persist in the kidneys and genital tract of animals and are excreted in the urine and genital secretions. Survival outside the host is favoured by conditions of humidity and heat. Transmission is by direct or indirect contact with the carrier. Disruption of animal-to-human transmission is a key factor in the control of human leptospirosis.

Key words: gram-negative, bacteria, zoonoses, dogs, humans

INTRODUCTION

The recognition of leptospirosis as a disease in dogs followed rapidly (1916) after its diagnosis in humans. Subsequently, the condition was described in cattle in 1935 and in pigs in 1939.

While in developed countries poor environmental conditions conducive to the development of leptospire have been largely eliminated from the working environment, improved living standards and increased time off have led to leptospirosis as a risk associated with recreational activities in wet environments such as fishing, navigation and boat racing. Increasing travel opportunities has also made leptospirosis a problem for tourists visiting areas with warm and humid climates, especially in south-east Asia.

Leptospire are thin, helical, mobile gram-negative microorganisms with one or both ends hooked. The length varies between 10 and 20 μm , and the diameter between 0.1 and 0.15 μm , with a coil length of about 0.5 μm . Under unfavourable nutritional conditions, leptospire can be much elongated, while in the presence of high concentrations of salt, in old crops or in tissues, can take coccoid forms of about 1.5-2 μm . They multiply by linear division.

The major cellular components are: an outer shell, which surrounds a cell wall or a complex of peptidoglycans and two polar endoflagellates (one at each end, with subterminal origin).

The taxonomy of leptospires goes through a period of change, which can cause considerable confusion to those unfamiliar with the subject. Until recently, only one genus *Leptospira* was recognized in the family Leptospiraceae. Within the genus, two groups were recognized: those found in animal species (parasitic strains) and those found in water (saprophytic strains). These two groups, which were called *interrogans* and *biflexa*, can be differentiated by growth needs and biochemical reactions. Only parasitic strains are of medical and veterinary interest.

For taxonomic purposes and as an aid to epidemiological studies, parasitic leptospires have been divided into serogroups, based on antigenic kinship determined by cross-agglutination reactions, and further into serovars, depending on the type of absorption agglutination. There are about 23 recognized serogroups that include about 212 serovars.

MATERIAL AND METHOD

Under laboratory conditions, the temperature range in which the pathogens will grow is variable, but they are not grown at temperatures below 13 ° C; optimal growth occurs at a pH of 7.2-7.6.

Leptospires are chemo organotrophic microorganisms that grow on aerobic or microaerophilic media. Oxygen protective agents, such as superoxidismutase and/or sodium pyruvate, are required for the initial isolation of some of the most demanding strains. The low oxygen concentration favours primary isolation and growth on solid media.

The experiment was performed between March 2019 and July 2020 and took place at the Pet Clinic in Oradea. During this period, the incidence of the bacterium among the dogs in the city of Oradea and its surroundings was monitored. Rapid bacterial identification tests were used as diagnostic materials and methods.

RESULTS AND DISSCUSIONS

Out of the 50 puppies that clinically showed common signs of leptospirosis (fever, apathy, lack of appetite, diarrhea, blood in urine) and all were tested for leptospirosis, 5 came out positive.

The vast majority of animal leptospiric infections are subclinical. There are two groups of animals with high probability of developing a clinical infection:

1. young animal;
2. sexually mature, lactating and/or pregnant females.

In cases where accidental leptospiral infection causes a clinical condition in animals, there is a close parallel with those observed in severe forms of disease in humans.

The severe form of the disease is characterized by jaundice, hematuria, hemoglobinuria, signs of kidney damage and meningitis, and infections can be fatal, such as jaundice. In addition, dogs infected with certain serovars, the most common being heatwave, can develop a chronic kidney disease, with massive polyuria and polydipsia.

Post-infection, fatigue problems can have serious consequences for performance animals, such as hunting dogs, greyhounds, racehorses and competition horses.

In the absence of characteristic clinical features, the definitive diagnosis of leptospirosis is dependent on laboratory confirmation. The diagnosis may be necessary not only to confirm leptospirosis as being responsible for the clinical condition, but also for other reasons, including:

- assessment of the infection status and/or the immune status of the population, in order to apply control or eradication programs at local, regional or national level;
- epidemiological studies
- assessment of the infectivity of an individual animal, to determine whether it is suitable for export or to be introduced into an uninfected population.

Diagnostic procedures of leptospirosis are divided into two groups. The first consists of tests to highlight leptospire in the body's fluids and in tissues harvested by biopsy and post-mortem, and the second includes tests for the detection of antibodies.

The principles and technique of the tests are similar in human and animal leptospirosis.

CONCLUSIONS

Most patients with leptospirosis heal within 2 to 6 weeks if they do not have jaundice. The death rate in jaundiced patients depends on the facilities available for the treatment of hepatic and renal insufficiency and the early initiation of penicillin treatment.

Patients who survive renal and myocardial insufficiency from severe leptospirosis usually recover completely in 6 to 12 weeks. Convalescence can be prolonged (up to 6 months), and up to 10% of patients report recurrent headaches and uveitis for several years.

In animals, the prognosis is very good if they did not show jaundice. Animals that abort due to leptospiral infection have an extremely low

probability of aborting again at a later stage due to an infection with the same serotype.

The prophylactic strategy in animals must minimize contact with carrier animals, by avoiding common sources of watering and providing separate shelters.

Also as a prophylactic measure, the annual vaccination of dogs against leptospirosis is especially important.

In dogs tested positive with leptospira, the necessary measures will be applied to reduce the direct physical contact between animal and human. The owner must be informed about the severity and aggressiveness of the zoonosis on him and the use of protective equipment will be mandatory.

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BIOACTIVE COMPOUNDS IN FRESH GARDEN VEGETABLES

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Abstract

Plant-based foods are rich in bioactive compounds such as flavonoids, anthocyanins, tannins, betalains, carotenoids, plant sterols and glucosinolates. These compounds were extensively investigated due to their benefits for human health, and their positive effects as cardioprotector and hepatoprotector as well as the anticarcinogenic effect were widely discussed. Six tomatoes and three pepper types were investigated in this study regarding their bioactive content. All the methods applied were spectrophotometric. The total phenolic content ranges from 29.3 mg GAE/100g in cherry tomatoes to 199.2 mg GAE/100g in kapia pepper. Flavonoids content ranges from 3.1 mg QE/100g in pink tomato to 28.9 mg QE/100g in kapia pepper. The pigment content of the tested vegetables shows, as expected, that green pepper practically is deprived of lycopene and β -carotene. In all other tested samples lycopene is predominant over carotene, much more obvious for tomatoes than for peppers. The highest lycopene content was determined in Sultana tomato TS (234 μ g/g) and kapia pepper (201.8 μ g/g) and the highest β carotene content in red pepper (139 μ g/g). The tomatoes' vitamin C content ranges from 27.9 mg% to 55.8 mg% and is much higher in all pepper samples, from 94.3 mg% to 98 mg%. The experimental results of the study showed that fresh tomatoes and peppers are a valuable source of bioactive compounds in our diet. Among the tested vegetables, kapia pepper type showed the highest investigated bioactive compounds content.

Key words: tomatoes, peppers, phenolics, vitamin C, lycopene, β -carotene

INTRODUCTION

Given the fact that food quality highly affects human health, the studies regarding their specific composition are conducted on both animal and vegetal foodstuff. The latter are rich in bioactive compounds such as flavonoids, anthocyanins, tannins, betalains, carotenoids, plant sterols and glucosinolates. They are defined as components of food that have an impact on physiological or cellular activities in the humans or animals that consume such compounds (Walia et al., 2019)

A healthy diet includes the consumption of fruits and fresh vegetables, such as tomatoes and peppers. The use of greenhouses enabled the consumption of fresh produce all year long.

Tomatoes (*Lycopersicon esculentum* Mill.) have been cultivated in Europe, in the Mediterranean countries since the 16th century, nowadays

being the most important garden crop. A large number of tomatoes and pepper cultivars are proposed to consumers and they provide important health benefits due to their rich bioactive components. Regarding tomatoes we can nominate carotenoids such as β -carotene, a precursor of vitamin A, and mostly lycopene, which is responsible for the red colour. As a matter of fact, tomatoes and tomato-based products account for over 85% of all the dietary sources of lycopene (Pinela et al., 2016). They are rich also in vitamins especially ascorbic acid, tocopherols and phenolic compounds including hydroxycinnamic acid derivatives and flavonoids. Analytical methods of antioxidants extraction and determination in vegetables were reviewed by Garcia – Salas et al., 2010 and Gomez-Romero et al., 2007.

Peppers can be very diverse in shape, colour and taste. They belong to the genus *Capsicum*. *C. annuum*, *C. frutescens*, *C. chinense*, *C. pubescens* and *C. baccatum*. *C. annuum* is the more common as garden or field crop. Peppers provide a large type of phytochemicals as pigments (carotenoids and anthocyanins), vitamins, phenolic acids and flavonoids (Abdul-Hamed et al., 2019). Capsaicinoids are responsible for the pungent taste of some bell peppers (Nagy et al., 2015).

The bioactive content can be affected by a lot of factors in both investigated vegetables. We can mention the maturity stage (Duma M et al., 2018), environmental and genetic cultivar or variety factors (Medina-Juárez et al., 2012, Mladenovics et al., 2014), geographical location and agricultural practices (Ulrichs et al., 2008) or processing conditions (Devanand et al., 2006, Kacjan Maršić et al., 2009, Mirdehghan and Valero, 2016).

A lot of scientific studies reveal the health benefits of the bioactive compounds contained in the above-mentioned horticultural products by direct consumption or through singular and combined extracts. Positive effects, such as cardioprotection and hepatoprotection, as well as the anticarcinogenic effect were under discussion. (Pinela et al., 2016). Nevertheless, the role of bioactive compounds in human health is not completely clarified by scientific studies and further investigations are needed in order to reveal their potential (Walia et al., 2019).

The aim of this study was to determine and to compare the amount of bioactive compounds content in some tomato and peppers genotypes cultivated in the Oradea area.

MATERIAL AND METHOD

Material

The tested material comprises six tomato types and three pepper types, coded as follows:

- round cherrytomato (TRC), oblong cherry tomato (TOC), oblong summer tomato (TOS), pink tomato(TP), Sultanatomato (TS), autumn tomato(TA)
- Yellow pepper (PY), red pepper (PR), Kapia pepper (PK)

The vegetables were cultivated during the summer of 2019 in private gardens from Biharia and Oradea. The experiments were conducted in the food control laboratory of the Food Engineering Department, Environmental Protection Faculty, University of Oradea.

Methods

Ethanol (50%) was used for phenolic extraction in a 1:10 ratio for both Total Phenolic Content (TPC) and flavonoids (FL) determination, after an appropriate dilution. TPC was determined using Folin-Ciocalteu spectrophotometric method developed by Singleton and Rossi (1965) and adapted for vegetables by Moigrădean et al., 2007. The reaction mixture contains the appropriate diluted extract, Folin-Ciocalteu reagent and sodium carbonate 7.5%. After 2 hours the absorbance was read at 750 nm. Gallic acid, from 0.2 to 1.2 $\mu\text{M}/\text{mL}$ was the used standard and results were expressed as mg GAE/100g FW.

FL was determined using the spectrophotometric method based on the formation of chelated compounds between flavonols, flavonols and aluminum chloride in methanol. (Kroyer and Molnar, 2011, Bahorun et al., 2004). The absorption of the reaction mixture containing ethanol extract, NaNO_3 25%, $3 \text{ AlCl}_3 \cdot 6\text{H}_2\text{O}$ 10% and NaOH 1M was read at 510 nm against reagents blank. The used standard was quercetin 0-100 mg/L in methanol and results were expressed as mg QE/100g FW.

The pigments, β -carotene and lycopene were extracted in a hexane:ethanol:acetone 2:1:1 mixed solvent (Sharma and Le Maguer, 1996). The absorbance of the organic layer, dried on anhydrous sodium sulphate, was read at 450 and 502 nm. Calculations were performed by Abdul-Hammed et al., 2012 method, β -carotene = $(1.483 \times A_{450} - A_{502}) / 1.798 \times 10^5$ and lycopene = $A_{502} / 1.72 \times 10^5$.

Vitamin C was extracted with metaphosphoric acid and spectrophotometric determined by Beltran-Orozco et al., 2009, method. Ascorbic acid reacts with 2,6-dichlorophenol indophenol (DCPIP) which changes its colour from blue to colourless in acetate buffer (pH4) environment. The reaction product was extracted in xylene and the absorbance read at 520 nm. Pure ascorbic acid between 0.1 mg/mL and 1 mg/mL concentration was used for the calibration curve.

The results represent the mean of two determinations at each sample for all tested parameters.

RESULTS AND DISCUSSION

Figure 1 presents the TPC and FL content of the tested samples. Regarding phenolic content, the values range from 29.3 to 199.2, the highest being determinate in red colour peppers. The registered values for tomatoes in our study are higher than the ones reported by Moigradean et al., 2007 (16 - 23 mg GAE/100 g) or Duma et al, 2018 (max 12.7 mg GAE/100 g for green house tomatoes).

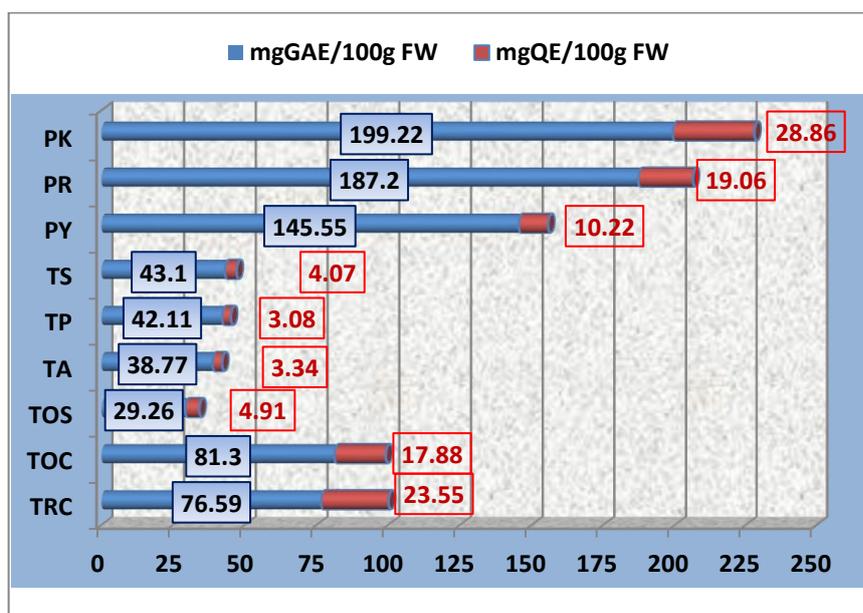


Fig.1 –Total phenolic and flavonoids content

They are in agreement with the ones found by Helyes and Pek, 2006 (33 - 48 mg GAE/100 g), aside from cherry tomatoes, where we determined a double TPH content. In what regards peppers, our experimental values are higher than the ones found by Shotorbani et al 2013 for yellow (30 mg GAE/100 g) and red (90 mg GAE/100 g) peppers and comply to those reported by Zhuang et al, 2012 (107 to 499 mg GAE/100 g).

As for the FL content, it ranges from 3.1 to 28.9 mg QE/100 g FW. Again, red pepper varieties present the highest values, but cherry tomatoes are close (23.5mg QE/100 g). Others tested tomato varieties revealed up to a six times lower FL content, which complies with Shotorbani et al 2013 (2.5 to 7.5 mg QE/100 g FW). However, the comparisons are rather difficult due to the differences of experimental procedures or the results expression.

Figure 2 shows the pigment content of the tested vegetables and, as expected, green pepper practically is deprived of lycopene and β -carotene.

In all cases lycopene is predominant over β -carotene, much more obvious for tomatoes than for peppers. The highest lycopene content was determined in tomato TS (234 μ g/g) and pepper PK (201.8 μ g/g) and the highest β -carotene content in PR pepper (139 μ g/g).The differences in pigment content among the tested tomatoes types are significant.

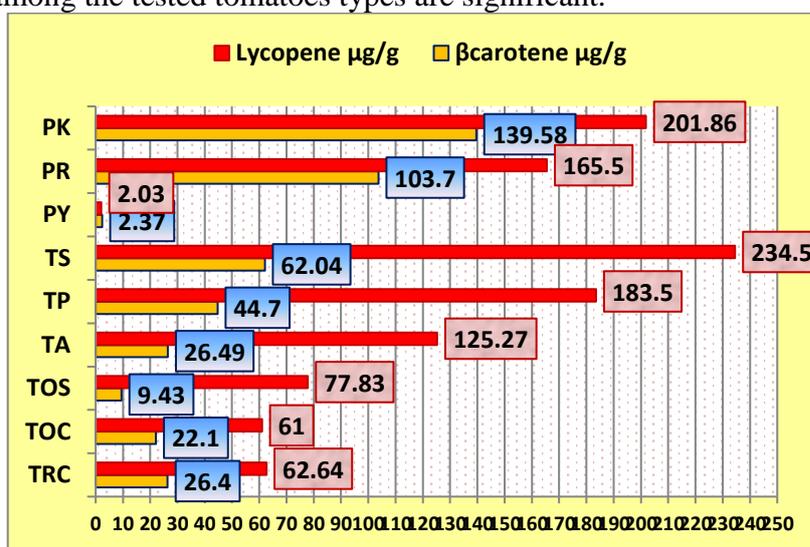


Fig.2 – The pigment content

Therefore the values range from a minimum 61 μ g/g to a maximum 234 μ g/g for lycopene and for from 9.4 μ g/g to 62 μ g/g for β -carotene. That is not an unusual situation, Duma et al, 2018 reported for red mature tomatoes lycopene content from 31 to 270 μ g/g and Mladenovic et al., 2014 reported for β -carotene values from 0.5 to 45 μ g/g.

The experimental results presented in figure 3 refer to vitamin C content of the tested vegetables. They show a double amount of vitamin C for all tested peppers than tomatoes, with a maximum of 98 mg% in PR.

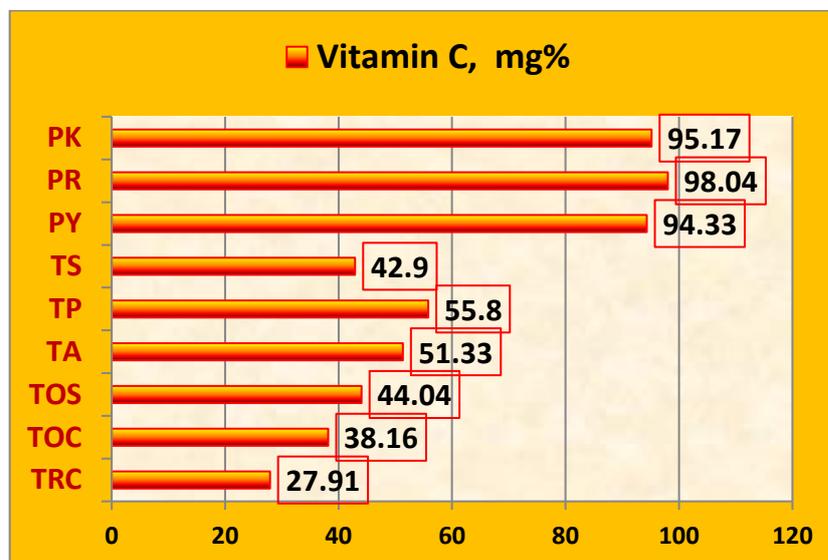


Fig.3 – The vitamin C content

The vitamin C content of tomatoes ranges from 27.9 mg% to 55.8 mg%. The results of our experiment complies with the ones reported by Chavez-Mendoza et al, 2013, for peppers(135 mg/%)and fortomatoes by Valšikova, et al, 2010, (max 34,5 mg%), Duma et al, 2018 (max 22.8mg%) or Mladinovic et al., 2014 (max 37mg%).

CONCLUSIONS

The experimental results of the study lead to some conclusions starting with the fact that fresh tomatoes and peppers are a valuable source of bioactive compounds in our diet. Among the tested vegetables, kapia pepper type showed the highest investigated bioactive compounds content.

Considering total phenolic content, peppers show significant higher content than tomatoes, kapia pepper being the leader as well as for flavonoids content. In the same time, we can observe a great variability among the tested tomatoes types referring to their phenolic content.

Peppers also lead in terms of vitamin C content and there is no significant difference regarding vitamin C between tomatoes tested types.

Besides green pepper, all tested vegetables are an important source of pigments. Peppers are a better source of β -carotene than tomatoes and their lycopene content is at the same level as in some tomato types, which showsignificantly different values for this parameter.

These conclusions emphasise the fact thatthe content of bioactive compounds in tomatoes and pepper is strongly dependant on the variety and,

for a balanced diet, the consumption of a wide variety of vegetables is advisable.

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COMPARISON BETWEEN THE MAXIMUM INCLUSION OF ESSENTIAL FATTY ACIDS IN YOGHURT COMPARED TO MATURED SPUN PASTE CHEESE

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Abstract

The aim of this study was to obtain dairy products enriched in essential fatty acids $\omega 3$ and $\omega 6$. Two products were chosen from two different classes of dairy products, from the class of acidic dairy products and cheeses, respectively yogurt and matured cheese with scalded paste. Aceste produse au fost fabricate în sistem de manufactură. As raw material was used sheep's milk from the first lactation period to which was added fish oil, rich in essential fatty acids in a proportion of 0.05%;0.10% and 0.15%. To incorporate the fish oil into the fat globule of the milk, it was homogenized. The technological processes for obtaining dairy products were the classic ones, but in the case of cheese, the maturation was accelerated by increasing the temperature by 2-3 ° C to protect the essential fatty acids. Thus, three samples of yogurt and three samples of ripened spun paste cheese enriched in essential fatty acids were obtained. It has also been made, and a control sample, without the addition of fish oil to comparație.

The fatty acids were analyzed by gas chromatography. The concentration of fish oil added to milk at the maximum limit of incorporation of three essential fatty acids that are specific for both the composition of sheep's milk and fish oil has been determined statistically. Thus, in the case of yogurt for the three essential fatty acids, the following values were obtained: for linoleic acid 2.8978, linolenic acid 1.2708 and γ -linolenic acid has no maximum limit. In the case of ripened spun paste cheese, the situation is as follows: for linoleic acid 0.2250, linolenic acid 1.3741 and γ -linolenic acid 1.3002.

Key words: ripened spun paste cheese, sana, essential fatty acids

INTRODUCTION

Acidic dairy products are important sources of probiotics due to their content in live lactic acid bacteria. Also, both acidic dairy products and cheeses are prebiotics because they are rich in proteins rich in essential amino acids that favor the action of probiotics in the body but are also beneficial for the optimal functioning of the human body.

Lactic acid bacteria (LAB) are prestigious bacteria that have reserved their position as a biotechnological tool due to the probiotic properties that characterize many of them, as well as the ability of LAB to produce many valuable compounds with significant applications in the food

and pharmaceutical industry. Bacteriocins are one of the important products produced by various bacteria and also by LAB. Bacteriocins are peptides that have different applications in the processing and preservation of food and many marketed products. More than that,, current and future applications of bacteriocins are expanding in the pharmaceutical and medical fields as promising agents of resistant anti-drug bacteria, anticancer agents and antivirals agents. (Ghoson M. Daba, 2020).

The diversity of non-starter lactic acid bacteria (NSLAB) isolated from various artisanal dairy products made from raw cow's, sheep's or goat's milk in the countries of the Western Balkans is extensive. 28 species of non-starter lactic acid bacteria and a large number of strains belonging to the genera *Lactobacillus*, *Lactococcus*, *Enterococcus*, *Streptococcus*, *Pediococcus*, *Leuconostoc* and *Weissella* were isolated from different dairy products. Over 3000 LAB strains have been obtained and characterized for their technological and probiotic properties, including milk acidification and coagulation, aromatic compound production, proteolytic activity, bacteriocin production and competitive exclusion of pathogens, exopolysaccharide production, aggregation capacity and immune effect. (Amarela Terzić-Vidojević, 2020).

A by-product of the cheese industry - whey, is often used as a source in the production of microbiological lactic acid. However, a microbial activity that occurs naturally in whey causes an imbalance in the microbiological processes in the technological process. Thus, the whey solution containing lactose was indicated as a suitable medium for the production of lactic acid, these being a good preservative. (Magdalena Lech, 2020).

The serum proteins in the milk composition can be extracted by incorporating lactic acid into their hydrophobic structure. They can find applications in wound healing but can also be used as growth factors during bone or cartilage regeneration. (Josephine Delmote, 2017).

Antioxidant micronutrients and extra intake of essential fatty acids appear to have a protective effect in some diseases such as cardiovascular disease, cancer and asthma (Miriam Isabel Souza dos Santos Simon, 2020).

Fish is a pure protein resource but also an essential fatty acid. For a balanced diet, Romanians should eat about two meals of fish a week. According to statistics, at the moment in Romania we consume, on average, a fish meal every three weeks, which is extremely low given the benefits of this food among consumers of all ages categories (Morna Anamaria, 2017).

The enrichment of products in fats rich in essential fatty acids also determines the improvement of their qualities from a rheological point of view. (Morna Anamaria, 2018).

MATERIAL AND METHOD

In order to obtain two milk products for analysis was used sheep milk collected from a sheep farm in Bihor. It chose april because this period is characterized by a low content of milk components. In particular, the fat concentration of the milk is taken into account because it is intended to incorporate essential fatty acids into the fat globules of the milk. Therefore, to enrich the products in essential fatty acids, tuna liver oil is added to milk. After that, the mixture of fish oil and sheep's milk is homogenized in a three-stage homogenizer. This operation aims to incorporate the fat of the fish oil together with the lactic fat into the fat globule of the milk. This product will be the raw material for the manufacture in the manufacturing system of 4 samples of yogurt and 4 samples of matured spun paste cheese. The concentration of fish oil is progressive because it will appreciate both the organoleptic characteristics of the products obtained but especially the maximum point of incorporation of essential fatty acids in the fat globule in the composition of sheep's milk.

For milk raw material, the acidity was determined, using the titratable acidity analysis method, the fat percentage using the acid-butyrometric method, the density with the areometric method. Also the physico-chemical parameters of the milk were analyzed in electronic system using the LatoStar machine and in order not to block the machine it was necessary to determine the acidity of the milk with the boiling test.

In order to protect the unsaturated fatty acids from the composition of dairy products, the technological process was intervened by reducing the maturation period of the cheese samples. The acceleration of the ripening of the cheese was obtained by increasing the ripening temperature by approximately 2-3 °C .

Both the yogurt and ripened spun paste cheese samples were analyzed, from an organoleptic point of view, by 5 unauthorized persons. S-a urmărit gustul, aroma dar și textura produselor.

The acidity of the finished products was performed with the titratable method, the determination of the fat percentage by the acid-butyrometric method and the percentage of dry matter by the oven drying method. The percentage of salt in the cheese was determined using the Mohr method.

19 fatty acids from the composition of the dairy samples were analyzed by gas chromatography. In particular, the proportion of essential fatty acids is taken into account.

Statistical analysis of the data was performed using the Anova method of comparison between samples but also samples with control sample, without the addition of fish oil. Pentru determinarea limitei maxime

de ulei de pește adăugat în lapte pentru înglobarea acizilor grași esențiali în globula de grăsime a laptelui s-au folosit curbele R.O.C. (Receiver Operator Characteristic).

RESULTS AND DISCUSSIONS

The coding of the samples is presented in table no.

Table 1

No. crt.	Add fish oil %	Coding of samples	
		Yogurt	Ripened spun paste cheese
1	0	l ₀	Cm ₀
2	0,0,5	l _{0,05}	Cm _{0,05}
3	0,10	l _{0,10}	Cm _{0,10}
4	0,15	l _{0,15}	Cm _{0,15}

From the point of view of physico-chemical differences were not observed between the samples with the addition of fish oil and those without added.

Dairy products were sensory analyzed by three unauthorized persons. The taste and aroma of fish oil is perceived, but it disappears, in the case of yogurt after 2 days of storage and in the case of cheese when ripe.

Gas chromatography analyzed 19 grouped fatty acids depending on the category, in saturated fatty acids (SFA), monounsaturated fatty acids (MUFA) and polyunsaturated fatty acids (PUFA).

The evolution of these three groups of fatty acids in the samples is shown in Figure 1.

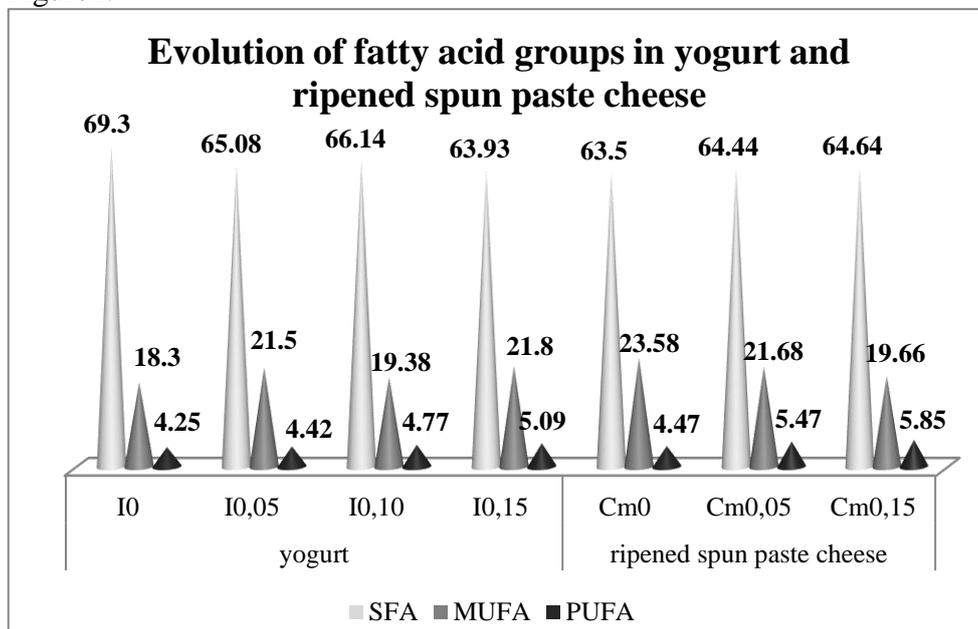


Figure 1. Evolution of fatty acid groups in yogurt and ripened spun paste cheese samples with and without added fish oil

Figure 1 shows that the proportion of SFA in sample I₀ is 5.8% higher than in Cm₀, in I_{0,05} it is higher by 0.64% than Cm_{0,05} and in sample I_{0,15} it is lower than in Cm_{0,15} with 0.71%. The proportion of MUFA evolves as follows: In sample I₀ it is lower by 2.14 compared to Cm₀, in I_{0,05} it is lower by 0.18% than Cm_{0,05} and in sample I_{0,15} it is higher by 21.4 than in Cm_{0,15} while the proportion of PUFA is higher in all cheese samples compared to yogurt.

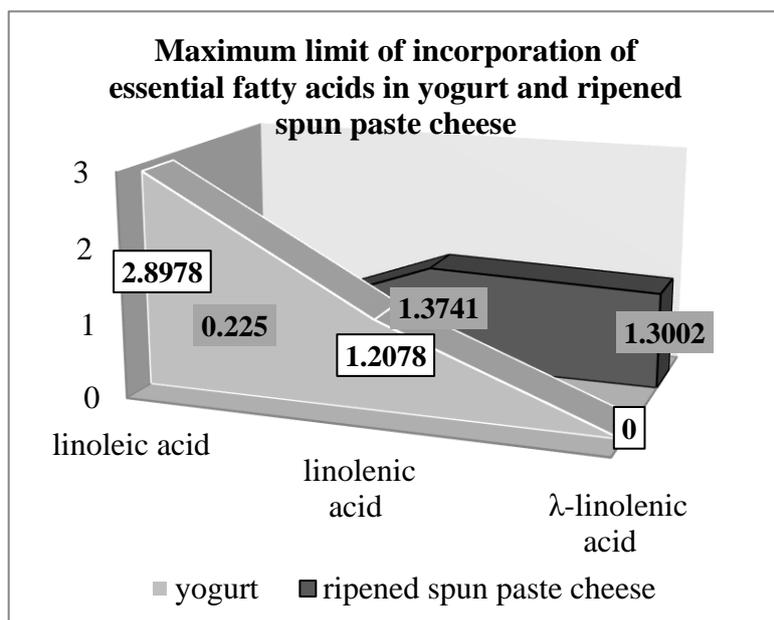


Figure 2. Maximum limit of incorporation of essential fatty acids in yogurt samples compared to those of ripened spun paste cheese

Figure 2 shows that in the case of yogurt there is no maximum globular limit of λ -linolenic acid. This is probably due to the high temperature pasteurisation of milk which can lead to thermal cleavage of the fat globule membrane. As can be seen, the maximum limits for the incorporation of the three essential fatty acids are higher in yogurt samples compared to those of ripened spun paste cheese.

CONCLUSIONS

Comparing the process of obtaining yogurt with that of ripened spun paste cheese enriched with essential fatty acids, it turns out that although the limit of entrainment of essential fatty acids is higher in the case of yogurt compared to ripened spun paste cheese, the proportion of polyunsaturated fatty acids is higher in all samples.

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THE RHEOLOGICAL BEHAVIOR OF BITTER CHOCOLATE AT DIFFERENT TEMPERATURES

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Abstract

The objectives we started from to achieve the purpose of the paper were: analysis of the variation of the apparent viscosity of chocolate depending on temperature and shear rate, quantification of the size of Casson mathematical model parameters affected by state variables: temperature and bitter chocolate ingredients.

The rheological properties of chocolate are important in determining the quality of the final product. Melted chocolate is known to exhibit non-Newtonian behavior and the same behavior was observed in this paper.

The four samples of bitter chocolate have ideal pseudo-plastic and thixotropic properties, because after removing the shear stress the initial viscosity is not restored, an irreversible structural change taking place.

These results indicate that these four melted chocolate samples have the same sensitivity to viscosity as the temperature increases.

Key words: bitter chocolate, viscosity, Casson mathematical model.

INTRODUCTION

Accurate knowledge of the rheological properties of food is essential for product development, sensory evaluation and design, quality control and evaluation of process equipment.

The flow behavior of a fluid and semi-solid food can vary from Newtonian to non-Newtonian depending on time, depending on the origin, composition and behavior of its structure (Trávníček et al., 2016; Hlaváč et al., 2016; Kumbár et al., 2017). This behavior is necessary for modeling.

Rigorous knowledge of rheological behavior is also very important for chocolate (Bozkurt and Icier, 2009; Gonçalves and da Silva Lannes, 2010).

In particular, the temperature dependence of the flow properties is very important for the processing of liquid chocolate as a topping or filling (Quiñones Muñoz et al., 2011; Božiková and Hlaváč, 2013; Glicerina et al., 2013).

Most researchers have studied the rheological characteristics of chocolate reported as a non-Newtonian plastic liquid with incredible yield stress (Ačkar et al., 2015; Cikrikci et al., 2017).

Many papers treat mixtures of rheological behavior of cocoa and supplements (hydrocolloids, milk, butter, or other fats) and have used many mathematical models: the Casson model, the Windhab model, the Carreau model, and the power law model (Fernandes et al., 2013; Baker et al. ., 2006; Glicerina et al., 2013).

The protective effect of cocoa flavonoids on the heart and blood vessels has been reported for a long time and is associated with their ability to change the course of many pathological processes in the development of cardiovascular disease (Alberts, et al., 2006; Briggs, et al., 2004).

There is strong evidence that a high intake of cocoa lowers blood pressure, improves vascular endothelial function and potentially increases insulin sensitivity (Graef et al., 2011).

With the increase in calories in chocolate consumption, a careful risk-benefit analysis is needed to assess whether consumption of cocoa in the form of energy-dense chocolate products can produce a net benefit on the risks (Fernandes, et al., 2013).

MATERIAL AND METHOD

The aim of this paper is to evaluate the rheological behavior of Poiana, Kandia, Roshen and Milka bitter chocolate.

The control of the rheological properties of chocolate is important, because the viscosity of chocolate is given by its liquid consistency, respectively how thick/dense/fluid the liquid chocolate is.

The rheological properties of chocolate are important in the manufacturing process to obtain high quality products with a well-defined texture.

The objectives I started from to achieve the purpose of the paper were: analysis of the variation of the apparent viscosity of chocolate depending on temperature and shear rate, quantification of the size of Casson mathematical model parameters affected by state variables: temperature and chocolate ingredients.

Four brands of bitter chocolate were purchased from the Auchan supermarket in Oradea. Commercial chocolates were used to ensure repeatability and standardization. The four brands of dark chocolate used are the following:

- ✚ Chocolate 1: Poiana bitter chocolate, manufactured by Mondelez România SA produced in Bucharest.
- ✚ Chocolate 2: Kandia bitter chocolate, manufactured by Kandia Dulce SA, produced in Bucharest.
- ✚ Chocolate 3: Roshen bitter chocolate, manufactured by Roshen SA, produced in Ukraine.

- Chocolate 4: Milka bitter chocolate, manufactured by Mondelez Romania SA produced in Bucharest.

Viscosity measurements were performed on melted chocolate samples at two temperatures (50, 55° C), with Brookfield viscometer (Brookfield Engineering Inc, Model DV E) and 6 different Rpm speeds (6, 12, 30, 50, 60, 100) with LV 3C axis no. 67.

Before testing, I crushed and divided the chocolate tablets as follows: 20% I left them in a solid state, 80% I melted them on a steam bath, stirring constantly.

We checked the temperature with a technical thermometer, but without exceeding the melting temperature of 55° C of the bitter chocolate.

When the chocolate reached the melting temperature, I added the remaining 20% chocolate in a solid state and mixed until I reached the working temperature of 50° C and 55° C, respectively.

RESULTS AND DISCUSSION

The first part of the results includes the analysis of the rheological behavior of melted bitter chocolate at different temperatures.

All samples show the same shear force, regardless of temperature, under conditions of a constant shear rate.

The viscosity of liquid chocolate samples decreases with increasing temperature.

The results obtained at a constant torsion (73.98%) frame chocolate as a thixotropic non-Newtonian liquid.

Thus, all melted chocolate samples, regardless of the manufacturer, are non-Newtonian, thixotropic time-dependent liquids, which suffer from decreases in viscosity, with increasing temperature at a constant shear rate.

Melted chocolate exhibits non-Newtonian behavior and the same behavior was observed in this paper.

Next, we presented the analysis of the rheological behavior of the melted chocolate samples at different temperatures.

As Rao (2014) wrote, the Casson model is considered a mathematical equation that describes rheological data, such as shear rate versus shear force, in a basic shear diagram, and provides a convenient and concise way to describe its data.

In addition, it is important to quantify how model parameter sizes are affected by state variables: temperature and chocolate ingredients (Rao, 2014).

The value of the Casson yield is important to determine the flow rate of chocolate (Beckett, 2000).

Analyzing the results, the apparent viscosity of the melted chocolate samples decreased in all brands as the speed and shear strength increased.

The apparent viscosity is inversely proportional to the shear rate and shear stress.

The viscosity of the melted chocolate samples, regardless of brand, was affected by temperature. The increase in temperature has led to a decrease in viscosity.

The yield value of Casson (Pa) decreased, with increasing temperature, in all samples of melted bitter chocolate.

Figures 1 and 2 show the typical graphs of shear force and shear rate of melted chocolate samples. The flow curves of melted chocolates show us that they are non-Newtonian liquids that exhibit non-ideal plastic behavior; when the yield value has been exceeded, thinning of the shear occurs, the elastic deformation ceases and the plastic deformation is installed.

The flow curve of the melted chocolate sample shows the measurement of the shear force as a function of increasing the shear rate.

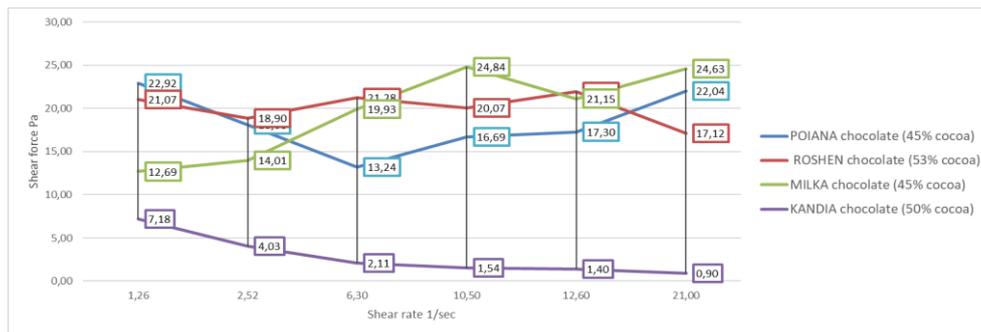


Fig. 1. Comparison of flow curves of melted chocolate samples at 50°C

The four samples show stress yield.

The stress increases linearly as the speed of shear or deformation increases. The flow of melted chocolate belongs to the Casson model.

The characteristics of the flow include Kandia chocolate as a pseudoplastic liquid, and Milka, Roshen and Poiana as plastic liquids.

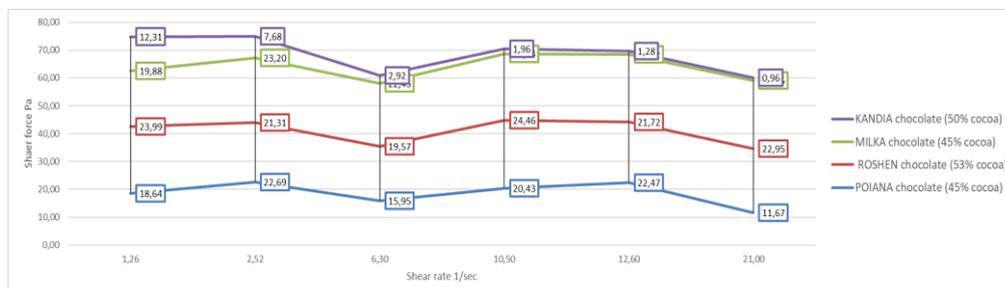


Fig. 2. Comparison of flow curves of melted chocolate samples at 55°C
 Increasing the temperature to 50° leads to a decrease in shear stress in the case of samples of bitter melted chocolate.

The Casson rheological parameters of the melted chocolate samples calculated as a function of temperature are shown in Figures 3 and 4.

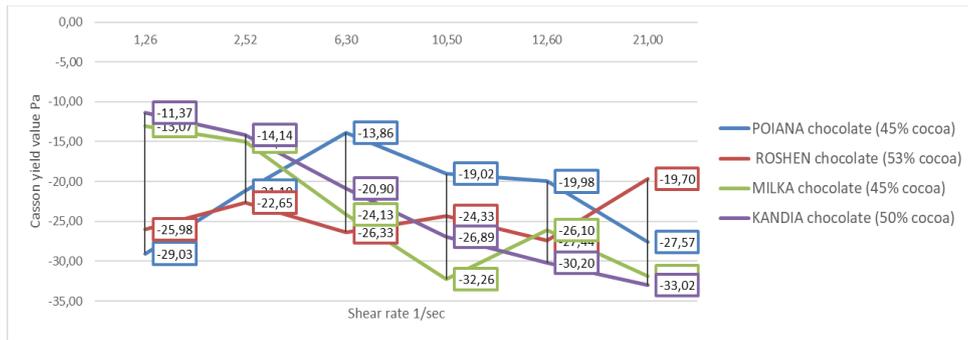


Fig.3. Casson yield value in samples of melted chocolate at 50°C

Casson efficiency is a material property that characterizes the minimum shear force required to induce flow.

It expresses the low properties of the chocolate's shear force and is influenced by the specific surface, particle fraction, emulsifiers and moisture, particle-particle interactions (Afoakwa et al. 2007, 2008, 2009; Abbasi et al. 2009).

The highest value of the Casson yield was for Kandia chocolate (-11.37 Pa), followed by Milka chocolate (-13.07 Pa) at the shear rate of 1.26 s⁻¹ and the temperature 50°C, showing us the direct connection between the flow and the flow rate of the liquid.

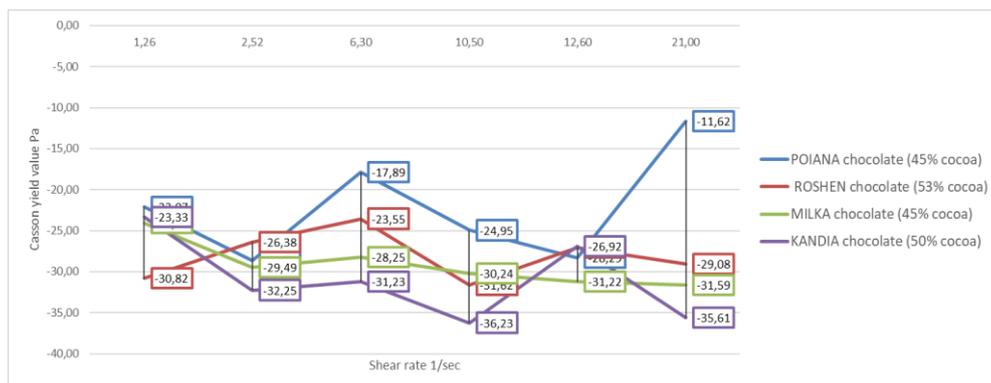


Fig.4. Casson yield value in samples of melted chocolate at 55°C

Increasing the temperature to 55°C led to a decrease in the yield value of Kandia chocolate (-23.33 Pa) and Milka (-24.05 Pa), both at the

minimum shear speed of 1.26 s^{-1} and at the maximum shear speed 21.00 s^{-1} : Milka - 31.59 Pa and Kandia - 35.61 Pa, as the elastic deformation ceases and plastic deformation sets in, the viscosity of the liquid chocolate samples decreasing with increasing temperature.

The flow behavior of chocolate and the yield value are influenced by the ingredients.

Yield values increased due to the presence of lecithin, while plastic viscosity decreased.

The relationship between temperature, shear rate and viscosity of chocolate samples is shown in Figures 5 and 6.

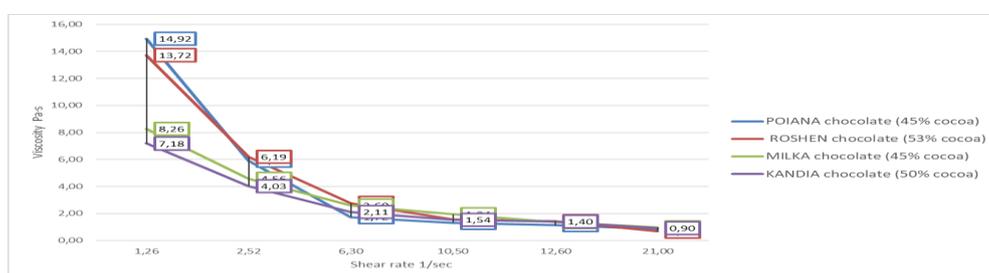


Fig. 5. Efectul temperaturii (50°C) asupra vâscozității probelor de ciocolată

The viscosity of melted chocolate samples decreases at a similar rate as the temperature increases.

Of all the samples of melted chocolate, the highest plastic viscosity was obtained in the Poiana chocolate sample (14.92 Pa) at a temperature of 50°C and a shear rate of 1.26 s^{-1} .

In general, the viscosity of chocolate will obviously increase if the content fat is reduced to a certain limit (Newtonian flux).

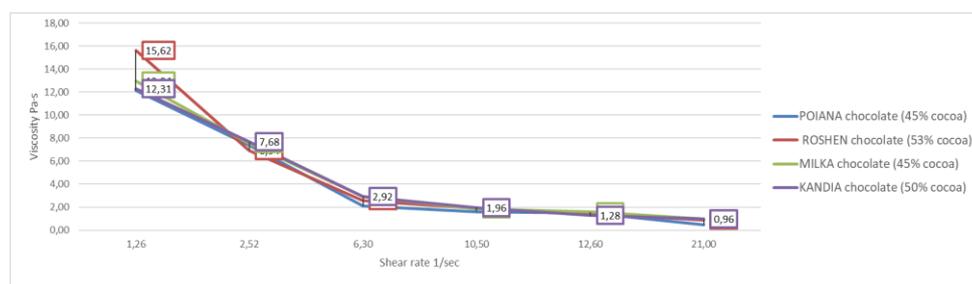


Fig.6. Efectul temperaturii (55°C) asupra vâscozității probelor de ciocolată

Figures 5 and 6 show that the melted chocolate samples exhibit a shear and thixotropic behavior.

By analyzing the viscosity curves in the four chocolate samples, they can be classified as pseudoplastic liquids.

The viscosity of chocolate depends on the content of cocoa butter at a certain temperature range. Increasing cocoa butter can cause a decrease in viscosity.

High temperature from 50° C to 55° C increases the kinetic energy of chocolate molecules, decreasing the viscosity (Rao, 2014).

The viscosity of chocolate depends on the fat content at a certain temperature range.

Increasing the content of cocoa butter prevents the formation of crystals and reduces viscosity as the temperature rises.

CONCLUSIONS

Melted chocolate is known to exhibit non-Newtonian behavior and the same behavior was observed in this study.

The four chocolate samples have non-ideal pseudo-plastic and thixotropic properties, because after the removal of the shear stress the initial viscosity is not restored, an irreversible structural change taking place.

By analyzing the viscosity curves in the four chocolate samples, all samples can be classified as pseudoplastic liquids.

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USE OF ROSEMARY AND RED ONION EXTRACT IN DEMI SMOKED SALAMY

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Abstract

Meatstuff production was increasing continuously in Romania during last 30 years. In order to answer to the higher demands of the population regarding quality and new types of products due to latest trends that are reducing the additives use there were researches and concerns related with additive replacement by natural compounds.

In this way it was a challenge to find proper dosage, way of production and way of use of natural extracts but keeping the appearance of the product similar with classical production variant in order to lead to purchasing intention from consumers. Also it was important to assess the meatstuff quality obtained in comparison with products obtained in classical approach.

Finding the shelf life of the products that contained natural additives was also a real challenge and it was the final validation of the solution proposed.

Key words: meatstuff, rosemary, red onion, shelf life, nitrites substitution.

INTRODUCTION

Meat has long been considered a highly desirable and nutritious food.

Unfortunately it is also highly perishable because it provides the nutrients needed to support the growth of many types of micro-organisms and due to composition rich in proteins and having high water content.

The meatstuff are most appreciated products in the foodchain and also very valuable from nutritional point of view. Due to high level of processing the meatstuff are very exposed to changes at physical, biochemical, microbiological and rheological level.

One of the most important change is related with color that is turning from the meat color to dark. The responsible for meat color is myoglobin in specific forms. Myoglobin is a water-soluble protein that stores oxygen for aerobic metabolism in the muscle. It consists of a protein portion and a nonprotein porphyrin ring with a central iron atom. The iron atom is an important player in meat color.

Myoglobin forms are the following: Deoxymyoglobin, Carboxymyoglobin, Metmyoglobin, Oxymyoglobin

The defining factors of meat color are the oxidation (chemical) state of the iron and which compounds (oxygen, water or nitric oxide) are attached to the iron portion of the molecule.

Meat color is dependent on: Pigment content - Myoglobin mainly, Chemical State of Myoglobin, Ultimate pH and rate of pH decline postmortem, Nature of group attached to the iron and the state of the iron, Ingredients, processing, Vitamin E, Microflora, Slaughtering, Curing (Salting), Packing, etc.

Meat color is very important because it affects consumer purchase decisions.

Research continues to find ways to improve the length of time a product stays "bright red" in the meat case. The most common technique of keeping the color of meatstuff is nitrites and nitrates adding.

Nitrite/Nitrate may be added to meat in the form of *sodium* - E250 and E251 or *potassium* - E252 and E249 salts to provide desirable flavor, color and conservation to the cured meat products.

Nitrate is reduced to **Nitrite** by bacterial action and thermal treatment and in fact nitrite is the compound that is responsible for the flavor, color and shelf life in cured meats.

The additives are introduced in the meat by so called curing process. Curing of meat using salts as preservatives is used for many centuries. It is a process by which meat products are treated with salt, nitrite or nitrate salts or both and other curing agents to improve the color, texture and flavor of meat and also preservation of meat. Most cured meat products are cooked and/or smoked: hot dogs, semi - smoked, raw - dry, bacon, etc.

As we mentioned the most important effect of nitrites after meat stuff color improving is preservative one. In this way we investigate alternatives for obtaining same effects using natural extracts rich in bioactive compounds from Rosemary and Red Onion. In the same time this approach fortify the meatstuff with bioactive compounds.

Rosemary and Red Onion were chosen because their well known benefits in consumers health. Rosemary Prevents oxidative stress, Fight against inflammation, Bioavailability, Helping cardiovascular system

Red Onion have the following properties on humans health: Reduce the cholesterol content, Prevent atherosclerosis, Fight against inflammation, Help immune system, Detoxification effect, Reduce blood pressure and Prevent diabetes according to several studies.

MATERIAL AND METHOD

Aims of the study were the following:

- Reducing the nitrite consume and intake,
- Fortifying the meatstuff with bioactive compounds,
- Maintaining the meatstuff global quality at the required demands,
- Improving the sensorial properties of the meatstuff.

For fullfiling this there were established following objectives:

- Producing the natural extract,
- Finding the proper dosage in meatstuff,
- Assesing the shelf life of the meatstuff.

Producing the natural extract was done following the production flow from below.

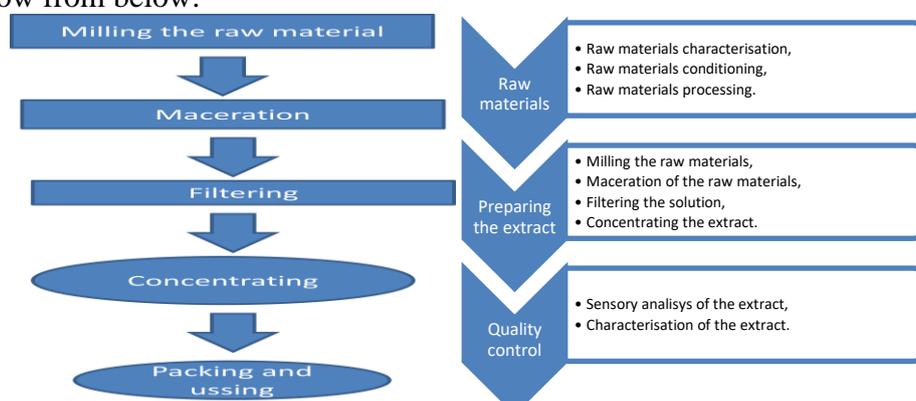


Figure 1. Producing the natural extract and quality control

The main issues was raw materials management. In this way raw materials were characterized, conditioned and mechanical procesed.

Preparation of the extract was the second issue because it was important to maintain properties of raw materials.

Preparation of extract from rosemary and red onion was done by maceration in alchoolic solution in 1:1 ratio for 24 hours and then under vacuum extraction the alchool was evaporated.

We pay attention for raw material food safety and in this way the raw materials were imersed for maceration in ethilic alchool and ultrafrezed at - 80 °C.

The assesment of the extract quality was done by FRAP method.

Before using the extract it was stored at 0 °C.

Finding the proper dosage

It was done by assesing the global quality of the semi – smoked sausage produced using following production flow by sensory analysys, microbiological and phisicho – chemical properties assesment.

There were conducted trials with following concentration of extract:

- 0 % (with sodium nitrite - blank sample),
- 2 %,
- 5 %,

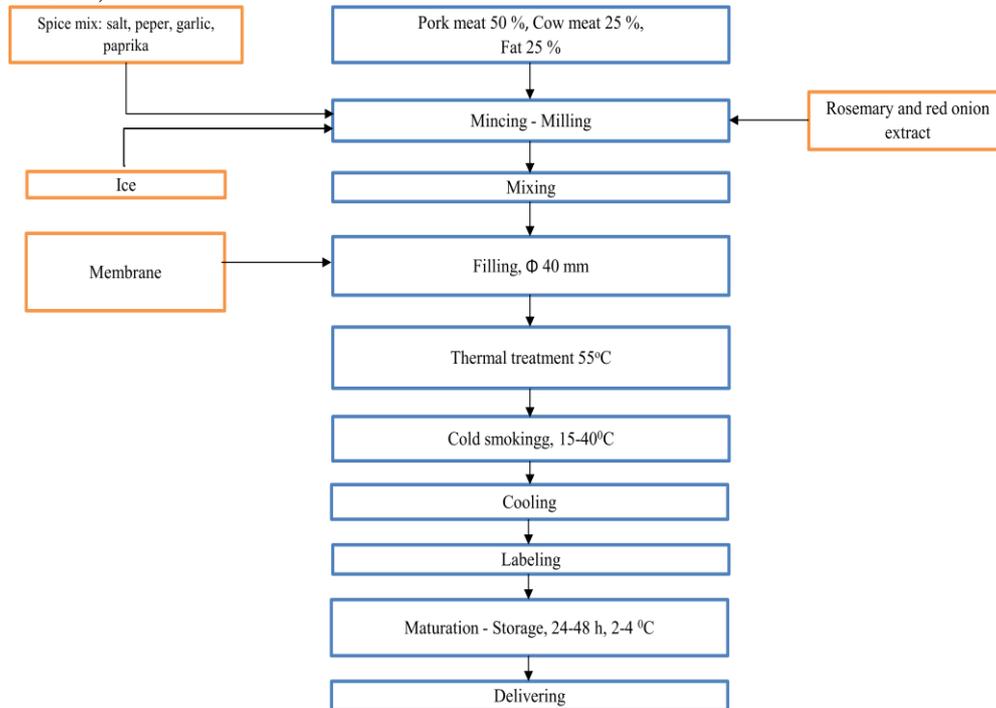


Figure 2. Production flow for demismoked sausages

The assesment of the demismoked salami was done by sensory nalysis for color, taste, texture, odor and shape using evaluation panels with grading up to 5.

The assesment of the quality parameters was done in 31.05.2020, 15.06.2020 and 07.06.2020.

There were analisys three kind of samples as following: 0% natural additive, 2% natural additive, 5% natural additive.

The parameters studied were: water content %, fat content % and salt content %. The methods used for analisys were drying in owen for water content, Soxhlet for fat content and Mohr for salt content.

For assesing the shelf life there were conducted following analisys:

- pH by instrumental method, use of Innolab pHmeter,
- Amonia by Nessler reaction.

- Microbiologic assesment at 7 days by cultural method using BioMaxima ready to use Petri dishes.

For microbiological assesment there were use the bellow cultural mediums.



Figure 3. Cultural mediums used for microbiological assesment

RESULTS AND DISSIONS

The first set of results was related with Natural extract properties. In this way Rosemary and Red Onion extract was assesed from antioxidant activity as mentioned above. The results are presented in figure 2.

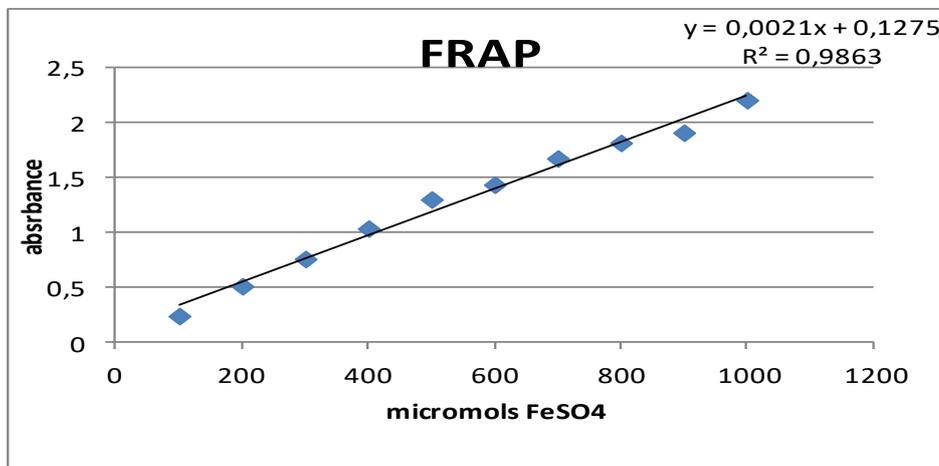


Figure 4. Determination of antioxidant activity of the extract of rosemary and red onion by the FRAP method - 593 nm

Calibration curve for FeSO₄

Where: x - μm FeSO₄, y – absorbance of the sample

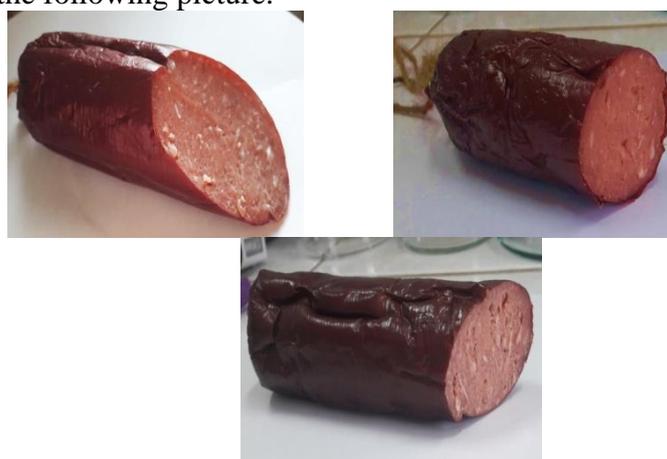
The concentration of extract was **1113,57** $\mu\text{m FeSO}_4$.

The results from color point of view were assessed by sensory analysis. In the pictures below are the aspects of the meat pasta and demismoked salami in all experimental variants.



Figure 5. Meat pasta color

From the demismoked salami color point of view the results are presented in the following picture.



0% natural additive 2% natural additive 5% natural additive

Figure 6. Demismoked salami color

Analyzing these images we can observe that sausage with the addition of extract in composition has a lighter red colour.

Also, all three types of sausages have a compact composition, with a specific mosaic aspect and a uniform consistency.

There are elasticity issues in the variant with 5% extract addition. This must be assessed in the following research.

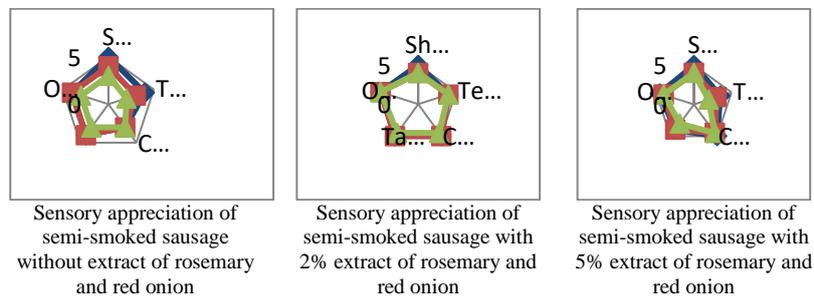


Figure 7. Demismoked salami sensory analysis

Examining the figures, we can conclude that the sausages keep their sensory characteristics over the first two weeks. Most of the respondents gave a low score in the third week of analysis.

This demonstrates that sensory properties of the sausages underwent changes perceptible to human senses.

The most appreciated was the sausage with 2% addition of extract.

The assessment was done in 31.05.2020 (blue line), 15.06.2020 (red line) and 07.06.2020 (green line).

For assessing the minimal parameters that are leading to acceptability by institutions responsible for food safety, the following surveys were done in 31.05.2020 and 07.06.2020.

Table 1

Comparative study of the moisture content

Sample	Humidity, %
Sample 1	59,11
Sample 2	57,29
Sample 3	59,06

Table 2. Comparative study of the fat

Sample	Fat, %
Sample 1	13,80
Sample 2	13,75
Sample 3	13,74

Table 3. Comparative salt content study

Sample	Sodium Chloride, %
Sample 1	1,755
Sample 2	1,789
Sample 3	1,696

The results of the above tables shown no deviation from the range of maximal allowed limits.

Table 4

pH study of our three samples and of the extract

Sample	pH	
	Date	
	31.05.2020	07.06.2020
Sample 1	5,95	6,15
Sample 2	5,79	6,01
Sample 3	5,80	5,74
Extract	4,44	4,46

The results are in the range of maximal allowed limits.

Table 3

Freshness study by qualitative determination of ammonia

Sample	Nessler reaction	
	Date	
	31.05.2020	07.06.2020
Sample 1	negative	weakly positive
Sample 2	negative	weakly positive
Sample 3	negative	weakly positive

The results are in the range of maximal allowed limits.

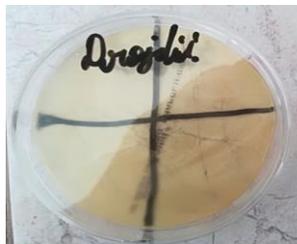


Figura 1. Yeasts



Figura 2. Fungus



Figura 3. Escherichia coli

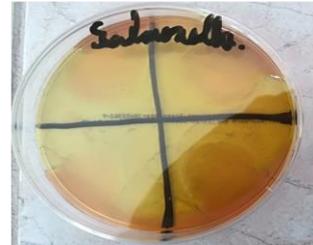


Figura 4. Salmonella

Figure 8. Microbiological assesment after 7 days was reveal no signs of microflora

CONCLUSIONS

Natural compounds enjoy positive consumer image and have application in development of novel functional healthy meat products.

Natural antioxidants are nature's defense against the damaging effects of free radicals for health but extend shelf life of meatstuff as well replacing nitrates use.

In this way the meat industry tends to reduce the amounts of nitrates that are responsible for the formation of nitrosamines with carcinogenic action by alternatives. One of this combinations that can replace additives in meat products is extract of rosemary and red onion as we shown and our opinion is that proposed variant is promising.

This extract improve also the sensorial properties of demi-smoked sausages as color, smell, odor and has the same antimicrobial effect as nitrite addition variant.

Moreover it does not adversely affect the physico-chemical characteristics.

Use of natural extract brings also a high intake of essential minerals such as potassium, phosphorus, calcium, sodium, iron, zinc; the large number of antioxidant compounds present in rosemary and red onion extract according references making a significant contribution to increasing the quality of this salami by transforming it in functional meatstuff.

The properties of the raw materials according with references especially high content of red onion and rosemary polyphenols provides salami, an important detoxifying, anti-inflammatory, anti-oxidant, antiviral, anticancer, cardioprotective, neuroprotective, antidiabetic, anti-aging properties.

The coloring effect of rosemary and red onion extract significantly improves the color of the sauseges and rosemary act synergig.

There is unfortunately an increase of specific taste due to rosemary effect in high dosage – 5% and lack of rheological properties at this level of additive.

RECOMANDATIONS

The nutritional impact studies are required in order to asses the increasing nutritional effect.

There is necessary also studies regarding possible alergic effects.

The increasing of the natural aditiv dosage over 2 % must be evaluated by rheologic methods competing the sensory analisys.

The microbiological assesment must be extended for longer time.

Acknowledgments

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EVOLUTION OF ROMANIA'S EXPORTS OF WINES, BEER AND MINERAL WATERS COMPARED TO THOSE OF NEIGHBORING COUNTRIES IN CENTRAL AND EASTERN EUROPE, BETWEEN 2017-2019

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Abstract

Wine continues to be one of the favorite drinks of Romanians, and in our country its production has been recorded since ancient times, practically before the Roman occupation, as evidenced by the presence in Romanian of terms of Dacian origin related to the cultivation of vines. Romania ranked 6th among European wine producers and a more than honorable 15th place in the top producers worldwide, but does not perform as well in terms of exports.

Key words: wine, exports, mineral waters, beer, market

INTRODUCTION

The International Wine Organization recently presented the situation of the wine industry in 2019 worldwide. The main conclusion that emerged from this presentation refers to the fact that world wine production (excluding juices and must) decreased to 260 mhl in 2019, registering a significant decline of 11% compared to 2018 production.

The report shall include the production potential of the global wine sector, data on world wine production and consumption, as well as data on world trade in wine.

After a slight decrease in wine consumption recorded in 2018, global wine consumption in 2019 is estimated at 244 mhl, marking an increase of 0.1% over the previous year. However, this apparent stabilization is the result of a counterbalance between countries with opposite trends.

At this early stage, the available information and statistics on the impact of the crisis caused by COVID 19 (triggered at the beginning of this year) are insufficient to provide an accurate forecast and to make future scenarios. Feedback from Member States reflects a radical change in the wine market. Overall, the decrease in consumption and the reduction in average prices led to a general decrease in total sales value, but also to a decrease in winery profit. In terms of exports, during this pandemic, the largest consuming countries were among the most affected, these being

mainly the United Kingdom, USA, Germany, France, China, Russia, but also others. Trade flows can be recovered later, with the general economic recovery, but some changes will be, unfortunately, permanent.

MATERIAL AND METHOD

The main assessments on the state of the industry in 2019 are highlighted in the following:

1. The areas planted with vines stabilized at approximately the same level of 7.4 mha in 2019, a value approximately equal to that of 2016.

2. World production of wine (excluding juices and musts) is estimated at 260 mhl, a significant decrease compared to the historical production of 2018.

3. World wine consumption was around 244 mhl in 2019, increasing by 0.1% compared to the previous year.

4. World wine exports increased in quantity, being estimated at 105.8 mhl (1.7%), but also in value at 31.8 billion euros (0.9%).

5. Sparkling wines are on the rise in terms of production and consumption, as well as international trade, thus confirming their increasingly important role on the world wine market.

In 2019, the world area with vines, planted for all purposes (wine, table grapes and raisins), including young vines that are not fruitful, is estimated at 7.4 mha. Starting with this presentation with the northern hemisphere, we note that the vineyards in the European Union (EU) remain at the same level for the fifth consecutive year, respectively at 3.2 mha.

RESULTS AND DISCUSSIONS

Within the EU, the latest available data for 2019 indicate an increase for areas planted with vines in France (794 kha), Italy (708 kha), Portugal (195 kha) and Bulgaria (67 kha). The vineyards areas in Spain (966 kha), Hungary (69 kha) and Austria (48 kha), on the other hand, decreased slightly compared to last year. In East Asia, after more than 10 years of significant expansion, the growth of Chinese vineyards (855 kha), the second largest in the world, seem to slow down.

In the United States (USA), the area cultivated with vines has steadily decreased since 2014, and was estimated in 2019 at 408 kha. In South America, the evolution of the wine-growing area showed a downward trend for the fourth consecutive year. The only exception on the continent is Peru, whose area has increased by 7.1 kha (17% compared to 2018), reaching 48 kha in 2019.

On the other hand, the vines area in South Africa remained stable compared to 2018, at 128 kha. In Australia, the area also remains stable at 146 kha in 2019, and in New Zealand the area increases by 1.6%, reaching a record level of 39 kha.

World wine production (excluding juices and musts) in 2019 is estimated at 260 (259.0) mhl, marking a sharp decrease of 35 mhl (11.5%), compared to the volume recorded in 2018. Italy, the largest world wine producer (47.5 mhl), France (42.1 mhl) and Spain (33.5 mhl), which together represent 48% of world wine production in 2019, had a sharp decline in wine production compared to 2018.

Other EU countries that recorded a decrease in production compared to 2018 are Germany (9.0 mhl, 12%), Romania (5.0 mhl, 4%), Austria (2.5 mhl, 10%), Hungary (2.4 mhl, 34%) and Greece (1.9 mhl, 8%); the only EU country which recorded a growth of wine production in 2019 is Portugal, with an increase of 6.7 mhl (10% compared to 2018).

In Eastern Europe, weather conditions were favorable in Russia (4.6 mhl, 7% compared to 2018) and Ukraine (2.1 mhl, 6% compared to 2018), while in the Republic of Moldova the production of 2019 decreased at 1.5 mhl (23% compared to 2018).

In Asia, new data available for China indicate an estimate of wine production of 8.3 mhl in 2019, marking a 10% decrease in the already relatively low level of production compared to 2018.

In North America, wine production was estimated at 24.3 mhl, down 2% from 2018. It appears that the decline in production in 2019 did not depend on adverse weather conditions or the fires in California in October, but was a response to the local excessive supply of grapes and wine.

In South America, the general trend of wine production in 2019 is negative compared to 2018. However, while in Argentina (13.0 mhl) and Chile (12.0 mhl) wine production in 2019 is lower, compared to 2018, but overall in line or even higher than the average of the last five years, Brazil (2.0 mhl) recorded a sharp decrease in wine production in 2019, over 1 mhl (34% compared to 2018).

In South Africa, production in 2019 reached 9.7 mhl, an increase of 3% compared to 2018, but it is still far from the average level of production recorded before the onset of the drought, which severely affected the country for three consecutive years (2016, 2017 and 2018).

In Oceania, Australian wine production is declining for the second year in a row, reaching 12.0 mhl in 2019 (6% compared to 2018), while in New Zealand wine production was 3.0 mhl in 2019, with a slight decrease of 1% compared to 2018.

In 2019, wine exports increased compared to 2018 both in volume, estimated at 105.8 mhl (1.7%) and in value, by 31.8 billion euros (0.9%).

Strong quantitative increases can be seen in exports from Italy (2.0 mhl), Spain (1.3 mhl), Canada (0.4 mhl) and Chile (0.3 mhl). Significant reductions in exports are recorded for Australia (1.1 mhl), South Africa (1.0 mhl), Ukraine (0.4 mhl) and Hungary (0.3 mhl).

France continued to be the world's largest exporter in terms of value, with 9.8 billion Euros exported in 2019. There were increases in the value of exports to many large exporting countries such as France (425 million Euros), Italy (211 million Euros) and New Zealand (84 million Euros). The largest decreases in exports were recorded by Spain (234 million euros) and South Africa (73 million euros).

In 2019, international trade in wine in terms of volume was mainly dominated by three European countries: Italy, Spain and France, which together exported 57.1 mhl, representing 54% of the volume worldwide.

In 2019, the top three importers in terms of volumes were Germany, Great Britain and the USA, which together imported 40.4 mhl, respectively 38% of the world total. At the same time, these three countries represent 39% of the total value of wine imports worldwide, reaching 11.9 billion euros.

The first importer in 2019 is still Germany with 14.6 mhl, even if the volume of wine imports decreased by 0.6% compared to 2018.

China recorded a significant decrease in these imported volumes for the second consecutive year (11% compared to 2018), reaching 6.1 mhl in 2019. In value, the trend is similar, with an overall decrease of 9.7% compared to 2018, reaching 2.1 billion euros.

The only category that increased both in terms of volume (8%) and value (8%) is sparkling wine, although it represents only 2% of the total volume imported.

Romania's world trade in wines, beer and mineral waters.

Romania ranked 6th among European wine producers and a more than honorable 15th place in the top producers worldwide, but does not perform as well in terms of exports, which were only 23,4 million liters of wine in 2019 or 6% of total production (domestic consumption being the majority).

However, it should be noted that although the share of exports in total production is particularly small, the volumes exported last year reached an all-time high, practically doubling in the period 2016-2019 (this translates, however, also by a significant reduction in total receipts).

The main destination countries for Romanian wine exports were, in 2019:

- Germany (6.275 million euros for a total of 4.204 million liters),

- Great Britain (5.200 million euros for a total of 3.105 million liters),
- the Netherlands (3.997 million to a total of 2.503 million liters),
- China (EUR 2.335 million to a total of 0.678 million liters),
- Spain (2.887 million euros for a total of 3.128 million liters),
- USA (1.422 million euros for a total of 0.817 million liters),
- Italy (1.335 million euros for a total of 1.245 million liters),
- Poland (1.096 million euros for a total of 0.544 million liters),
- Greece (0.696 million euros for a total of 3.338 million liters)
- Japan (0.681 million euros for a total of 0.253 million liters).

The total wine exports from Romania totaled in 2019 30.866 million euros, at a volume of 23.347 million liters.

Regarding Romania's trade in beverages with the USA (wines, beer and mineral water, included in tariff category 22), the following aspects are noted: general Romanian exports were of \$ 3.172 million, which represents an increase of 3.6% in 2019, compared to 2018 and 24.9% compared to 2017.

Wines accounted for the majority of exports in the category (50.7%), registering an increase of 33.5% compared to 2018 and 16.8% compared to 2017. Mineral waters (both those with sugar content and those without) have represented 44.6% of the total exports of the category, registering a decrease of 1.6% compared to 2018 and an increase of 52.9% compared to 2017.

Romanian beer contributes only 2.2% in the total exports of the category, having uniform deliveries for the last 3 years, respectively of about 72 thousand dollars.

Romania was the 27th exporter of fresh grape wines on the US market (out of a total of 67 exporters) and the 5th in our geographical region, after Greece, Slovenia, Hungary and the Republic of Moldova.

Romania was the 15th exporter of mineral and natural waters on the US market (out of a total of 69 exporters) and the 2nd in our geographical region, after Poland.

Romania was the 64th beer exporter on the US market (out of a total of 88 exporters) and the 8th in our geographical region.

CONCLUSIONS

We appreciate that the evolution of Romanian wine exports (such as mineral water or plain water on the American market, as well as beer, not to mention spirits) continues to be below the real potential, expected by our producers and exporters. But the explanations are related to the fierce competition on this

market, but also to the insufficient preparation and promotion of Romanian exports or the reluctance of Romanian exporters to approach this market, considered distant in terms of logistics.

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8. <https://www.reportlinker.com/>; <https://www.bevindustry.com/>

IDENTIFICATION OF YERSINIA IN FOOD TOXINFECTIONS

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Abstract

The term of "biota" is used in this text, instead of "flora" as general reference to bacteria. The flora is referring to the life of plants. The term of "bacterial flora" goes back to the period when it is considered that the bacteria would have been primitive plants. Because the bacteria are not plants it is preferred instead of "flora" the term of "biota" or of "bacterial microbiota". In general, biota reflects the mediums of cutting and of processing mentioned above, the gram-negative bacteria being predominant. Among the gram positive bacteria the most frequent are the enterococci and lactobacilli.

Due to their presence in all the mediums of processing of meat it is expected that the number of yeasts to be very large, including, Penicillium, Mucor and Cladosporium. The yeasts that are found most frequently in the red meat and the poultry are members of the genders Candida and Rhodotorula.

Key words: biota, bacterial flora, enterococci.

INTRODUCTION

Yersinias are gram negative Enterobacteriaceae with coccobacillary morphology. In the Yersinia genre are included 12 species of which only three, *Y. pestis*, *Y. pseudotuberculosis* and *Y. enterocolitica* were isolated from the human being, the others being present only in the soil and waters, or pathogen for the wild mammals, birds and fish.

Yersinia pestis has as main fountains the rodents. From the *Y. pestis* animals is transmitted to the human being by the fleas of the rats, in the proventricol and stomach of which it lives for a long time, or by dust of excretions or animal products. Between the human beings the pest is transmitted by the *Pulex irritans* flea and, most frequently, by inhaling of Flügge drops from the patient in the prodromal stage or the acute stage of pulmonary pest.

Yersinia pseudotuberculosis has as natural fountain rodents and wild birds from which it gets on the soil and in the waters where it survives actively, even with low temperatures. In human being it is transmitted on digestive way and is the cause of some sub-acute enteritis accompanied by

marked mesenteric adenopathy that can mime appendicitis. The clinical picture includes fever, diarrhea and abdominal pain, with the duration of 1-3 weeks; the nausea and vomit are added in 15-40% of the cases. In the fecal matters can be detected leucocytes, blood or mucus. The severe cases can be complicated with ileac perforations or rectoragias. The patients with mesenteric adenitis or terminal ileitis present fever pain and muscular defense in the right iliac fossa accompanied by leukocytosis; the older children and adolescents are affected predominantly. In these cases the picture can't be differentiated from the acute appendicitis and often is intervened surgically.

The sepsis induced by *Yersinia pseudotuberculosis* is rarely reported; approximately 50% of the patients with sepsis present a basic chronic affection. A syndrome similar to the scarlatina was described in association to some strains of *Y. pseudotuberculosis* in the Eastern Russia and Japan. This condition is explained by the production of a mitogen, a unique super antigen similar to the one involved in the syndrome of toxic shock induced by staphylococci and streptococci. Moreover the recent data indicate the involving of the bacteria in the Kawasaki disease, the infection being associated with an increased frequency of the arterial lesions.

MATERIAL AND METHODS

We accomplished a prospective study, based on the microbiologic diagnosis registered in the bacteriological register of the laboratory of medical analysis, S.C. Diaser, Oradea.

The duration for which was extended the study is of 5 years, included in the period 01.01.2014-31.12.2019.

For the performing of the study was used also the archive, registered in the specific program of the computer from the laboratory of S.C. Diaser, Oradea, the computerized data base of the unit, respectively.

Necessary materials for the performing of the examination:

- A recipient of collection (collection recipient of fecal matter with collecting spoon) with transport medium
- Wood spatula
- Latex gloves

For the collection of fecal matter it has to be collected a sample of fecal matter of 5-10g introduced in the collection recipient of fecal matter with transport medium. If the stool is liquid, it will be collected 5 ml. It is recommended to be chosen a liquid, mucous and bloody portion, if there is one. Don't collect larger quantities than 10 g because will reduce the chances to isolate the pathogen bacteria.

RESULTS AND DISCUSSIONS

The antibodies detected by the method Western blot are guided against the 3 species of *Yersinia*: *enterocolitica*, *pseudotuberculosis* and *pestis*. The test uses the secretor antigens coming from *Yersinia* (Yop: *Yersinia* outer proteins) relevant serologically, that are separated based on the molecular weight by the electrophoresis in the gel of polyacrylamide in the presence of sodium dodecyl sulfate (SDS-PAGE) and transferred afterwards electrophoretically on a membrane of nitrocellulose (Western blotting). The free connecting sites from the membrane are saturated with a solution of proteins, and afterwards the matrix is washed and cut in strips. For the detection of specific antibodies anti-*Yersinia* the strip loaded with antigens is incubated together with the diluted serum of the patient. If in the serum are present specific antibodies they are connected to the corresponding antigens from the strip. After a phase of washing, the strip is incubated, depending on the tested class of antibodies, with a human anti-IgG or anti-IgA conjugated marked with the alkaline phosphatase. The conjugate will be attached to the antigen-antibody complex formed. After the elimination by washing of the conjugate not connected it is added the chromogenic substrate. If the connected conjugate is present the enzymatic reaction will generate a product of violet color on the level of the bands occupied by the specific antibodies. Thus the bands visualized on the level of the strip are the result of the connection of the specific antibodies to the individual antigens. Each strip includes in the upper part a band of control that represents the control of the reaction necessary to confirm the correct performing of the test. The test is validated if the band YopD (35 kDa) of the control IgA and IgG is present. The evaluation of the intensity of the bands that appeared in the serum of the patients is made using as reference the band of control. The bands whose intensity is larger or equal to the one of the control are marked with X in the protocol of work. The very intense bands will be marked with XX; the bands with intensity smaller than the one of the control won't be considered. **The antibodies IgG** are produced in case of chronic yersiniosis, the reactive arthritis associated with *Yersinia* and of acute yersiniosis. In the beginning stage of a yersiniosis the antibodies are rarely detectable. The IgG antibodies persist minimum 5 months from the beginning of the disease, but most often for a longer period (over 5 years). The antibodies IgG are guided against all the proteins secreted by *Yersinia*, but most often against YopE (23 kD), YopD (35 kD), YopB (41kD) and YopH (51 kD). **The antibodies IgA** appear pregnantly in the beginning phase of the acute yersiniosis. In case of the reactive arthritis associated with *Yersinia*, the response of IgA is guided in 90% of the cases against the antigen YopD (35kD). In case of chronic yersiniosis the

antibodies IgA are guided in a visible way against YopE (23 kD), YopD (35 kD) and YopB (41kD). In case of the complicated yersiniosis the antibodies IgA persist in the majority of the case for more years and in case of the simple yersiniosis, usually, only a few months.



Fig.1. colonies of Yersinia. The medium of culture endo – agar.<http://www.bacteriainphotos.com>

In the study “Enterocolitis Yersinia: the charisma continues”, affirms the fact that the majority of the human pathogen strains are found in distinct blood groups (for example, O: 3, O: 5,27, O: 8, O: 9) and include factors of virulence mediated by chromosomes, and by plasmids (60 up to 75 kb), absent in the “non virulent” strains. While Enterocolitis Yersinia is first of all a pathogen agent of the gastric-intestinal tube, it can produce extra-intestinal infections in hosts with basic predisposing factors. The post infection sequelae include arthritis and nodular erythema, that are observed mainly in Europe in the patients with blood groups: O: 3 and O: 9 infection and antigen HLA-B27. Enterocolitis Yersinia is achieved on an oral way and is connected epidemiologically to the pig sources.

CONCLUSIONS

For *Yersinia* a current procedure of enriching is keeping the tapped swab in tampon solution of phosphate 2-3 weeks at 4-5°C after which is seeded after selective mediums. Because the bacteria from the *Yersiniagenre* are developed preferentially at 22-29°C, the simple incubation at this temperature performs the enriching on the broth for gram-negative bacilli.

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THE UTILIZATION OF THE FLOUR FROM GRAPES KERNELS IN THE BAKERIES

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Abstract

The fortification of the flour is a practice widely spread in all the world in the last period of time using on a large scale by products coming from different industries, with the purpose of satisfying the growing and more diversified demands of the population. The grapes kernels, byproduct of the wine growing production, obtained by the separation of pomace with the mechanical way and dried before milling or pressing, are usually used in the pharmaceutical industry, in the food industry but also in other industries due to their content of fat acids, vitamin E, Calcium, Potassium, Zinc and fibers. The flour from grapes kernels obtained by milling the kernels is used as such or in combination with different foodstuff. In this paper we followed the effects of the addition of flour from grapes kernels in the bread and of the maceration obtained from flour and kernels and water. The results obtained recommend its adding as such in the bakery products in a percentage of maximum 5%.

Key words: grapes, flour from grapes kernels, fermentation, bread

INTRODUCTION

The bread making, a subject always open to innovation, basic part of the food industry in parallel evolution with the science, by finding new techniques of obtaining, raw materials and new auxiliary, by repeated testing in pilot system, brought on the market new products, innovative products, that could bring to the consumer numerous benefits depending on the individual needs.

The grapes kernels are being used for a long time for the obtaining of the cosmetic products, in the kitchen, due to the high content of oil between 8-16% with high content of fat acids, for the high content of vitamin E with effect on the locomotor apparatus, it is rich in Calcium and Potassium, Zinc and a high percentage of dietary fibers.

The utilization of the flour from grapes kernels in the bread-making products can bring to the consumer many benefits: support for a healthy cardiovascular system; it helps maintaining the natural defense of your body; support for the normal functioning of the body cells; assistance in the

fight against the free radicals; support for a good health of the immune system and preventive against the cancerous tumors.

The grapes kernels are byproducts resulted from the wine-growing production, separated from the pomace in a mechanical way and dried before milling or pressing.

The flour from grapes kernels is obtained by cold milling of the grapes seeds, after the oil from grapes kernels was extracted previously by cold pressing. Then, it passes by a special process of milling that helps with the keeping of all the nutritive properties of the flour.

MATERIAL AND METHOD

The grapes flour can be used to replace a part of the wheat flour in the recipes for the bread. In the content of the premix it shouldn't cross 4-5% of the total quantity of flour. In our products was introduced as such a percentage of 5% also in the form of pomace obtained by mixing the water with flour of grapes kernels 5%, left 24h for maceration and then strained. The maceration thus obtained was used instead of water for the dough forming.

For the obtaining of the dough we used the direct method that consists of mixing all the ingredients in the beginning of the operation, is started the operation of mixing and kneading of the ingredients for 8-10 min (95% white wheat flour strained and weighed, 5% flour of grapes kernels, is mixed with water or maceration and 2% salt) following then the specific technologic steps.

RESULTS AND DISCUSSIONS

The form of the products is similar, shaped, increased in case of the versions with maceration and less increased in the case of the versions when we introduced more flour of grapes kernels. Also the volume of the products obtained was smaller for the bread obtained from premix, presenting an aspect easily bent, not very developed and gibbous.

The aspect of the crust of breads in which it was introduced flour of grapes kernels was smooth, with cracks and without wrinkles and in case of the one with maceration the crust is smooth with smooth surface, without wrinkles.

We can also mention here the fact that the color of the crust of the bakery products is different between the two versions ranging based on the experimental component as such: in case of the products with maceration the color is easily violaceous compared to the products where it was

introduced flour of kernels that present a darker brown color with violaceous shade.

The aspect of the core in the section presents also differences between the two versions so that: in case of the products obtained from the premix the product is baked enough, when knocking in the crust it produces a clear sound, elastic core on pressing in returns to the initial form, the core of brown-violaceous color, uniform, dry on touch, on cut the blade of the knife remains clean and is shred and the one obtained with maceration is well baked, the core uniform, well fluffy with uniform porosities, and the blade of the knife remains clean and on pressing the core is elastic.

The pores of the core of the versions with maceration are well defined and structured, uniform, of oval form and those obtained from premix the porosity is also in this case good, structured, well defined and uniform. We can also say that the rheological structure of the core is affected very little and only in the version with flour of grapes kernels.

Regarding the taste of the products it was observed that it is present a pleasant smell, characteristic to a product well baked with flavor corresponding to the product on both versions. Related to the taste, in case of the products obtained with maceration it is salted enough, without foreign sour or bitter taste and those obtained of premix it is salted enough, but on mastication they present fine particles of grapes kernels, aspect that can become annoying for certain categories of consumers.

CONCLUSIONS

The bakery products fortified with active biological compounds, originated from flour of grape kernels are designated to different categories of consumers, to healthy persons preoccupied with the maintaining of the health condition and also to the persons that suffer mild affections of the digestive tube, hypertensive, overweight persons and/or in a preventive purpose.

The products obtained are natural, without preservatives, flavors or synthetic colorants. They present different sensorial qualities given by the aspect, color and taste. The flour of grape kernels, during the technological process, is not depreciating or influencing in any kind the quality of the dough or of the finished product. The only disadvantage of using the flour would be the presence in the structure of the core of some small particles of kernels.

We recommend the introduction of the flour of grapes kernels in the alimentation of the people because, by it composition it can have benefic effects on the consumers preventing the increase of cholesterol, favoring the elimination of the fats from the body, it can prevent the appearance of the

coronary diseases, it can regulate and accelerate the intestine transit, it can prevent cancer and gastro-intestinal diseases.

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THE CONTENT OF MILK IN BIOACTIVE FATTY ACIDS WITH IMPLICATIONS FOR HUMAN HEALTH

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Abstract

Milk fat is composed mainly of fatty acids. Cow's milk has a high concentration of saturated fatty acids and trans type fatty acids, which is why the consumption of milk and dairy products is associated with the occurrence of certain diseases, especially those of a cardiovascular nature and those associated with obesity. However, numerous studies have shown that polyunsaturated fatty acids include a special category of fats called omega 3 fatty acids and CLA (conjugated linoleic acid or omega 7 fatty acids), which are essential for the development and maintenance of human health. This bibliographic review aims to collect the main results regarding the content and nutritional quality of fats in cow's milk, with express reference to the structure and content of functional fatty acids with implications on the health of consumers of milk and dairy products.

Key words: milk, omega 3 fatty acids, CLA, atherogenic index (AI) and thrombogenic index (TI)

INTRODUCTION

The nutritional quality of milk and dairy products is a very important parameter, especially in terms of the links between food and human health, a vital area of research today. The international medical scientific world considers that dietary fats, food fats and especially those of animal origin, are responsible for certain diseases, especially those of a cardiovascular nature and those associated with obesity (Abu-Gazaleh et al. 2007; Hu et al., 2001). However, research initiated by Hu (2001) has shown that polyunsaturated fatty acids include a special category of fats called omega 3 fatty acids and CLA (conjugated linoleic acid or omega 7 fatty acids), which are essential for the development and maintenance of human health (ensures the development of nerve cells to children, prevents and treats cardiovascular diseases, protects and preserves the integrity of vascular endothelium, prevents obesity, has anti-cancer and antioxidant potential, etc.). They must be provided by food because they are not synthesized in the human body, especially CLA which is present only in milk and meat from ruminants (cattle, sheep, goats), resulting in the processes of biohydrogenation of linoleic acid (C18:2 c9, c12) and linolenic acid (C18: 3 c9, c12, c15) from feed, by microorganisms in the rumen (Ip et. al., 2004).

Due to the positive effects that Omega 3 and CLA fatty acids have on the human body, foods enriched in these fatty acids are included in the category of "functional foods".

As a result, the consumer understands by quality, a product safe for his health (unpolluted), which in addition to the intake of nutrients must also contain a series of active biocomponents with sanogenic effect (Omega-3 fatty acids, conjugated linoleic acid (CLA), *trans*-vaccenic acid (VA), antioxidants, vitamins, microelements, etc.), with an important role in ensuring the "quality of life". Consequently, a new approach is needed to the concept of quality of agri food products, which should represent as accurately as possible the interests and preferences of consumers.

The lipid fraction of milk and meat has been considered to have negative effects on consumer health, due to its high content of saturated fatty acids and *trans* type fatty acids, which are responsible for cardiovascular and obesity-associated diseases. However, numerous studies have shown that whole milk is more effective in preventing cardiovascular disease in humans than skim milk (Steinmetz et al., 1994). These positive effects are attributed to the functional fatty acids (FA) present in whole milk fat. Functional fatty acids are represented by: omega-3 fatty acids, conjugated linoleic acid (CLA; isomer C18:2 *cis*-9, *trans*-11; also called rumenic acid-RA and isomer C18:2 *trans*-10, *cis*-12) and *trans*-vaccenic acid (C18:1 *trans*-11; VA).

MILK FAT CONTENT AND STRUCTURE

Milk fat has very wide variation limits, between 2.5 and 7.5%. Mainly milk fats are triglycerides, complex lipids and free fatty acids. Triglycerides, which have a share 95% of the lipid fraction, are composed of fatty acids of different chain lengths (between 4 and 24 C atoms) and different degrees of saturation.

The largest share in milk fats is fatty acids, which represent about 90% of their weight. Over 95% of fatty acids are found in the form of triglycerides, the rest in the form of mono- and diglycerides, phospholipids and in the form of cholesterol esters. Free fatty acids are present in a small proportion (Kay et al., 2004).

Cow's milk is composed of an average of 4% fat, of which 97-98% are triacylglycerols (Jensen, 2002). Milk fat usually contains a high proportion of saturated fatty acids (70% of the total identified fatty acids) and monounsaturated fatty acids (MUFA, 25.6%), to which are added small amounts of polyunsaturated fatty acids (PUFA, 3.3%). *Trans* type fatty acids represent for about 4% of total fatty acids (Ferlay and colab., 2008; Shingfield and colab., 2008). However, these average values can be greatly

altered by various animal-dependent factors (breed, age, lactation stage) and nutritional factors (supplementation of feed content with fat, nature of feed, mode of preservation of feed, amount of food concentrates, etc.). The effects of genetic and physiological factors are limited, while major changes in the FA composition of milk can be induced by nutritional manipulation (Ferlay et al., 2011).

SATURATED FATTY ACIDS (SFA)

More than half of the fatty acids in milk are saturated (approximately 65-70%), constituting about 19 g / l milk. The most important saturated fatty acid in milk is palmitic acid with a share of 30% of total saturated fatty acids.

SFA from milk has a dual origin: long-chain FA (C16 and above) are taken from plasma lipoproteins (on average 60%), and short and medium chain FA (4: 0 to 16: 0) are synthesized *de novo* (on average 40%) in the mammary gland from acetic acid and beta-hydroxybutyrate, from rumen fermentation (Chilliard and Ferlay, 2004).

There is evidence that SFA in food leads to increased serum concentrations of low-density cholesterol (LDL-bad cholesterol) (Givens, 2010), a predictor of the risk of cardiovascular disease. However, such effects are related only to lauric acid (C12:0), myristic acid (C14:0) and palmitic acid (C16:0), while other saturated fatty acids have neutral or positive effects on human health. (Mensink et al., 2003).

In many European countries, milk and dairy products supply on average approx. 40% of the total SFA contribution. As a result, there has been a great deal of interest in manipulating the FA profile of milk fat to address consumer concerns. The main monounsaturated fatty acid (MUFA) in milk is oleic acid (C18:1 *cis*-9), followed by 18:1 *trans*. Replacing SFA in human food with oleic acid has been shown to reduce the frequency of cardiovascular disease (Lopez-Huertas, 2010). In contrast, *trans* fatty acids if consumed in excess have led to an increase in the frequency of coronary heart disease (Schingfield et al., 2008; Givens, 2010).

However, recent data seem to indicate that in the case of milk trans-18:1 fatty acids may have beneficial effects in reducing the incidence of cardiovascular disease (the positive effects are greater for *trans* 10- than *trans* 11-18:1) (Roy et al., 2007). Several studies have shown that diets containing low-fat dairy products have been associated with favorable changes in serum cholesterol content.

MONOUNSATURATED FATTY ACIDS

Monounsaturated fatty acids represents for about 25% of total milk fatty acids. Oleic acid (18:1c9) is the unsaturated fatty acid with the highest concentration found in milk (23.8% of MUFA), constituting about 8 g / l in the case of cow's milk. Therefore, milk and dairy products contribute substantially to the intake of oleic acid in most countries.

Oleic acid has beneficial effects on health, as diets high in monounsaturated fatty acids can lower LDL plasma cholesterol and triglyceride levels.

POLYUNSATURATED FATTY ACIDS (PUFA)

The content of cow's milk in polyunsaturated fatty acids is on average 2 g / l.

Linoleic (18:2n-6) and α -linolenic (18:3n-3) acids are the main polyunsaturated fatty acids in milk fat. These FA cannot be synthesized in the body and must be obtained from the diet. These FA can be metabolized in the body contributing as precursors to form arachidonic acid (AA, C20:4 n-6) and eicosapentaenoic acid (EPA, C20:5 n-3), which are precursors for prostaglandin synthesis (Palmquist, 2009).

OMEGA-3 FATTY ACIDS

Omega-3 fatty acids are polyunsaturated fatty acids that have in common a carbon-carbon double bond in the catenary position 3. The most important FA n-3 (omega-3) with sanogenic effect are: C18:3n-3 (α -linolenic acid, ALA); C20:5n-3 (eicosapentaenoic acid-EPA) and C22:6n-3 (docosahexaenoic acid-DHA). The importance of functional AF lies in the role they have in the human diet. N-3 fatty acids: reduce the level of LDL (bad cholesterol) in the blood and increase the level of high density lipoproteins (HDL-good cholesterol) which play an important role in preventing cardiovascular disease; reduce high blood pressure; regulates hormonal secretions; intervene in the therapy of arthritis and inflammatory processes (Rubino et. al., 2006); protects and preserves the integrity of vascular endothelium; stimulates the development of nerve cells in children (Hu, 2001).

FA n-3, and especially EPA and docosahexaenoic acid (DHA, C22: 5 n-3), could reduce the risk of cardiovascular disease (Mills et al., 2011).

CONJUGATED LINOLEIC ACID (CLA)

Conjugated linoleic acid (CLA) is in fact a mixture of several isomers of double conjugated linoleic acid, located mainly on carbon atoms 9 and 11 (*cis*-9, *trans*-11 C18:2 = rumenic acid, which represents 80-90% of total CLA isomers).

CLA is provided in human food by agri-food products from ruminants, being synthesized either by rumen biohydrogenation of unsaturated fatty acids in food, or by endogenous transformation of *trans*-vaccenic acid (C18:1 *trans*-11) in the presence of the enzyme Δ^9 -desaturase, in different tissues of the body (mainly the mammary gland). *Trans*-vaccenic acid, which is the substrate for the enzymatic synthesis of CLA, comes, as an intermediate, from the rumen biohydrogenation of mono- and polyunsaturated fatty acids in food. Complete rumen biohydrogenation of VA leads to the formation of stearic acid (C18:0). Of the total CLA c9, t11 present in milk, 70-90% comes from the enzymatic desaturation of VA (C18:1 t11) in the mammary gland, while the rest, including the other CLA isomers (especially CLA *cis*-12, *trans*-10) results as intermediates in the process of rumen biohydrogenation of unsaturated fatty acids in food (Chilliard et al., 2007). The level of CLA in milk depends mainly on the level of linoleic acid (C18:2n-6) and linolenic acid (C18:3n-3) in animal feed and on the intensity of the activity of sterol-coenzyme A desaturase, given the value of the desaturation index of substrate (DI 18:2 c9, t11) (Mierlita, 2016). Differences in rumenic acid concentrations in milk fat can also be explained by differences in Δ^9 -desaturase activity, caused by a number of animal-dependent or nutritional factors (Griinari and Bauman, 1999; Giorgio et al., 2019). The CLA C18:2 *trans*-10, *cis*-12 isomer appears to be synthesized exclusively in the rumen because the existence of a Δ^{12} -desaturase in the mammary gland has not been demonstrated (Griinari and Bauman, 1999).

Research on experimental animal models has shown that CLA has an anticancer effect, prevents obesity by reducing the body's lipofforming capacity, has an antioxidant role (reduces oxidative degradation of polyunsaturated fatty acids in the structure of cell membranes) and prevents atherosclerosis (Rubino et al., 2006) has immuno-modulatory action. It is noteworthy that cow's milk contains 9 times less Omega 3 and CLA polyunsaturated fatty acids than women's milk; Rossant (2003) explaining in this way the better development of the brain and the higher level of intelligence found in breastfed infants. A similar conclusion emerges from the research of Andrew (2004) who found that low consumption of PUFA Omega 3 and CLA leads to an increase in the frequency of depressive states (eg in New Zealand 6% of the population suffers from depression compared

to only 1% in Japan where consumption of FA Omega 3 and CLA is 4 times higher).

VACCINE ACID (VA)

Although *trans* type fatty acids have negative effects on human health, *trans*-vaccenic acid (*trans*-11, C18:1), which accounts for 60-80% of all *trans* type fatty acids in milk and meat, has been shown to be (in experiments on human cell lines) that it has beneficial effects on the human body, because in human tissues through a process of elongation and desaturation it is transformed into conjugated linoleic acid (CLA).

To evaluate the nutritional quality of animal fats, in terms of impact on consumer health, Pilarczyk et al., (2015) recommend the calculation of sanogenic lipid indices: PUFA / SFA ratios, n-6 / n-3 FA, atherogenic index (AI), thrombogenic index (TI), desaturation index (DI) and hypocholesterolemic / hypercholesterolemic fatty acid ratio (h/H). Nutritionists believe that the ratio of n-6/n-3 fatty acids should be below 4:1, and that of PU FA/SFA should be above 0.45, to avoid the occurrence of cardiovascular diseases and those associated with obesity (Simopoulos, 2006). Fats that have a high atherogenic (AI) and thrombogenic index implicitly have a low h/H ratio are recognized as major risk factors for human health (Bucher et. Al., 2002; Sadation-Elahi et al., 2004).

The content of agri-food products in functional fatty acids and implicitly the value of sanogenic lipid indices are influenced on the one hand by genetic and physiological factors and on the other hand by a series of nutritional factors. Most studies have shown that nutritional factors are sovereign in manipulating the fatty acid profile and improving the sanogenic lipid indices of milk and meat fat (Chilliard et al., 2007).

ASSESSMENT OF THE NUTRITIONAL QUALITY OF MILK FATS (LIPID INDICES HEALTHY)

PUFA/SFA ratios, n-6/n-3 FA, atherogenic index (AI) and thrombogenic index (TI) are commonly used to assess the nutritional quality of milk fats in terms of impact on consumer health (Pilarczyk et al. , 2015). In general, a PUFA/SFA ratio greater than 0.45 and an n-6/n-3 ratio less than 4.0 are required in the human diet to prevent and even combat "lifestyle diseases" such as coronary heart disease and cancer (Simopoulos, 2002).

The atherogenic and thrombogenic index characterizes dietary fats in terms of the probability of increasing the incidence of pathogenic phenomena, such as the formation of atheroma plaques and/or blood thrombi (Pilarczyk et al., 2015). Addis et al., (2005) demonstrated that there is a direct correlation between the content in saturated FA and the value of

these indices (AI and TI) in dietary fats. It is believed that milk fat with high levels of AI and TI may contribute more to the development of atherosclerosis or coronary thrombosis in humans; but milk with a high h/H ratio can have a protective effect against cardiovascular disease (Hanus et al., 2018).

HPI (health promotion index) was proposed by Chen et al. (2004) as an indicator of the sanogenic quality of dietary fats and is based on the evaluation of the effect of some fatty acids in the structure of milk fats on cardiovascular diseases. Milk with a high HPI value is thought to be more beneficial to human health.

The calculation of the sanogenic lipid indices of milk fat is done using the following equations:

- $n-6/n-3 = (C18:2n-6 + C18:3n-6 + C20:4n-6) / (C18:3n-3 + C20:5n-3 + C22:3n-3 + C22:5n-3 + C22:6n-3)$ (Ellis et al. 2006);
- Atherogenic index (AI) = $(C12:0 + (C14:0 \times 4) + (C16:0) / MUFA + PUFA)$ (Chilliard et al, 2003);
- Thrombogenic index (TI) = $(12:0 + 16:0 + 18:0) / [(0.5 \times MUFA) + (0.5 \times n-6FA) + (3 \times n-3FA) + (n-3FA/n-6FA)]$, (Ulbricht & Southgate, 1991);
- Health Promotion Index (HPI) = $(n-3 PUFA + n-6 PUFA + MUFA) / [C12:0 + (4 \times C14:0) + C16:0]$, (Chen et al. 2004);
- Hypocholesterolemic / Hypercholesterolemic fatty acid ratio (h/H) = $(C18:1 + PUFA) / (C12:0 + C14:0 + C16:0)$ (Pilarczyk et al., 2015);

At the level of the mammary gland, enzymatic desaturation processes performed by Δ^9 - desaturase take place. The activity of this enzyme can be measured indirectly by comparing the product: substrate or product: (substrate + product) ratio of certain fatty acids. Therefore, the C14:1 / C14:1 + C14:0 ratio is the best indicator of this activity, because all the amount of C14:0 in milk fat comes from de novo synthesis in the mammary gland (Lock et al. 2005).

The enzyme Δ^9 - desaturase acts on the mammary gland and other tissues and adds a double bond in the Δ^9 position (between carbons 9 and 10 of saturated fatty acids with a chain length of 10 to 18 carbon atoms) and thus converts myristic acid (14:0) to myristoleic acid (*cis*-9 14:1), palmitic acid (16:0) to palmitoleic acid (*cis*-9 16:1), stearic acid (18:0) to oleic acid (*cis*-9 18:1) and vaccenic acid (VA; *trans*-11 18:1) to the conjugated linoleic acid isomer, respectively rumenic acid (*cis*-9, *trans*-11 18:2). Garnsworthy et al., (2010) suggest that the activity of the enzyme Δ^9 - desaturase, has an important genetic component, which means that the level of CLA *cis*-9, *trans*-11 in milk, is determined on the one hand by race, and on the other. on

the other hand it is due to rumen bacteria that favor the formation of acetic acid and promote the production of VA by biohydrogenation especially of linoleic acid (Kucuk et al. 2001).

Enzymatic desaturation indices are calculated based on mathematical equations; their high values indicating an intensification of the substrate desaturation processes, respectively a higher proportion of unsaturated fatty acids in milk coming from the enzymatic desaturation of saturated fatty acids at the level of the mammary gland:

- $DI(18) - \text{index } \Delta^9\text{-desaturase}(18) = 100 [18:1 / (18:1 + 18:0)]$ (Pilarczyk et al., 2015);
- $DI(18:2\ c9,t11) - \text{index } \Delta^9\text{-desaturase}(18:2\ c9,t11) = 100 [18:2\ c9,t11 / (18:2\ c9,t11 + 18:1\ t11)]$, (Pilarczyk et al., 2015).

Although a higher proportion of PUFA in milk fat is desirable from the perspective of the effect on human health, they can influence the technological properties of milk fat in a positive way (butter becomes easily spreadable) or negatively (it increases the susceptibility to oxidation of PUFA, with formation of aldehydes and ketones toxic to the consumer). Thus, indices such as (Hanus et al., 2018) have been proposed:

- the peroxidability index (PI), which represents the degree of unsaturation of food lipids and is used as an indicator of PUFA peroxidation;

$PI = 0.025 - \text{Mono} + \text{Di} + 2 - \text{Tri} + 4 - \text{Tetra} + 6 - \text{Penta} + 8 - \text{Hexa}$
where: Mono, Di, Tri, Tetra, Penta and Hexa represent the percentages of monoenoic, dienoic, trienoic, tetraenoic, pentaenoic and hexaenoic fatty acids.

- the spreading index (SI), for the evaluation of the ratio C16:0 and C18:1 c9, being the most precise indicator of the hardness of the butter ($SI = C\ 18:1\ c9 / C\ 16:0$).

THE EFFECT OF NUTRITIONAL FACTORS ON BIOACTIVE FATTY ACIDS IN MILK

Nutritional factors (nature of feed, type and structure of feed ration, fat supplement in food and their degree of saturation), in addition to the direct influence they have on bioproductive performance have a major importance in manipulating the structure and content of fatty acids Omega 3 and CLA polyunsaturated fats of animal origin (Khanal et al., 2004; Palmquist, 2007; Tomasz, 2007).

It is unanimously acknowledged that nutritional factors are sovereign in modulating the fatty acid profile of cow's milk (Rego et al., 2004; Flori et al., 2008; Gomez-Cortes et al., 2008; De La Fuente et al. al., 2009; Nuda et

al., 2020). By manipulating the diet, the milk fat content in n-3 FA and CLA can be changed up to five times (Gomez-Cortes et al., 2008, 2009; De La Fuente et al., 2009). The largest increases in the concentration of n-3 FA and CLA in milk fat are obtained by the use of fresh grass in food, which is rich in PUFA (especially linolenic acid and linoleic acid) and their rumen biohydrogenation results a larger amount of intermediates such as vaccenic acid (VA, C18:1, *trans*-11) (Addis et al., 2005; Abu Ghazaleh et al., 2007; Mikolayunas et al., 2008; Herves et al. . al., 2009) or by supplementing the diet with fats (Martini et. al., 2004; Melle et. al., 2007; Pulina et. al., 2006; Sanz-Samplelayo et. al., 2007).

The effect of the season is closely related to the type of diet; the most significant variations were observed in PUFA, with the highest values recorded in spring and summer and the lowest in winter (De La Fuente et. al., 2009). Banni et. al., (1996) noted that sheep's milk is much richer in n-3 FA and CLA compared to cow's milk; One possible reason could be that sheep are fed on pastures, and dairy cows are generally fed preserved and concentrated feed.

CONCLUSIONS

Consumer awareness of the link between dietary fats and health has led to increased demand and intensified research in the field of obtaining foods enriched with bioactive fatty acids. Milk fats and dairy products, contribute significantly to the rational diet of people, containing many beneficial FA (some even unique), such as omega-3 fatty acids (C18:3 c9, c12, c15; C20:5 n-3, C22:5 n-3), linoleic acid conjugated to the two important isomers (CLA: C18:2 c9, t11 and C18:2 t10, c12) and vaccenic acid (VA, C18:1 t11). Increasing these FAs in the structure of milk fats and dairy products, through sustainable cow farm management practices (such as breed, lactation phase) but especially by manipulating nutritional factors (nature of feed, type and structure of feed ration, use fresh green pastures or fodder, feed preservation, feed/concentrate ratio in food, fat supplement in food and their degree of saturation), can improve the health of consumers without a change in diet.

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EFFECT OF APPLYING ORGANO-MINERAL FERTILIZERS ON THE CONCENTRATION OF COOPER IN WHEAT AND MAIZE SEEDS

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Abstract

Were studied copper concentration of wheat and maize seeds harvested from four variants fertilized with different doses of organo-mineral fertilizers with nitrogen, phosphorus, potassium and farmyard manure. In wheat grains, for the three years under study, average copper concentration, in the control was 1.640ppm.

A higher concentration was determined in variant $N_{100}P_{100} + 60$ t/ha farmyard manure, there was of 36.4% compared to control, of 2.236ppm, being statistically significant.

In terms of the concentration of copper in the grains of maize, in unfertilized variant was 2.858 ppm.

The biggest difference compared to the control variant was registered in the version fertilized with $N_{100}P_{100} + 60$ t/ha farmyard manure, this being with 1.077 ppm bigger.

Percentage was higher by 37.7% being.

Key words: copper, wheat, maize, seeds, fertilizers, organo-mineral.

INTRODUCTION

Brune A. et al., (1995) argue that the differentiated toxicity of metals in plants is, at least in part, related to their compartmentalization in the plant: epidermis, mesophilic (and in their cells, in the cell wall, vacuoles and chloroplasts). Most of the metal content is attached to the cell walls (Abd El-Aziz S.S. et al, 2009).

For plants the accessibility of heavy metals is not constant. It varies depending on the species and soil and climatic conditions. Wastewater irrigation leads to an increase in the concentration of heavy metals (Cu, Cr, Mn, Ni, Pb and Zn) in the roots, stems and seeds of wheat plants, the most significant increase being in the case of manganese and zinc (M. Karatas et al., 2006, XuY. et al., 2013).

Salad, unlike carrots and potatoes, has a greater ability to accumulate zinc, copper and cadmium, and clover absorbs copper faster than grasses. The tolerance levels of various heavy metal crops are in descending order:

herbs, grasses, grains, potatoes, and sugar beet (R.L. Hough et al., 2003, Hejcman M. et al., 2013).

Plants exposed to excessive levels of copper in the soil can be toxic to most animals. Thus, sheep are very sensitive to copper, the toxicity occurring when the food contains 12-15 ppm Cu. Critical values in plants, dangerous for animals are 30 ppm Cu (Ciobanu G., 2007, Diacono M. and F. Montemurro, 2010).

By applying moderate doses of chemical fertilizers with nitrogen, phosphorus and potassium maize crop the concentration of copper in grains increases insignificantly (Vușcan A., 2017).

This article shows the influence of the organo-mineral fertilizers over copper concentration in wheat and maize seeds.

MATERIAL AND METHOD

The wheat and maize seeds were harvested in the long term trials at the Agricultural Research and Development Station Oradea, in 2014 – 2016 period.

Variants studied:

V₁- N₀P₀ + 0 t/ha farmyard manure,

V₂ - N₅₀P₀ + 20 t/ha farmyard manure,

V₃ - N₅₀P₅₀ + 40 t/ha farmyard manure,

V₄ - N₁₀₀P₁₀₀ + 60 t/ha farmyard manure.

Laboratory investigations were carried out in the “*Research Laboratory of risk factors for Agriculture, Forestry and the Environment*”, Faculty of Environmental Protection Oradea.

To determine the copper concentration, the plant samples were mineralized with a mixture of sulfuric and perchloric acids.

Samples of vegetal biological material were prepared according to the working methods and analyzed with a spectrophotometer with atomic absorption SHIMADZU AA-6300 to determine the concentration of copper.

The links between different doses of organo-mineral fertilizers and copper concentration in wheat and maize seeds were calculated using Microsoft Excel program; of the 5 types of functions available on the program (linear, exponential, logarithmic, polynomial and power) was chosen the function with the highest value of R².

RESULTS AND DISCUSSIONS

Wheat grains harvested from experiment with chemical fertilizers with nitrogen, phosphorus and farmyard manure had an average concentration of copper of 1.640 mg/kg in variant N₀P₀ + 0 t/ha farmyard

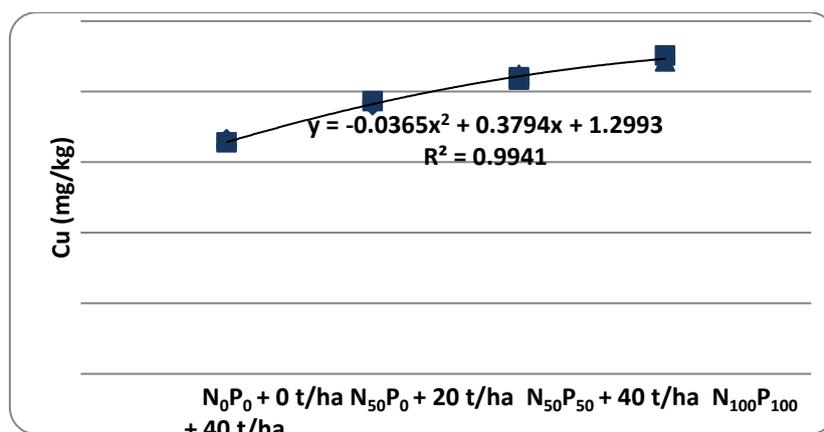
manure (control), 1.920 mg/kg (17.1% higher compared to control variant) in variant N₅₀P₀ + 20 t/ha farmyard manure, 2.102 mg/kg (28.2% higher compared to unfertilized variant) in fertilized variant N₅₀P₅₀ + 40 t/ha farmyard manure, respectively 2.236 mg/kg (36.4% higher compared to the control variant) in variant N₁₀₀P₁₀₀ + 60 t/ha farmyard manure. In fertilized variant N₅₀P₀ + with 20 t/ha farmyard manure the difference was statistically insignificant, and variants N₅₀P₅₀ + 40 t/ha farmyard manure and N₁₀₀P₁₀₀ + 60 t/ha farmyard manure the differences were statistically insured as being “significant”.

Table 1

The influence of NP fertilizers and manure on copper concentration in winter wheat seeds

Variant	Cu concentration		Difference		Statistical significance
	mg/kg	%	mg/kg	%	
N ₀ P ₀ + 0 t/ha farmyard manure	1.640	100	-	-	Control
N ₅₀ P ₀ + 20 t/ha farmyard manure	1.920	117.1	0.280	17.1	-
N ₅₀ P ₅₀ + 40 t/ha farmyard manure	2.102	128.2	0.462	28.2	*
N ₁₀₀ P ₁₀₀ + 60 t/ha farmyard manure	2.236	136.4	0.596	36.4	*
LSD 5%			0.310		
LSD 1%			0.611		
LSD 0.1%			0.958		

Mathematical modeling of the results regarding the concentration of copper in wheat grains from the variants of experiment with nitrogen, phosphorus and farmyard manure studied, from the 5 tested functions (exponential, linear, logarithmic, polynomial, power), polynomial type function, $y = -0.036x^2 + 0.379x + 1.299$, $R^2 = 0.994$, best quantifies the relationship between doses of nitrogen, phosphorus and farmyard manure fertilizers and the concentration of copper in wheat grains (Figure 1).



*FYM - farmyard manure

Fig. 1. Correlation between doses of NP fertilizers and manure and copper concentration in wheat grains

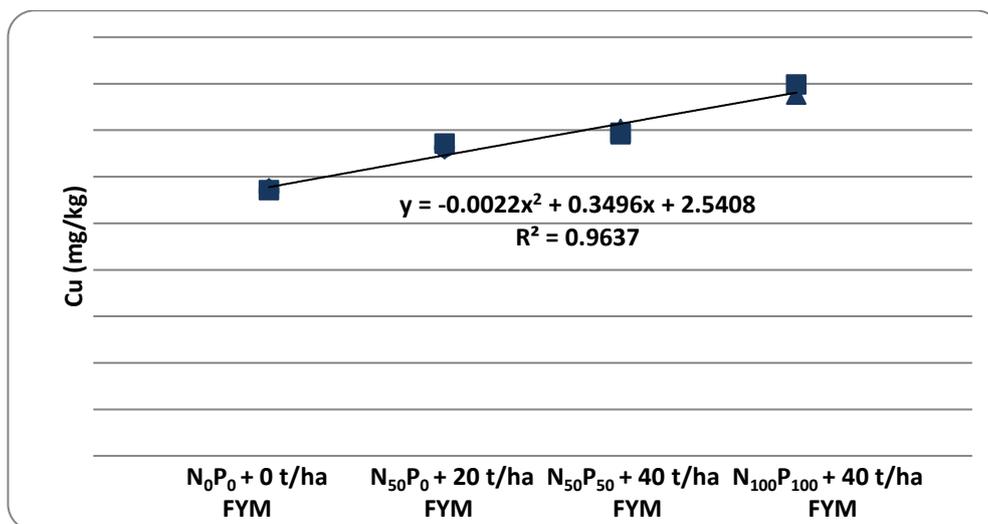
In the three years studied, the average concentration of copper in maize grains, the experiments with chemical fertilizers with nitrogen, phosphorus and farmyardmanure was 2.858 mg/kg for the control variant, 3.322 mg/kg (16.2% higher compared to control) in variant N₅₀P₀ + 20 t/ha farmyard manure, 3.479 mg/kg (21.7% higher compared to the control variant) in the fertilized variant with N₅₀P₅₀ + 40 t/ha farmyard manure, respectively 3.935 mg/kg (37.7% higher compared to unfertilized variant) in variant N₁₀₀P₁₀₀ + 60 t/ha farmyard manure.

Table 2

The influence of NP fertilizers and manure on copper concentration in maize grains

Variant	Cu concentration		Difference		Statistical significance
	mg/kg	%	mg/kg	%	
N ₀ P ₀ + 0 t/ha farmyard manure	2.858	100	-	-	Control
N ₅₀ P ₀ + 20 t/ha farmyard manure	3.322	116.2	0.464	16.2	-
N ₅₀ P ₅₀ + 40 t/ha farmyard manure	3.479	121.7	0.621	21.7	*
N ₁₀₀ P ₁₀₀ + 60 t/ha farmyard manure	3.935	137.7	1.077	37.7	**
LSD 5%			0.57		
LSD 1%			0.967		
LSD 0.1%			1.500		

The mathematical modeling of the results regarding the copper concentration in the maize grains from the variants of the experiment with nitrogen, phosphorus and farmyardmanure studied, shows that the polynomial type function, $y = -0,002x^2 + 0,349x + 2,540$, $R^2 = 0.963$, quantifies the best link between doses of NP fertilizers and farmyard manure and the concentration of copper in the maize grains.



*FYM - farmyard manure

Fig. 1. Correlation between doses of NP fertilizers and manure and copper concentration in maize grains

CONCLUSIONS

Changes in the copper concentration of seeds caused by the use of different doses and combinations of fertilizers led to a different translocation of copper in wheat and maize grains.

Compared to the unfertilized control in all the studied variants, the copper concentration in the wheat grains increased; on average during the period studied they were "statistically significant". In the variant fertilized with N₁₀₀P₁₀₀ + 60 t/ha manure, the biggest difference was registered, 36.4%.

For maize, there were statistically assured differences in the variants fertilized with N₅₀P₅₀ + 40 t/ha manure and N₁₀₀P₁₀₀ + 60 t/ha, being 21.7%, respectively 37.7% higher than the control, recording concentrations of 3.479 mg/kg and 3.935 mg/kg, respectively.

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ANIMAL HUSBANDRY

ASSESSMENT OF FATTY ACID COMPOSITION AND NUTRITIONAL VALUE OF FATS IN WHITE LUPINE SEEDS FROM LOW-ALKALOID VARIETIES

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Abstract

The aim of the research carried out was to establish by means of chromatography the fatty acid profile of white lupine seeds with low alkaloid content, Amiga variety, obtained in the specific agroclimatic conditions of Transylvania (47°17'03"N23°40'34"E). Oleic acid (C18:1 n-9) (48.8%), which is a monounsaturated fatty acid, is the main fatty acid in the fat composition of the white lupine seeds analyzed. Among the polyunsaturated fatty acid, linoleic acid (C18:2 n-6) (20.12%) followed by linolenic acid (C18: 3 n-3) (9.98%) stands out. Lupine seeds fat shows an optimal omega-6:omega-3 fatty acid ratio for human health, if considering recommended ratios ranging between 1/1 and 1/4. The high content of polyunsaturated fatty acid indicates that white lupine can be a potential source of fat, which can favorably influence the fatty acid profile of fats in animal agri-food products, with a sanogenous effect for consumers. Moreover, the high content of linoleic acid and linolenic acid highlight lupine seeds a good source of essential fatty acid for human and animal nutrition.

Key words: white lupine, FAME, gas chromatography, omega-6/omega-3.

INTRODUCTION

Old varieties of white lupine, due to their high alkaloid content (2-3%) have a limited use in animal feed. Recently, productive lupine varieties free of alkaloid (less than 0.002%) have been created through breeding works, so that they can be used as main protein source both in monogastric animal feed (pigs and poultry) and in human nutrition.

Lupine seeds contain 90-110 g fat/kg DM and have a high content of omega-3 and omega-6 series fatty acid. If this quality of lupine fats would be transferred to meat and eggs fats, it would lead to the improvement of their sanogenic lipid indices with beneficial effects for consumers (especially on the cardiovascular system). This increases the quality and competitiveness of the product obtained. Some researchers consider that in the future, white lupine seeds fat content could be increased by improvements works, so that they became comparable to soya beans related to protein and fat content (Voisin *et al.*, 2014; Faligowska and Szukala 2015, Reckling *et al.*, 2016).

In general, fats quality depends on the fatty acid profile and content, and also on the ratios of the main fatty acids (Rybinski *et al.*, 2017). In the case of polyunsaturated fatty acids (PUFA), the ratio between omega-6 and omega-3 series fatty acid is very important and especially the ratio between linoleic acid (C18:2 n-6, the main representative of omega-6 fatty acid) and linolenic acid (C18:3 n-3, the main representative of omega-3 fatty acid) both in animal nutrition, but especially in human nutrition (Suchy *et al.*, 2008).

The purpose of the research was to establish lupine seeds fatty acid profile by means of chromatography technique.

MATERIAL AND METHOD

For the studies, white lupine seeds with low alkaloid content, Amiga variety, obtained in the specific agroclimatic conditions of Transylvania (47°17'03"N 23°40'34"E) were used, accordingly to the culture technology recommended by Joordens Zaden BV (Netherlands), from where seeds were purchased to set up the white lupine culture.

The elementary sampling and the achievement of the homogenized raw sample was done according to the norms provided in the standards SR ISO 6498/2012 and STAS 21/3-73. The raw sample was homogenized and cleaned up of impurities in the laboratory, and then minced using the Laboratory mill type Grindomix GM 200. The quarter-end method, described by Salajan *et al.* (1999), was used to obtain the laboratory sample from the homogenized raw sample, which was then stored in tightly sealed glass jars at room temperature until use (Sujak *et al.*, 2006).

The fatty acid profile of fats in white lupine seeds was assessed by using the chromatographic gas method, which involves the conversion of sample fatty acid into methyl esters and their separation on chromatographic column, followed by set up of the fatty acid methyl esters ratio (FAME) from the determined fat.

Fat extraction from the sample was performed according to the method described by Folch *et al.* (1957), using as a solvent a mixture of chloroform-methanol (2:1, v/v). After sample was mixed with solvent and homogenized, the mixture was passed through a separatory funnel, and the filtrate was left to settle for 24 hours. The lower phase containing chloroform was used to dissolve the fat from the sample, it was passed into a flask and brought to dryness by evaporating the chloroform using a rotary evaporator. The fatty acid passed in methyl esters throughout chemical reaction with boron trifluoride/methanol at 80°C for two hours in a closed Pyrex glass tube.

The fatty acids were determined using a Shimadzu GC-17 A gas chromatograph (GC) coupled with a FID (flame ionization detector) detector and equipped with an Alltech AT-WAX column, 30 m long, 0.25 mm inside diameter and 0.25 μm thickness of the stationary phase (polyethylene glycol). Helium was used as carrier gas at a pressure of 149 kPa. The split ratio was 1:28. A 260 $^{\circ}\text{C}$ temperature was set for the injector and detector. The oven program was: 70 $^{\circ}\text{C}$ for 2 min., then it was raised to 150 $^{\circ}\text{C}$ with a gradient of 10 $^{\circ}\text{C}/\text{min.}$, and then a level of 3 min., next it was increased again to 235 $^{\circ}\text{C}$ with a gradient of 4 $^{\circ}\text{C} / \text{min}$ (fig. 1). After the gas chromatograph reached the programmed operating parameters, the FID detector for stearic acid was calibrated using tristearin chloroform solution and heptadecanoic acid (internal standard) (fig. 2), after which 0.5 μl hexane solution of fatty acid methyl esters (FAME) was injected using a Hamilton syringe.

The peaks area determination on gas chromatograms was made by using fatty acids authentic standards, achieved from Sigma Aldrich (St. Louis USA). The ratio of fatty acids in the analyzed sample fat was determined by relating the area of fatty acid of the sample to the area of the dilution standard, the result being expressed for each fatty acid as a percentage of fatty acid methyl esters (FAME).

RESULTS AND DISCUSSION

Table 1 data regarding fatty acid composition of fats in lupine seeds, shows that oleic acid (C18:1 n-9) was the main fatty acid, followed by linoleic acid (C18:2 n-6) and then α -linolenic acid (C18:3 n-3).

Each fatty acid concentration was influenced by variety and agroclimatic conditions, but on average, the predominant fatty acid in white lupine seeds are oleic, linoleic and linolenic acid, which is also ascertained by Jezierny *et al.* (2010), Rusníková *et al.* (2013) and Mierliță *et al.* (2018).

Saturated fatty acid content in lupine seeds is relatively low (12.12% of FAME - fatty acid methyl esters), which are represented by: palmitic (C16:0), stearic (C18:0), arachidic (C20 :0) and behenic (C22:0) acids.

Table 1

Fatty acid composition of white lupine seeds fat (% of FAME)

Specification	Own results			Bibliographic references *		
	Mean	(Min - Max)	SD	1	2	3
A. palmitic (C16:0)	6,10	(5,19 - 8,07)	0,43	8,57	4,30	5,86
A. palmitic (C16:1)	0,28	(0,22 - 0,39)	0,03	0,37	0,30	0,32
A. stearic (C18:0)	3,12	(2,54 -	0,39	1,57	2,28	2,98

		3,87)				
A. oleic (C18:1 n-9)	48,80	(41,24 - 56,12)	2,43	54,29	43,90	47,65
A. linoleic (C18:2 n-6)	20,12	(18,20 - 23,18)	1,96	14,92	22,19	19,97
A. α -linolenic (C18:3 n-3)	9,98	(6,43 - 11,51)	0,88	7,22	12,14	10,93
A. arachidic (C20:0)	1,07	(0,97 - 1,63)	0,32	0,81	0,99	0,90
A. gadoleic (C20:1 n-9)	5,51	(4,70 - 6,20)	0,47	4,14	8,14	6,82
A. behenic (C22:0)	1,83	(1,65 - 2,21)	0,24	2,73	ND	3,15
A. erucic (C22:1 n-9)	1,34	(0,97 - 1,38)	0,38	1,59	ND	1,42
Σ Saturated fatty A.	12,12	(9,71 - 14,08)	1,51	16,14	12,52	12,89
Σ Monounsaturated fatty A.	55,93	(51,43 - 60,37)	4,29	58,79	52,34	56,21
Σ Polyunsaturated fatty A.	30,10	(27,92 - 33,80)	3,21	25,07	35,14	30,90
n-6 / n-3	2,02	(1,22 - 3,71)	0,13	2,11	1,90	1,83
Polyunsaturated Index (PI)	40,08	-	-	29,36	46,47	41,83

*1- Andrzejewska *et al.*, 2016; 2 - Zrally *et al.*, 2007; Mierliță *et al.*, 2018.
FAME - fatty acid methyl esters; ND – not determined.

Monounsaturated fatty acid (MUFA) were the most common in fats structure of lupine seeds, representing 55.93% of the total fatty acid identified using chromatographic analysis (Fig. 1). The highest concentration was recorded in case of oleic acid (C18:1 n-9), which held 48.8% of FAME (fatty acid methyl esters). The results presented are generally consistent with the values obtained by Erbas *et al.* (2005), Uzun *et al.* (2007), and Rybinski *et al.* (2017). However, we should note that oleic acid concentration and implicitly monounsaturated fatty acid concentration in white lupine seeds was lower in our study, compared to those reported by Andrzejewska *et al.* (2016) (54.29% for C18:1 n-9 and 58.79% for MUFA, respectively), but higher than those referred by Zrally *et al.* (2007) in white lupine Amiga variety (43.9% in C18:1 n-9 and 52.34% in MUFA).

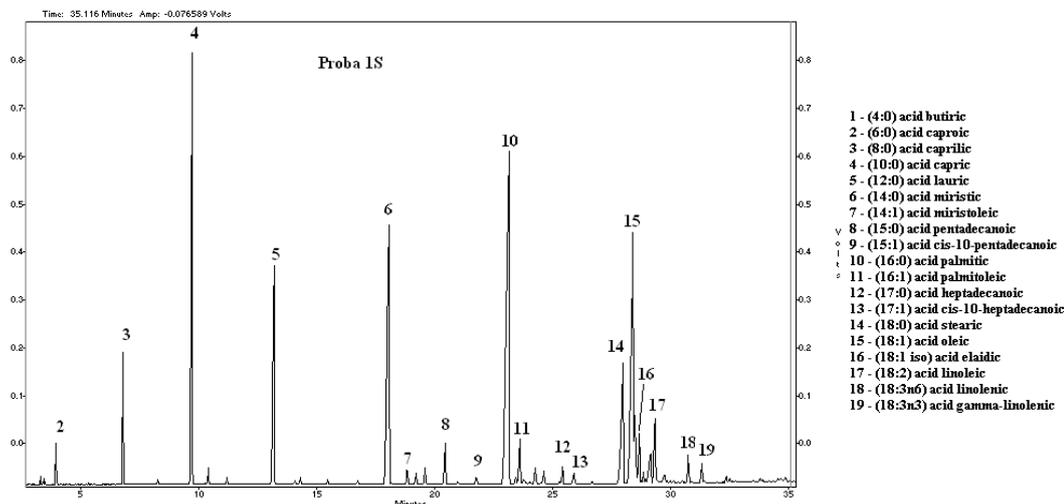


Fig. 1. Representative chromatogram of fatty acid in lupine seeds

The presence of erucic acid (C22:1) in food and feed is not desirable due to its toxic and antinutritional effects in humans and animals (Bhardwaj and Hamma, 2013). Our studies presented in the present paper, along with the data reported by Rybinski *et al.* (2017) is showing an advantage of white lupine, which is the presence of erucic acid in small amounts. The minimum and maximum values of erucic acid ranged from 0.97 to 1.38%.

The white lupine seeds polyunsaturated fatty acid content (PUFA) reached values between 27.92% and 33.8%, with a 30.1% average value of total fatty acid identified. PUFAs were represented by linoleic acid (C18:2 n-6) in a ratio of 20.12% and linolenic acid (C18:3 n-3) in a ratio of 9.98% of FAME (fig. 2).

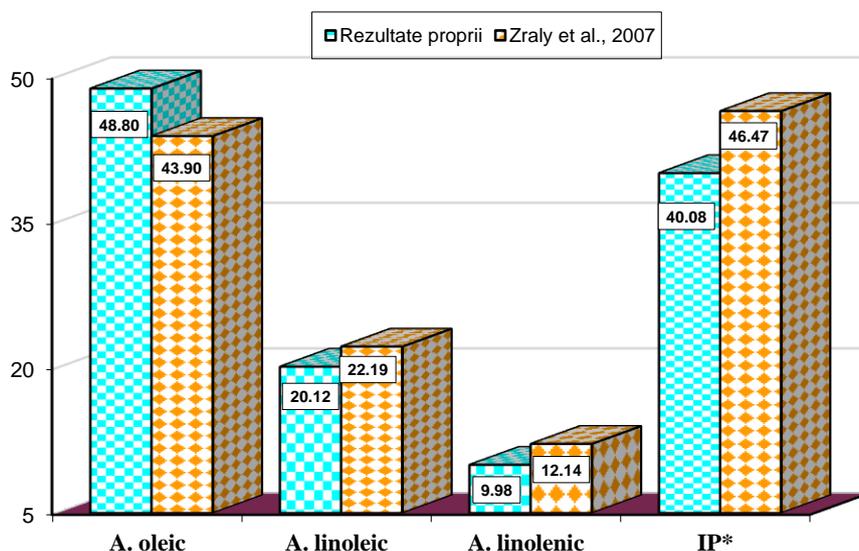


Fig. 12. Ratio of the main fatty acid and polyunsaturation index (IP) of white lupine seeds fats

Large range of variation of linolenic acid concentration (6.43 - 11.51%) indicates the possibility of selection for a high content of omega-3 fatty acid series of white lupine seeds. A large range of variability (5.6-12.8%) was also reported by Rybinski *et al.* (2017). Moreover, even data referenced in scientific publications related linolenic acid in fat content in white lupine seeds vary a lot: 7.22% linolenic acid, in the study performed by Andrzejewska *et al.* (2016) and 12.14% linolenic acid in the study carried out by Zrally *et al.* (2007).

Omega-6/omega-3 fatty acid ratio is very important in human nutrition and should be between 1:1 and 1:4 (Simopoulos, 2003). The white lupine seeds analyzed in this study meet this criterion, linoleic acid (n-6) and linolenic acid (n-3) ratio being 1: 2.02, with variation limits between 1: 1.22 and 1: 3.71, due to linolenic acid concentration large variation limits. The present study shows high values of polyunsaturation index (PI) of fats in lupine seeds, which indicates that lupine contains a large amount of polyunsaturated fatty acid (PUFA). PUFA input in human diets is recommended for cardiovascular diseases prevention (Simopoulos, 2003), and on the other hand polyunsaturated fatty acid are precursors for long-chain omega-3 polyunsaturated fatty acid biosynthesis, specifically eicosanoids, which act as biological regulators of many cellular processes and immune system (Ijarotimi *et al.*, 2015).

CONCLUSIONS

The high content of polyunsaturated fatty acid indicates that white lupine can be a potential source of fat, which can favorably influence the fatty acid profile of animal agri-food products, with a sanogenic effect for consumers. [Furthermore](#), linoleic acid and linolenic acid high content of lupine seeds indicate that it as a good essential fatty acid source for human and animal nutrition.

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STUDY REGARDING THE REPRODUCTION ACTIVITY OF SHAGYA ARABIAN BROODMARES FROM RĂDĂUȚI STUD FARM

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Abstract

This paper represents a case study on some aspects of reproductive activity, carried out within the Rădăuți stud farm, Romania. Specifically, the results obtained were followed and analyzed, from the broodmare population of the 2000s generation, from the moment of their promotion in the reproduction herd of the stud farm, and after taking the qualification tests until now. Thus, we observed that on average: the age of introduction to reproduction was 1714.8 ± 104.1 days (4.7 ± 0.3 years); the age at first foaling was 1626.4 ± 56.9 days (4.5 ± 0.2 years); the gestation length was 338.7 ± 0.9 days; service-period parameter was 149 ± 18.3 days; foaling-interval parameter was 503 ± 19.9 days; the reproductive longevity of the studied broodmares was 5335.6 ± 429.2 days (14.6 ± 1.2 years). Regarding the obtained data we confirm that the biological material studied presents reproduction aspects results within the limits specified by the literature.

Key words: reproduction, foaling-interval, gestation, longevity, broodmares

INTRODUCTION

Given that the main purpose of a stud farm is to obtain high-value products that perpetuate and improve the number of horses, it goes without saying that the place occupied by activities related to the breeding segment. The results obtained in the breeding activity of a stud reflect practically the entire activity of that stud, because the achievement of superior results, from the point of view of reproduction, is dependent on many other aspects related to the general management applied in the stud (feeding, shelter and horse care, the professionalism and education of the staff employed etc.).

It is known that, compared to other species of domestic animals, the efficiency of horse breeding is much lower. Thus, under normal conditions, its fertility is on average 65%, and the birth rate rarely exceeds 50%. On the other hand, in stud farms, where the growing conditions are close to optimal, fertility can sometimes exceed 90% and birth rate 80-85% (Dumitrescu I. 1986; Doliș M.G., Gavrilaş A., 2008; Gîlcă I., Doliș M.G., 2006; Mărginean et al., 2005; 2012; Moldoveanu et al., 1961; Pânzaru C. et al., 2019; Tănase D., Nacu Gh., 2005; Velea C. et al., 1980).

The low values obtained for these reproductive indices are usually the result of so-called physiological sterility, for which the main culprit, in most cases, is the man.

Through this paper we propose, based on the analysis of the existing data in the records of the stud, to create a more realistic picture of the breeding activity in this unit, with positive and negative aspects, from which certain conclusions can be drawn and, thus, to be able to make a small contribution to the best progress of the activity of future breeding of Shagya Arabian horses, from Rădăuți Stud Farm.

MATERIAL AND METHOD

The object of the research was a group of 16 mares, belonging to 5 genealogical bloodlines of the Shagya Arab breed (El-Sbaa, Siglavy-Bagdady, Koheilan, Hadban, Shagya, and Dahoman genealogical bloodlines), from the 2000s generation, which was promoted in the National Stud, broodmares category, by the National Commission for the evaluation and classification of Purebred horses, based on the results obtained after taking the qualification tests and the credit rating works from 2003 (table 1).

Table 1

The biological material studied

Nr. Crt.	Name	Birthdate	Nr. Crt.	Name	Birthdate
1	El-Sbaa XII-35	15.02.2000	9	El-Sbaa XII-38	06.04.2000
2	El-Sbaa XII-36	15.02.2000	10	Shagya LXII-7	29.04.2000
3	Siglavy-Bagdady XV-58	16.02.2000	11	Hadban XXXV-17	15.07.2000
4	Koheilan XXXIX-15	18.02.2000	12	El-Sbaa XII-42	19.08.2000
5	Shagya LXII-3	19.02.2000	13	Dahoman XXXIX-51	04.12.2000
6	Shagya LXII-8	23.05.2000	14	Siglavy-Bagdady XV-61	06.12.2000
7	El-Sbaa XII-37	25.02.2000	15	Dahoman XXXIX-53	08.12.2000
8	Shagya LXII-6	07.03.2000	16	Hadban XXXV-18	27.12.2000
1	El-Sbaa XII-35	15.02.2000	9	El-Sbaa XII-38	06.04.2000
2	El-Sbaa XII-36	15.02.2000	10	Shagya LXII-7	29.04.2000
3	Siglavy-Bagdady XV-58	16.02.2000	11	Hadban XXXV-17	15.07.2000
4	Koheilan XXXIX-15	18.02.2000	12	El-Sbaa XII-42	19.08.2000
5	Shagya LXII-3	19.02.2000	13	Dahoman XXXIX-51	04.12.2000
6	Shagya LXII-8	23.05.2000	14	Siglavy- Bagdady XV-61	06.12.2000
7	El-Sbaa XII-37	25.02.2000	15	Dahoman XXXIX-53	08.12.2000
8	Shagya LXII-6	07.03.2000	16	Hadban XXXV-18	27.12.2000

We chose this population starting from the consideration that the selected broodmares had a long period of reproductive activity (up to 17 years), which could provide sufficient data for a complex study.

The data necessary for the analysis of the breeding activity were collected from the stud records, respectively from: Genealogical Register, Register of broodmares, Ranking Tables, Monthly and Annual Reproductive Situations etc.

The breeding activity of the mares was mainly analyzed based on the reproductive indices, as follows:

- the age of introduction to reproduction (the difference between the date of first breeding and the date of birth);
- the age at first foaling (the difference between the date of first foaling and the date of birth);
- gestation length (the difference between the date of foaling and the date of the related fertile foaling);
- SP – service-period parameter (the difference between the date of foaling and the date of fertile breeding after foaling);
- FI – foaling-interval (the difference between the dates of two successive foalings or the sum between SP and the next gestation length).

Data were statistically processed using the arithmetic mean (\bar{x}), variance (s^2), standard deviation (standard deviation of individual values - s), standard deviation of the mean ($\pm s\bar{x}$), and also the coefficient of variation (V%).

RESULTS AND DISCUSSION

From the records of the stud farm, based on the data regarding the birth and the first breeding, it was possible to determine the age of introduction to reproduction of the mares studied.

Following the statistical processing of these data, it was observed that the introduction of mares for breeding was done, on average at the age of 1714.8 ± 104.1 days (4.7 ± 0.3 years), with limits between 1242 and 3041 days (3.4-8.3 years), the group manifesting from this point of view a high variability (24, 3%).

High variability is given by the fact that one of the broodmares (Shagya LXII-3) recorded the first breed at the age of over 8 years, while most recorded this much earlier (at 4-5 years). If the mentioned mare were not taken into account, the average would be 1626.4 ± 56.9 days (4.5 ± 0.2 years), the variability decreasing to 14%.

Another observation is the fact that, of the 16 mares born in 2000, the majority (81.25%) were introduced to breeding activity in the seasons of 2000 and 2005, respectively 43.75% (7 heads) and 37.50 % (6 heads), so, generally, at age 4-5 years, the rest being introduced in the season in the season of 2003 (12.50%/2 heads), at the age of fewer than 4 years,

respectively in the season of 2008 (6.25%/1 head), at an abnormal age, over 8 years.

Depending on the bloodline (fig. 1), the age at the first mount varied, on average, from 1247 days (Koheilan) to 1953.5 days (Shagya).

The data obtained in this study fall within the limits provided in the literature, which specify that young horses can be used for the first mount when they have achieved at least 75% of adult development, respectively the age of 2½-3 years in heavy breeds, 3-3½ years for intermediate breeds and 3½-4 years for light breeds (Dumitrescu I., 1986; Doliş M.G., Gavrilaş A., 2006; Tănase D., Nacu Gh., 2005; Ujică V., 1981; Ujică V., 1988; Velea C., 1980).

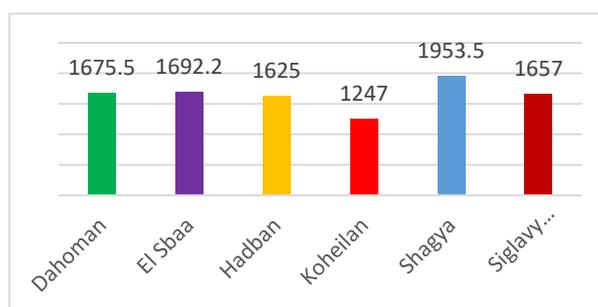


Fig. 1. The average age of introduction to reproduction (days) of genealogical bloodlines

Unlike the age of introduction to reproduction, which is largely dependent on the organization of reproductive activity, the age at first calving is mainly dependent on the proper functioning of the female genital tract, the neurohormonal balance of the mare, and the result of breeding, respectively of fecundity.

In the case of the studied population, 7 mares (43.75%) foaled after the first breeding, respectively from the first year/breeding season, another 7 mares foaled for the first time in the second year after introduction to breeding, while 2 mares (12.5%) never calved (El-Sbaa XII-36; Koheilan XXXIX-15).

If we disregard the two mares, which did not register foalings, the age at the first foaling, for the entire studied herd, was on average 2186.6 ± 164.0 days, respectively 6.0 ± 0.4 years, with limits between 1755 and 4200 days, respectively 4.8 and 11.5 years (fig. 2). The variability for this character was high (28.1%) and, as in the case of age at first mating, was mainly due to the mare Shagya LXII-3, which, as seen, recorded the first mating only after the age of 8. Eliminating this mare from the calculation, the average reaches 2031.8 ± 58.2 days (5.6 ± 0.2 years), and the variability decreases to 10.3%, these values being normal.

If only mares, which foaled from the first year of breeding use, are taken into account, the age at first foaling is reduced, on average, to 1963.1 ± 21.4 days (5.4 ± 0.1 years), which is a desirable value in any stud farm. In this case, the variability is small (2.9%), the group being homogeneous in terms of this character.

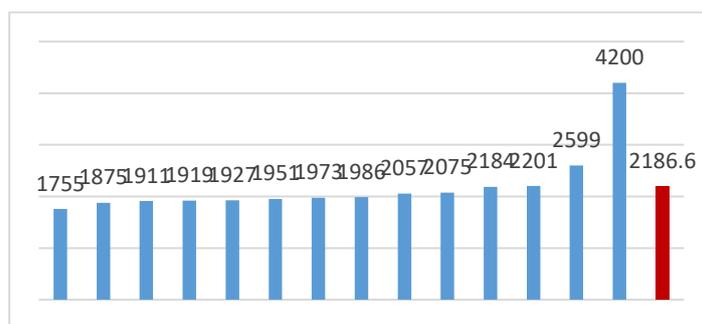


Fig. 2. The absolute and average values of age at first foaling (days)

From the statistical processing of the data on the gestation length, it is observed that on the entire herd studied and taking into account all gestation lengths completed with calving; the average duration of gestation was 338.7 ± 0.9 days, the limits of absolute values were 313 and respectively 366 days (fig. 3).

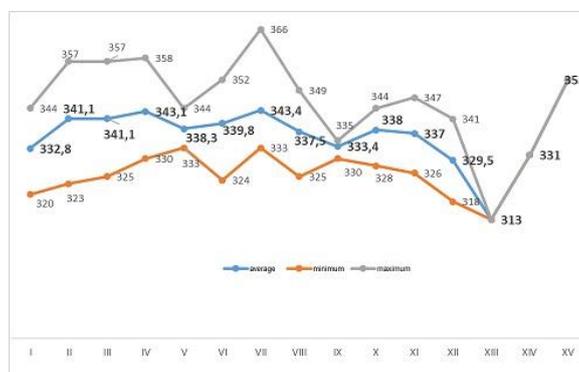


Fig. 3 The dynamics of gestation length (days)

The average duration of the first gestation was 332.8 ± 5.2 days, calculated for 13 mares, as the gestation of the Dahoman mare XXXIX-51 ended with a late abortion, at 273 days, and was not taken into account. The limits were between 320 and 344 days, the group studied being homogeneous from this point of view ($V\% = 2.4$).

In the case of the second gestation, for 11 mares, the average was 341.1 ± 3 days, with limits between 323 and 357 days. Also, in the case of this second gestation there was a case of abortion, which occurred on the

291st day and was not taken into account (Shagya LXII-3). The average of the third gestation, calculated for 12 mares, was 341.1 ± 2.7 days, with limits between 325 and 357 days.

The duration of the fourth gestation the average value was 343.1 ± 2.4 days, which was calculated for 11 mares. The absolute values ranged between 330 and 358 days, the group being homogeneous from this point of view ($V\%=2.3$). The mare El-Sbaa XII-35 during the fourth gestation was aborted at 267 days, so it was excluded from the calculation.

The fifth gestation had an average duration of 338.3 ± 1.2 days, with limits between 333 and 344 days. Of the 12 mares left pregnant in this case, one (Hadban XXXV-17) had an abortion at 255 days, not being considered.

The sixth and seventh gestations with an average of 329.5 days, were available for just 2 broodmares (328 and 344 days).

The 13th, 14th, and 15th gestations were recorded in the case of a single mare (El-Sbaa XII-38) and lasted between 313 and 352 days.

Depending on the genealogical bloodline of mares (fig. 4), the average gestation length ranged between 334.9 ± 3.3 days (Dahoman) and 341 days (Shagya). The shortest gestation length was recorded at the El-Sbaa bloodline (313 days), and the longest at the Dahoman bloodline (366 days).



Fig. 4. Gestation length of genealogical bloodlines (days)

In the literature, the gestation length of mares is, on average, 11 months, with variations between 307 and 412 days (Doliş M.G., Gavrilaş A., 2006; Pânzaru C., et al., 2017; Ujică V., 1981; 1988).

The data on the service period were centralized and statistically processed (fig. 5).

From these data, it is observed that, in general, counting all foalings, respectively fertile amounts, SP in the studied population had an average value of 149 ± 18.3 days, the absolute values oscillating in very wide limits, between 6 and 783, which also determined a very high variability of the character, between 84 and 139.2% (fig. 5 and 6).

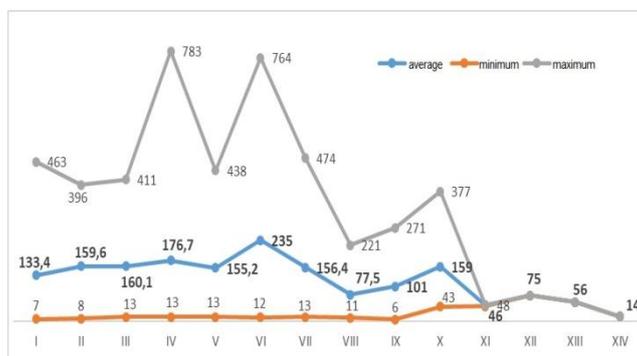


Fig. 5 The dynamics of the service-period parameter (days)

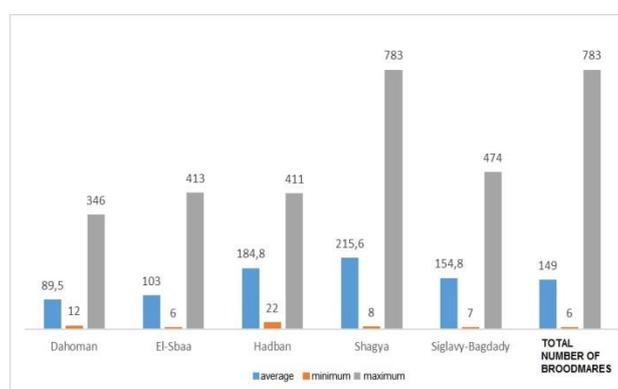


Fig. 6 The service-period length of genealogical lines (days)

In the calculations, the fourth gestation was completed with late abortion (Dahoman XXXIX-51, El-Sbaa XII-35, Hadban XXXV-17, Shagya LXII-3) but they were assimilated as normal gestations. The lowest value of the average duration of SP was recorded after the eighth foaling, calculated for 6 mares, respectively 77.5 ± 38.4 days. The absolute minimum of SP, recorded in this study, was 6 days after foaling. The highest mean value of SP duration was recorded after the sixth foaling, respectively 235 ± 90.4 days. The absolute maximum was recorded after the fourth foaling, 783 days (Shagya LXII-7). In this case, after the fourth foaling, the highest variability of the character was registered, respectively 139.2%.

Depending on the pedigree of mares, the average length of service ranged from 89 ± 27.4 days (Dahoman) to 215.6 ± 45.5 days (Shagya). The shortest duration of the SP was recorded at the El-Sbaa bloodline (6 days), and the longest at the Shagya bloodline (783 days). Counting all the intervals between foaling (89), at the level of the entire population the FI had an average value of 503 ± 19.9 days and absolute values that ranged between 326 and 1125 days (fig. 7 and 8). The absolute minimum for this character was registered in the population studied in the case of the first FI,

respectively the one registered between the first and the second foaling (326 days). The absolute maximum in this study was recorded in the case of the fourth FI (1125 days).

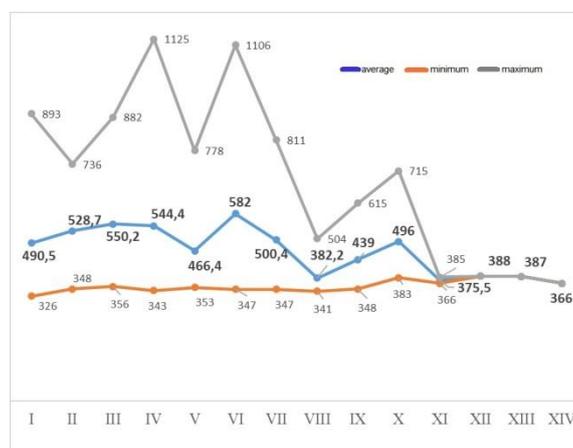


Fig. 7. The dynamics of foaling-interval parameter (days)

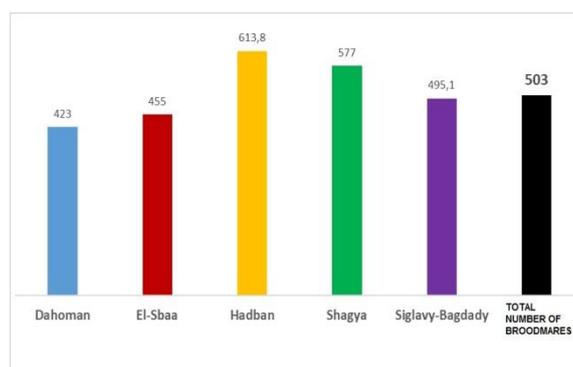


Fig. 8. The average values of foaling-interval parameter of the genealogical bloodlines (days)

The variability of this character in the population was generally high (18.1-46.4%).

The calculations did not take into account the 4 abortions, mentioned above, from the mares Dahoman XXXIX-51, El-Sbaa XII-35, Hadban XXXV-17 and Shagya LXII-3.

Depending on the bloodlines of mares, the mean foaling-interval ranged from 423 ± 31.4 days (Dahoman) to 613.8 ± 63.7 days (Hadban). The shortest duration of the FI was recorded at the Dahoman bloodline (326 days), and the longest at the Shagya bloodline (1125 days).

The reproductive longevity of the studied mares was estimated based on the age they had at the last record in the reproduction registers, respectively breeding or foaling (fig. 9 and 10).

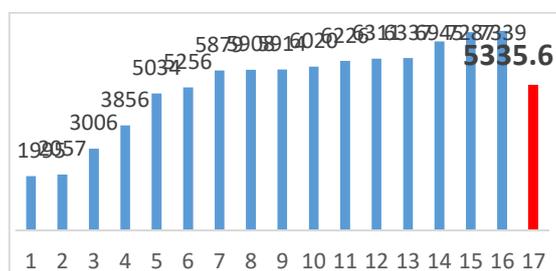


Fig. 9 Reproductive longevity of broodmares (days)

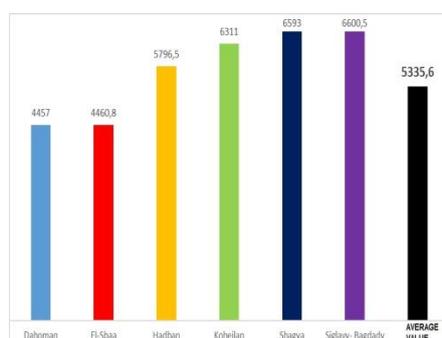


Fig. 10 Reproductive longevity of broodmares from all genealogical lines (days)

Thus, it was observed that in 12 mares (75%) the last breeding event recorded in the records was a insemination, namely a non-fertile one, after which the mare was excluded from the breeding nucleus, on the occasion of the first classification. In 4 other mares (25%) the last recorded breeding event was calving. Of the 16 mares of the 2000 generation, taken into the study, three are still active in the stud farm. These are:

- Shagya XII-7 (last mounted on 05.05.2019 - non-pregnant);
- Siglavy Bagdady XV-58 (last childbirth on 29.01.2020);
- El Sbaa XII-38 (last calving 10.05.2020).

Statistical data processing shows that the reproductive longevity of the mares studied was on average 5335.6 ± 429.2 days (14.6 ± 1.2 years), with limits of 1995 and 7339 days (5.5 and 20,1 years). The variability of this character in the studied population was high, of 32%.

Depending on the genealogical bloodline of mares, the highest average reproductive longevity (6600.5 days/18.1 years) was recorded on the Siglavy-Bagdady line, and the lowest (4457 days/12.2 years) on the Dahoman line.

CONCLUSIONS

Following the study on the breeding activity carried out on the 16 mares of the Shagya Arab breed from the 2000 generation, promoted in the herd of the Rădăuți Stud Farm, the following conclusions were drawn:

- the average age of introduction to reproduction of mares was 1626.4 ± 56.9 days, respectively 4.5 ± 0.2 years;
- the average age of mares at the first foaling was 2186.6 ± 164.0 days, respectively 6.0 ± 0.4 years;
- the average gestation length of broodmares was 338.7 ± 0.9 days, the limits of the absolute values registered to be 313, respectively 366 days;
- the service period had an average value of 149 ± 18.3 days, the absolute values oscillating in the limits of 6 and 783 days;
- the foaling-interval was on average 503 ± 19.9 days, the absolute values recorded ranged between 326 and 1125 days;
- the reproductive longevity was on average 5335.6 ± 29.2 days (14.6 ± 1.2 years), with limits of 1995 and 7339 days (5.5 and 20.1 years).

Given the conclusions drawn during this study, it is recommended to ensure all conditions (food, shelter, care) to ensure the best results in breeding activity. Also, it is important to maintain, respectively promote in the breeding herd of the stud farm only the best specimens, able to bring genetic progress.

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RESEARCH ON THE THERAPEUTIC EFFECT OF SEA BUCKTHORN HIPPOPHAË RHAMNOIDES L. AND OIL EXTRACTED FROM THESE

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Abstract

Research has been made regarding the quality of common sea-buckthorn fruits (*Fructus Hippophae*) harvested manually from underbrush growing spontaneously in the Cluj-Bistrita area. In order to achieve proper storage, the common sea-buckthorn fruits were partially dried at 50 to 60°C, and then packed into paper bags. Gross chemical composition was determined by using methods of feed analysis. Obtained results have shown structure values closely resembling those recorded by literature. During the second phase of the research, common sea-buckthorn fruit oil was extracted by using petroleum ether heated at 60-degree Celsius in water bath. The oil was 34-35% of the fruits' dry matter. The chemical profile of fatty acids within the oil structure was determined by gas chromatography. It was noticed that the common sea-buckthorn oil contains a remarkable quantity of unsaturated fatty acids (oleic, linoleic and linolenic). Extraction residues (common sea-buckthorn grit) was recommended for lying hen feed, which could determine an increase in body weight and egg production. The oil has also been useful in veterinary medicine for external use in the treatment of soft-tissue destructive pathology (mastitis) and in human medicine, helping with the treatment of burns, psoriasis and decubitus sores. Results have been remarkable. We highly recommend increasing the use of common sea-buckthorn fruits, common sea-buckthorn oil and common sea-buckthorn grit, both in animals and humans.

Key words: sea-buckthorn oil, fatty acids, external use

INTRODUCTION

The flora of our country is extremely rich in medicinal plants. Among the species of great importance for the active principles contained the sea buckthorn *Hippophaë rhamnoides L* is also found. Direct observations, made over time, as well as numerous studies on sea buckthorn, have led to the highlighting of substances with special physiological effect, rare or non-existent in other plants. The properties of these substances found in sea buckthorn fruits are addressed to all diseases of the body related to malnutrition (poor absorption and metabolic processing of food) and the immune system, as well as diseases caused by stress (Thomas et al., 1996). Due to its exceptional qualities, the complexity of the active substances it contains, sea buckthorn finds applications in pharmacology to obtain a wide range of drugs used in human and veterinary medicine (Brad, 2002).

Among the components of sea buckthorn, fruits are the most important, concentrating in them the active principles of the plant. Sea buckthorn is a vascular and nervous trophic, coronary protector, has antiscorbutic action due to the high content of vitamin C, antiulcer action, dermato-generative effect, anti-inflammatory, slightly bactericidal. It is a general tonic, good antianemic, stimulates the body's immunity, it is also used in neoplasms, hormonal disorders that occur at menopause, in osteoporosis associated with various tinctures. Sea buckthorn fruits contain vitamin C, twice as much as in rosehips and ten times more than in citrus, carotenoid substances (α and β carotene, zeaxanthin, cryptoxanthin, physalis), vitamin E, B1, B2, PP, folic acid, vitamin P (flavonoids) in the form of glycosides of everator, isoramnetol and kemferol, provitamin D, phytosterols, inositols (Sabir et al., 2005). The oil is rich in oleic, linoleic, linolenic, palmitic acid and triterpene substances such as ursolic and oleanolic acid. It also contains macro- and microelements, especially Ca, P, Mg, F. The average oil content of whole sea buckthorn fruits is 8-12%. In veterinary medicine, sea buckthorn oil has been tested in the treatment of ovine necrobacillosis, in infectious pododermatitis, in the treatment of wounds caused by mechanical haircuts (Kaushal et al., 2011). After the oil extraction, the process residue remains, which can be used in animal feed, being a rich source of proteins with high biological value, energy substances, minerals and vitamins.

MATERIAL AND METHOD

The following determinations were made for fruits: organoleptic characteristics, hectoliter weight, and crude chemical composition. When examining the organoleptic characters, the color, smell, dimensions, uniformity and integrity were observed by direct examination.

The drying of the fruits for storage was carried out progressively, in two stages: the determination of the hectoliter mass was performed after STAS 6123 / 2-73. Two determinations were performed in parallel and the average was calculated expressing the result in kg/hl.

The determination of the dry matter content consists in drying the sea buckthorn fruits at a temperature of 105°C to a constant mass.

Fat extraction was performed using the Soxhlet extractor. In the composition of raw fat, in addition to the actual fat, there are other substances: waxes, steroids, phosphatides. At extraction, the solvent carries with it fat and other substances: vegetable pigments, fat-soluble vitamins, resins, essential oils. The crude fat was determined by weighing the crude fat: by distilling the solvent and weighing the remaining fat in the flask.

The protein was determined by the Kjeldahl method, based on the transformation of organic nitrogen into inorganic nitrogen. By multiplying the amount of nitrogen determined by a factor of 6.25, the so-called "crude protein" was obtained.

The determination of total nitrogen was performed in three steps: mineralization of the sample, alkalization of the sample, distillation of ammonia and collection in sulfuric acid - 0.1 N solution and titration.

Non-nitrogenous extractive substances were determined by difference, using the relation: $SEN (\%) = SU - (Pb + Gb + Ceb + Cb)$.

Crude cellulose was determined by the Weende method.

The principle of the method for the determination of crude ash consists in incinerating the samples in the calcination furnace at a temperature of 550°C.

To determine the quality of the oil obtained from sea buckthorn fruits, the gas-chromatographic determination of the methyl esters of fatty acids was performed by trans-esterification of the lipids in the sample.

A Shimadzu GS 17 A gas chromatograph with FID detector and Chrompack capillary column, specialized for the determination of fatty acids, was used for the determination.

The acidity index is the number of mg of potassium hydroxide (KOH) required to neutralize the free fatty acids in one gram of oil.

This index changes according to the duration and storage conditions of the oil. Fresh oils have a very low acidity.

The acidity index increases with the age and the degree of rancidity of the oil and shows the degree of hydrolysis of the fat.

The acidity index was determined by titration with a basic solution in the presence of phenolphthalein as an indicator. As reagents, were used: potassium hydroxide 0.1 N solution; neutralized mixture of ethyl alcohol-ethyl ether 1: 1; phenolphthalein, 1% alcoholic solution.

The titration was performed until a pink color was obtained.

The acidity index was obtained based on the titration factor, the volume of the hydroxide used for titration, the mass of the product taken into consideration and K used in alkaline solution of 0.1 N.

To obtain the oil, finely ground fruits were used and as solvent the petroleum ether with evaporation by heating on a sand bath.

Crude sea buckthorn oil obtained was used as such or in a mixture with petroleum for the treatment of the following diseases: one case of severe psoriasis (in the trunk), 5 cases of skin burns caused by hot water or gas flame, a case of fungal dermatitis in humans, a case of mastitis in cows, located in a quarter of the mammary gland with nipple necrosis, rebellious to treatment.

RESULTS AND DISCUSSION

On organoleptic examination, dried sea buckthorn fruits had a very variable size, shape and color.

The hectolitre weight was 28.8 kg.

The results obtained from the analysis of the raw chemical composition are presented in Table 1.

Table 1

Gross chemical composition (%) of the sea buckthorn fruits studied

DM	Protein	Fat	Cellulose	NES	Ash
88,89	20,25	22,77	9,16	33,52	3,19
100	22,78	25,62	10,30	37,71	3,59

The dry matter content of dried fruits was within normal limits. The crude protein had high values that exceed the values in the literature attributed to the cultivated varieties (Oprica et al, 2007).

The crude fat, in the amount of 25.62% of the dry matter, had values much lower than the values given by the specialized literature.

The values found in the determination of raw fat place sea buckthorn fruits among those of plant species which are a significant source of oil with medicinal properties.

Crude cellulose, relative to dry matter, was elevated due to fruit seeds.

Non-nitrogenous extractive substances (SEN), which are known to consist of carbohydrates, had high values.

They give the oil processing residues important nutritional qualities. The content in mineral substances (raw ash) was around 3.8% of the dry matter, a value similar to other specialized data.

Sea buckthorn oil obtained from the researched fruits contains significant amounts of essential fatty acids, especially from vitamin F group (table 2) and confirm other literature data (Yang and Kallio, 2001).

They certainly give it therapeutic properties and by oral administration.

Table 2

Concentration of fatty acids with C16, C17 and C18 in the analyzed sea buckthorn oil

Fatty acid	Abbreviation	Retention time (min)	Concentration (%)
Acid palmitic	C16: 0	9,89	36,71
Acid palmitoleic	C16:1	10,4	25,30
Acid heptadecanoic	C17:0	12,1	-
Acid stearic	C18:0	14,45	-
Acid oleic	C18:1	14,8	28,92
Acid linoleic	C18:2	15,8	6,47
Acid linolenic	C18:3	17,26	2,44

The results obtained from the treatments performed were the following: cases of burns in which the crude oil was used or solved in a very short time, the oil prevented the formation of blisters and total healing in 1-3 days, depending on the severity of the burn; the use of the oil in the treatment of mastitis in cows had healing effects, after 18 days of applications with raw sea buckthorn oil there was healing; the treatment of psoriasis, with severe generalized rash, had the effect of removing crusts and suppuration, starting epithelialization after about a week of skin applications and after two months epithelialization became almost normal. The oil was applied twice a day to the wound.

The acidity index of sea buckthorn oil obtained from relatively dried and preserved fruits for 6 months, determined in oil after 3-4 weeks after extraction was 4.34 mg KOH / g oil. The value obtained is much lower than that given by different authors for the oil resulting from pressing, extraction with organic solvents or extraction with CO₂.

CONCLUSIONS

Research on the value of sea buckthorn fruits (*Hippophae fructus*) has shown that they have significant oil content.

It has been shown that the oil is more efficiently separated from finely ground fruit with heated and evaporated petroleum ether by heating in a sea bath, than from fruit crushed by grinding (larger granulation) and by heating the solvent in a sand bath.

The oil extracted in the Soxhlet apparatus with petroleum ether was analyzed by gas chromatograph. The results obtained showed that it has an increased content of polyunsaturated fatty actions, especially from vitamin group F.

The treatment of 1-2 degree skin burns, with crude oil, led to complete healing in 1-3 days. The use of sea buckthorn oil, mixed with oil 1: 9, in the treatment of psoriasis has led to very good results, which is why we recommend its use in such conditions. The high level of protein in the composition of the meal justifies its successful use in animal feed.

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PRODUCTIVE PERFORMANCE OF ROSS-308 BROILERS FED WITH NUTRITIONALLY AND COST-EFFECTIVE OPTIMIZED DIETS

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Abstract

The goal of the study was to use a linear programming algorithm in trying out to optimize the standard starter, grower and finisher diets of chicken broilers in a familial type microfarm, using the locally available feedstuffs and replacing partially the concentrated protein and energy raw matters (soy meal and vegetable oil) by full-fat soy. The objective function was set to minimize mix production costs, under several restraints related to nutritional value and inclusion proportions of certain raw matters in diets. ROSS 308 broilers have been used as biological material, 750 individuals being allotted randomly in three groups, one of it being considered control, fed with conventional mixed feed (CG), while the other two contained soy meal as main protein concentrate (OG 1 SM group) while the third one contained full-fat soy in diet composition (OG 2 FFS), as well. Feed formulation optimizing led to lower production costs and, subsequently to better production and economic performances (live weight at slaughter improved by 3.29% in full-fat soy group and by 1.52% in soy meal optimized group; FCR better with 0.69-2.14% vs. control; 2.17% to 7.27% improved profits in experimental treatments). As follow-up, it is planned to test the optimized variants on more individuals, to achieve more consistent data and to use a more elaborate data processing methods, such as ANOVA post-hoc testing and regression, in order to estimate the repeatability of such findings in similar future optimizing scenarios.

Key words: broiler nutrition, optimization, cost-effective, feed conversion ratio, revenue

INTRODUCTION

It is essential that poultry farmers provide a perfectly balanced feeding at the lowest possible costs, avoiding meanwhile to affect the feed quality and, subsequently, the fowl productive performances and the economics of the farm itself, knowing that feeding occupies circa 60-65% of the overall production expenses in chicken broilers production (Wilkinson, 2011).

Feed formulation using optimization is one of the ways used to ensure the above mentioned conditions.

However, this requires in deep knowledge of many nutritional parameters related to the animal needs and to the feed composition, as well, which could negatively affect poultry flock performance when are not

appropriately provided or monitored (Olugbenga et al., 2015).

Nutritionists should perform a multifactorial analysis of certain critical parameters when formulating broilers diets, such as: availability of certain raw feedstuffs and their market prices (Alqaisi et al., 2017); restrictions related to the inclusion of certain feed raw matters (such as animal originating ingredients, forbidden to be used in the own species feeding or in certain production systems) (Beski et al., 2015); chemical proximate composition and the nutritional value of feedstuffs (Latshaw, 2008); digestibility of certain nutrients such as the energy, protein and mineral sources (Roush et al., 2004); special requirements for essential amino-acids and the digestibility for their sources (Vieira et Angel, 2012); energy-protein density of the raw matters and of the targeted mixture; the appropriate sources of dietary fats, with respect to the legally allowed raw matters and to the technological limitations of inclusion (Kamran et al., 2020); the occurrence of certain limitative factors or hazards: too much raw fiber content (Varastegani et Dahlan, 2014), presence of certain digestion inhibitory molecules (Dousa et al., 2012) or even of toxic or hazardous compounds that should be inactivated prior to inclusion in feed mixture (Abd El-Hack et al., 2018).

Different methods were used by nutritionists in optimizing monogastric diets, such as: multiple free iteration, algebraic systems, quadratic Pearson method, Simplex algorithm method, Bat algorithm, Two-by-Two matrix, linear programming and so on (Babic et Peric, 2011).

The linear programming using computer assisted applications is the most commonly used method when there is not possible to find solutions for an optimizing goal using successive free iterations, common simple equations and inequities.

Therefore, if a challenge in the real world could be accurately represented by the mathematical equations of a linear programme, then the method will find the best solutions, either in terms of nutritional quality, either in terms of minimum costs or for both restraints.

Furthermore, when the linear programming could not provide feasible solutions, other mathematical algorithms could be used as follow-up, such as Quadratic programming, Integer programming, Dynamic programming (Rahman et al., 2010).

Within the context of several digital solutions available for broilers feeding optimization, the main goal of the research was to identify an optimal mix of feedstuffs to produce combined feed (starter, grower and finisher diets), taking into account the proximate composition of ingredients, the subsequent nutritional or participating constraints, in order to reduce cost and to maintain an appropriate level of nutritional quality.

Thereafter, the optimized diets had to be tested on broilers, to find out

their productive response and to compute the economic efficiency of optimizing.

MATERIAL AND METHOD

Several consecutive stages have been passed in acquiring the goal of the study implemented in a familial microfarm in Iasi county:

- broilers nutritional requirements have been updated in accordance with the nutritional recommendations of the producer (Aviagen, 2020);
- choice of the locally available and valid feedstuffs to be used, observing the technological, nutritional or legally constraints of usage.
- formulation of a linear programming model, setting up restraints related to nutritional needs; to minimal and maximal inclusion proportions in the mix and orientating the objective function to a minimal cost of production, using the Microsoft Excel 2019 Solver Add-in (Olugbenga et al., 2011);
- comparative analysis of the existing diet in the farm with the new optimized version, containing new introduced ingredients, in term of nutritional value and costs.
- manufacturing and small scale testing of the newly optimized diets on chicken broilers, using the existing one as control.

Biological material: 750 ROSS 308 broilers, reared on permanent litter (slaughter at 40 days old) randomly allotted in 3 groups:

- **CG** – 250 broilers fed with the conventional diets existing in the microfarm (table 1);
- **OG 1 SM** – 250 broilers fed with nutritionally and cost-effectively optimized diets (main protein concentrate ingredient – Soymeal);
- **OG 2 FFS** – 250 broilers fed with nutritionally and cost-effectively optimized diets (Soymeal partially replaced by Full-Fat Soy).
-

Table 1

Conventional diets used in the microfarm
(nutritional requirements of broilers, nutritional facts, price)

STARTER DIET	Kcal EM/kg	%CP	%M+C	%L	%CF	%Ca	% P	Cost/kg
Nutr. Requirements	3000-3050	23	1.08	1.44	4	0.96	0.48	-
Nutr. facts:	3050	22.82	1.08	1.44	4.00	0.96	0.48	1.649ROL
Ingredients:	Corn, Soymeal, Methionine + Cystine, Lyzine, Limestone (calcium carbonate), Monocalciumphosphate, Premix (oligoelements and vitamins), Salt (NaCl)							
GROWER DIET	Kcal EM/kg	%CP	%M+C	%L	%CF	%Ca	% P	Cost/kg
Nutr. Requirements	3100-3150	21.5	0.99	1.29	4	0.87	0.43	
Nutr. facts:	3100	21.50	0.99	1.29	3.86	0.87	0.43	1.563ROL
Ingredients:	Corn, Soymeal, Methionine + Cystine, Lyzine, Limestone (calcium carbonate), Monocalciumphosphate, Premix (oligoelements and vitamins), Salt (NaCl)							

FINISHER DIET	Kcal EM/kg	%CP	%M+C	%L	%CF	%Ca	% P	Cost/kg
Nutr. Requirements	3150-3200	19.5	0.9	1.15	4	0.81	0.39	
Nutr. facts:	3152	19.51	0.89	1.15	3.62	0.82	0.39	1.439ROL
Ingredients:	Corn, Soymeal, Oil, Methionine + Cystine, Lyzine, Limestone (calcium carbonate), Monocalciumphosphate, Premix (oligoelements and vitamins), Salt (NaCl)							

The reasoning criteria for conventional diet replacement with the experimental ones effects were measured by the end of each technological phase (starter 1-10 days, grower 11-24 days and finisher 25-40 days + overall series 1-40 days):

- live weight: at the brooding moment, at the end of each phase (gravimetric, g/capita);
- total weight gain per phase and overall series (difference between the final and the initial weight – g/capita; average daily gain - g/day);
- feed intake askg total per group and calculated individually (kg/capita);
- feed conversion ratio (kg feed/kg gain).

The data were measured per 100 individuals from each group and were submitted to statistical processing in MsExcel 2019 – Data Analysis Add-in, to obtain the main descriptors (mean, standard error, variation coefficient), while absolute and relative comparisons were calculated between group. By the end of the experiment, a brief economic calculation was run, in order to assess the efficiency of replacing the conventional diet with the optimized ones.

Study limitations – lack of proximate composition analysis for the locally available feedstuffs used in both type diets (existing and optimized); the nutritional values used in optimizing were taken from literature tables. Usage of limited individuals in feed testing (250 broilers/group).

RESULTS AND DISCUSSION

Comparison: optimized diets vs. conventional diets

Considering the specific of the three diets already provided in the microfarm, in the 1st stage of the experiment we tried to optimize them nutritionally and for cost effectiveness. We did not opt out for animal originating feedstuffs, motivated by biosecurity and cost reasons.

As objective function we choose to minimize the diet cost and a series of restraints have been applied: total proportion of 100% ingredients in the mix, results to vary between minimum and maximum of ROSS 308 nutritional requirements, fixed proportions for some ingredients (salt at 0.3% and oligo-elements – vitamins premix at 1.0%).

Also, in order to avoid aberrant mathematical solutions, such as negative proportions (feasible algebraically but not relevant in reality), positivity constraints have been also programmed for each feedstuff proportion, as well as some maximal inclusion rate restraints for certain feedstuffs, due to technological manufacturing limitations (eg. maximum fat proportion of 5% in the feed).

The diets optimized in the first stage and fed to OG – 1 – SM group broilers are presented in table 2.

Table 2

Diets optimized nutritionally using the same ingredients as the conventional diets and fed to OG – 1 – SM broilers (nutritional requirements of broilers, nutritional facts, price)

STARTER DIET	Kcal EM/kg	%CP	%M+C	%L	%CF	%Ca	% P	Cost/kg
Nutr. Requirements	3000-3050	23	1.08	1.44	4	0.96	0.48	-
Nutr. facts:	2987	22.91	1.07	1.44	4.03	0.90	0.47	1.591ROL
Ingredients:	Corn 54.00%, Soymeal 38.30%, Oil 3.47%, Methionine + Cystine 0.34%, Lyzine 0.24%, Limestone (calcium carbonate) 2.00%, Monocalcium phosphate 0.35%, Premix (oligoelements and vitamins) 1%, Salt (NaCl) 0.3%							
GROWER DIET	Kcal EM/kg	%CP	%M+C	%L	%CF	%Ca	% P	Cost/kg
Nutr. Requirements	3100-3150	21.5	0.99	1.29	4	0.87	0.43	
Nutr. facts:	3101	21.44	0.99	1.30	3.85	0.86	0.43	1.560ROL
Ingredients:	Corn 56.50%, Soymeal 34.80%, Oil 4.70% Methionine + Cystine 0.30%, Lyzine 0.18%, Limestone (calcium carbonate) 2.00%, Monocalcium phosphate 0.22%, Premix (oligoelements and vitamins) 1%, Salt (NaCl) 0.3%							
FINISHER DIET	Kcal EM/kg	%CP	%M+C	%L	%CF	%Ca	% P	Cost/kg
Nutr. Requirements	3150-3200	19.5	0.9	1.15	4	0.81	0.39	
Nutr. facts:	3150	19.50	0.90	1.15	3.62	0.81	0.39	1.437ROL
Ingredients:	Corn 62.10%, Soymeal 29.56%, Oil 4.53%, Methionine + Cystine 0.26%, Lyzine 0.17%, Limestone (calcium carbonate) 1.98%, Monocalciumphosphate0.10%, Premix (oligoelements and vitamins) 1%, Salt (NaCl) 0.3%							

In comparison with the diets already used in the microfarm, the results of the optimization did not differ quite much in terms of production cost, especially in Grower (-0.2%) and Finisher (-0.1%) diets. However, in the Starter diet, the richest in crude protein, the optimization brought savings of 3.6% for the production cost.

In the 2nd stage, we thought of introducing a new raw matter in optimizing the three diets, using the Full Fat Soy, as partial replacement for the Soymeal (main protein concentrate ingredient) and for the oils (knowing that full fat soy is also rich in energy). The result of optimization is displayed in table 3 and the diets were provided in OG – 2 – FFS group broilers.

As result of partial replacement of soymealby full-fat-soy, as concentrate ingredient both rich in protein and energy, a higher amplitude of production cost reduction could be observed.

In Starter diet, the production cost decreased by 12.17%, while in Grower feed, the production was 5.9% less expensive. In the last diet (Finisher), the optimizing brought a production cost decrease by 3.3%. However, these apparently good results, in terms of expenses, had to be tested in terms of broiler production performances.

The influence of the diet on the productive response of the broilers is presented in table 4.

Table 3

Diets optimized nutritionally using the same ingredients as the conventional diets and fed to OG – 2 – FFS broilers (nutritional requirements of broilers, nutritional facts, price)

STARTER DIET	Kcal EM/kg	%CP	%M+C	%L	%CF	%Ca	% P	Cost/kg
Nutr. Requirements	3000-3050	23	1.08	1.44	4	0.96	0.48	-
Nutr. facts:	3000	22.95	1.08	1.44	4.00	0.96	0.48	1.470ROL
Ingredients:	Corn 59.15%, Soymeal 24.19%, Full fat soy 12.18%, Methionine + Cystine 0.36%, Lysine 0.34%, Limestone (calcium carbonate) 2.23%, Monocalcium phosphate 0.25%, Premix (oligoelements and vitamins) 1%, Salt (NaCl) 0.3%							
GROWER DIET	Kcal EM/kg	%CP	%M+C	%L	%CF	%Ca	% P	Cost/kg
Nutr. Requirements	3100-3150	21.5	0.99	1.29	4	0.87	0.43	
Nutr. facts:	3100	21.50	0.99	1.29	3.95	0.87	0.43	1.476ROL
Ingredients:	Corn 59.19%, Soymeal 22.92%, Full fat soy 12.77%, Oil 1.25%, Methionine + Cystine 0.28%, Lysine 0.14%, Limestone (calcium carbonate) 2.15%, Premix (oligoelements and vitamins) 1%, Salt (NaCl) 0.3%							
FINISHER DIET	Kcal EM/kg	%CP	%M+C	%L	%CF	%Ca	% P	Cost/kg
Nutr. Requirements	3150-3200	19.5	0.9	1.15	4	0.81	0.39	
Nutr. facts:	3150	19.50	0.90	1.15	3.67	0.81	0.39	1.393ROL
Ingredients:	Corn 63.59%, Soymeal 23.47%, Full fat soy 6.40%, Oil 2.78%, Methionine + Cystine 0.25%, Lysine 0.18%, Limestone (calcium carbonate) 2.03%, Premix (oligoelements and vitamins) 1%, Salt (NaCl) 0.3%							

Overall series (1-40 days), the best live weight was achieved by the broilers in group OG 2 FFS, that received feed optimization through full-fat soy introduction and decreasing of production cost and reached 2603.50 kg/capita (+3.29% versus the control group). In OG 1 SM (feed optimized by production cost reduction) the broilers reached 2.56 kg/capita at slaughter (+1.52% compared to control).

In comparison with the day old weight, that was quite similar (41.1-41.2 g/capita), the broilers cumulated weight gains differentiated through the type of consumed feed: 2479.40±2.03g in control group; 2517.70±2.52g in OG 1 SM group (+1.54% vs. control); 2562.30±4.31 g in OG 2 FFS group (+3.34% vs. LC). Therefore, the best cumulated weight gain was obtained by the broilers fed with the diet in that soy meal was partially substituted by full-fat soy and also had the lowest production cost.

In terms of average daily gain, the calculated values varied accordingly, reaching 61.99 g/capita/day in control group, 62.94

g/capita/day in OG 1 SS group and 64.06 g/capita/day in OG 2 FFS (1.54 to 3.34% versus control) (table 4).

Cumulated feed intake overall the entire series ranged between 4.49 kg/capita (CG) and 4.54 kg (OG 2 FFS), while the broilers in OG 1 SS group, consumed 4.53 kg feed/capita (table 4).

Feed conversion ratio was calculated at 1.81 kg feed/kg gain in CG (not optimized feed), at 1.79 kg feed/kg gain in OG 1 SS (-0.69% versus CG) and at 1.77 kg feed/kg gain in OG 2 FFS (-2.14% vs. control) (table 4).

Table 4

Productive response of ROSS-308 broilers to diet optimizing, overall the experimental series (life span 1-40 days) (n=100 individuals / group)

Productive trait	Statistical descriptors	CG	OG 1 SM	± % vs. CG	OG 2 FFS	± % vs. CG
Weight at slaughter	Mean (\bar{X}) (g)	2520.50	2558.90	+1.52	2603.50	+3.29
	Standard error ($\pm s_{\bar{x}}$)	2.04	2.50	-	4.28	-
	Variation coefficient (v %)	0.81	0.98	-	1.64	-
Total weight gain	Mean (\bar{X}) (g)	2479.40	2517.70	+1.54	2562.30	+3.34
	Standard error ($\pm s_{\bar{x}}$)	2.03	2.52	-	4.31	-
	Variation coefficient (v %)	0.82	1.00	-	1.68	-
Average daily gain	Mean (\bar{X}) (g/capita/day)	61.99	62.94	+1.54	64.06	+3.34
	Standard error ($\pm s_{\bar{x}}$) (g/capita/day)	0.05	0.06	-	0.11	-
	Variation coefficient (v %)	0.82	1.00	-	1.68	-
Cumulated feed intake	Mean (\bar{X}) (kg feed)	4.49	4.53	+0.98	4.54	+1.32
	Standard error ($\pm s_{\bar{x}}$) (kg feed)	0.01	0.01	-	0.01	-
	Variation coefficient (v %)	1.05	2.27	-	2.06	-
Feed conversion ratio	Mean (\bar{X}) (kg feed/kg gain)	1.81	1.79	-0.69	1.77	-2.14
	Standard error ($\pm s_{\bar{x}}$) (kg feed/kg gain)	0.01	0.01	-	0.01	-
	Variation coefficient (v %)	1.49	2.57	-	1.78	-

Considering a livability rate of 98.3% in all groups and extrapolating the experimental findings to a computation for 10000 broilers/group, it was found that introducing full fat-soy as partial replacer of soy meal, the feeding expenses per series decreased by 3.4-3.9%, comparing to the other types of diet.

Also, when the weight gain was introduced in computation, the results were better in OG 2 FFS group (+1.7% vs. OG 1 SM group; +3.3% vs. control group).

In terms of profit, the optimized versions generated 7.27% higher revenues (OG 2 FFS group) or 2.17 better results (OG 1 SM group).

CONCLUSIONS

Linear optimizing of the broiler experimental diets, in order to minimize production costs led to better production and economic

performances (live weight at slaughter improved by 3.29% in full-fat soy group and by 1.52% in soy meal optimized group; FCR better with 0.69-2.14% vs. control; 2.17% to 7.27% improved profits in experimental treatments).

Therefore, it is recommended to introduce the full-fat soy in all three phases of feeding, assisted by a mix optimizing linear algorithm oriented toward cost minimization as objective function, in order to achieve better gains, lower feed conversion and higher revenue.

Our study, although presents the real results of the optimistic scenario of feed optimizing through the partial substitution of soy meal and vegetable oil by the full fat soy, has some limitations that should be overcome in the research follow-ups by: usage of more subjects in groups; run of analytical laboratory investigations related to feedstuffs proximate composition; usage of more in deep statistical apparatus, that could estimate certain probabilities of findings repeatability in each scenario.

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VARIA

QUALITY ASSESSMENT OF HEALTH CARE SERVICES PROVIDED FOR PATIENTS WITH ORTHOPEDIC DISEASES IN INTEGRATED AMBULATORY OF A COUNTY EMERGENCY CLINICAL HOSPITAL

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Abstract

The need to improve the quality of medical services provided in the outpatient clinic to patients with orthopedic diseases is supported by the needs and expectations of modern society in accordance with technological and therapeutic advances. Given the fact that there is a legal basis in Romania regarding the conditions for providing medical assistance, medicines and medical devices within the social health insurance system, it is possible to establish well-defined standards. This paper is part of a complex study that analyzes the provision of medical services to patients with orthopedic problems, thus conducting a retrospective study based on satisfaction questionnaires addressed to these patients in the Integrated Outpatient Clinic of the County Clinical Emergency Hospital Oradea during 01.07.2019 - 31.02.2020 will increase the level of knowledge. These questionnaires provide information on the perception that patients, the third party payer or other service providers have about the organization. Thus, it was proved that the reputation of the County Clinical Emergency Hospital Oradea and of the doctors from this institution have a major contribution for attracting patients with orthopedic diseases in the integrated outpatient clinic in order to benefit from medical services. A percentage of 85% of patients were satisfied with the medical services provided in the Integrated Outpatient Clinic, 77.5% considering the level of the Integrated Outpatient Clinic to be good or very good. The short waiting time and the observance of the appointments have contributed to the increase of the degree of satisfaction regarding the medical services provided.

Key words: outpatient, orthopedics, quality management, integrated ambulatory

INTRODUCTION

Implementing a continuous quality development strategy for medical care services is an important component of the processes of improving the health system. Currently, medical institutions are motivated to organize structures for quality management, prevention of medical risks and adjustment of current practices to the standards of evidence-based medicine. (Armean P. et al., 2002)

According to the WHO, quality means providing each patient with a set of diagnostic and therapeutic acts that ensure the best outcome for their health according to the current state of scientific knowledge, with the lowest cost and risk. At the same time, it is necessary for the patient to be as

satisfied as possible with the procedures, results and human contacts in the respective health organization. (Panaite N. et al.,2011; Gheorghe I.L et al, National School of Public Health and Management , Romania, 2006)

Given the fact that there is a legal basis in Romania regarding the conditions for providing medical assistance, medicines and medical devices within the social health insurance system, it is possible to establish well-defined standards. These standards are established and controlled by the National Authority for Quality Management in Health (NAQMH/ANMCS). International regulations on quality management systems are currently established by the standards ISO 9000: 2015 (ISO.org, 2020) which describe the concepts and fundamental principles of quality management, they being universally applicable in the field of health.

The quality of health services, unlike that of other tangible goods, cannot be assessed until they have been provided. Patients' reaction is subjective, as it is based on expectations and perceptions that may vary from person to person or even to the same person at different times. A systematic action to assess perceived quality requires tools capable of monitoring the expectations of all patients. (Panaite N. et al,2011)

The technical quality of medical care is usually related to technical competence, compliance with clinical protocols and practice guidelines, use of infection control measures, information and counseling, integration of health services, efficient management. Its existence leads to an effective and efficient work environment, positive treatment results, followed by patient satisfaction and, last but not least, provider satisfaction. (National School of Public Health and Management , Romania, 2006). One of the problems identified in the research conducted by the author of this paper on ensuring adequate technical quality was the need of a diagnostic protocol development for all elderly patients with fractures, for a correct diagnosis and appropriate therapeutic conduct. (Bancsik K. et al, 2019)

Quality assessment involves the systematic identification of the current level of quality achieved by a health unit or a system, and consists in quantifying the level of performance according to certain standards. The quality assessment process begins with identifying areas that can be improved. (Popa F. et al,2008)

Patient satisfaction is an important measure of organizational performance, as it synthetically combines: the organizational context in which the care process takes place, the patient's experience in interpersonal relationships that characterize the interface with the organization, the professional content of the service received, even if the patient has no competence. necessary to enable it to indicate the technical characteristics and clinical quality of an intervention or service. (Furtunescu F. et al ,2010)

MATERIAL AND METHOD

A retrospective study was performed based on satisfaction questionnaires addressed to patients with orthopedic diseases in the specialized Outpatient Clinic of the County Clinical Emergency Hospital Oradea(CCEHO/SCJUO) between 01.07.2019 - 31.02.2020. The questionnaires contained a set of 25 questions regarding the conditions under which the medical services are provided within the County Clinical Emergency Hospital Oradea, respectively in the integrated Outpatient Clinic. A number of 40 questionnaires were awarded in the period studied by the author of this paper to 40 patients, the exclusion criteria being the lack of patient consent and age <18 years.

The questionnaires contain questions that assess:

- a) Information on the hospital unit chosen by the patient
- b) The degree of patient satisfaction regarding the hospital unit
- c) Patients' satisfaction with medical services
- d) General data about the patient

RESULTS AND DISCUSSION

The identification of individual specific factors

Recognition, grouping and analysis of individual specific factors of patients who have received medical services in the Orthopedic cabinet within the Integrated Outpatient Clinic is essential for identifying consumers of medical services. Thus, the study shows that there is an unequal distribution between patients presented in the Ambulatory clinic, the ratio being 1,857 women to one man, 67% of people presented in the Ambulatory came from urban areas and most patients (67.5%) were registered in the age category 50-70 years, centralized data in Table 1.

Table 1

Individual specific factors

18-30 years 0p	Age						Gender		Living area	
	30-40 years 5p	40-50 years 3p	50-60 years 12p	60-70 years 15p	70-80 years 4p	80-90 years 1p	M	F	Urban	Rural
							14	26	27p	13p

Note: p – number of patients

The reasons for choosing the Integrated Outpatient Clinic

Identifying the main reason for choosing the healthcare provider is necessary in order to highlight the main factors that attract service consumers (patients). In Figure 1 we can see that the most important reasons for choosing the integrated outpatient clinic within the CCEHO/SCJUO

were the reputation of the hospital, the recommendation of the doctor or relatives / friends.

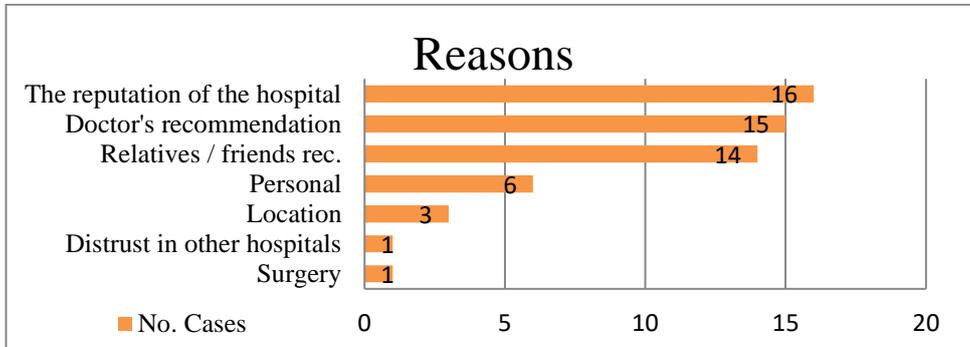


Fig. 1. The main reasons for choosing the integrated outpatient clinic

Specific statistical results regarding the medical services

Regarding the evaluation of the medical services provided in the Outpatient Clinic, we can see that: 77.5% of patients considered that the level of integrated ambulatory is good or very good, 85% of patients were satisfied with the medical services provided, data presented in Figure 2 and Figure 3.

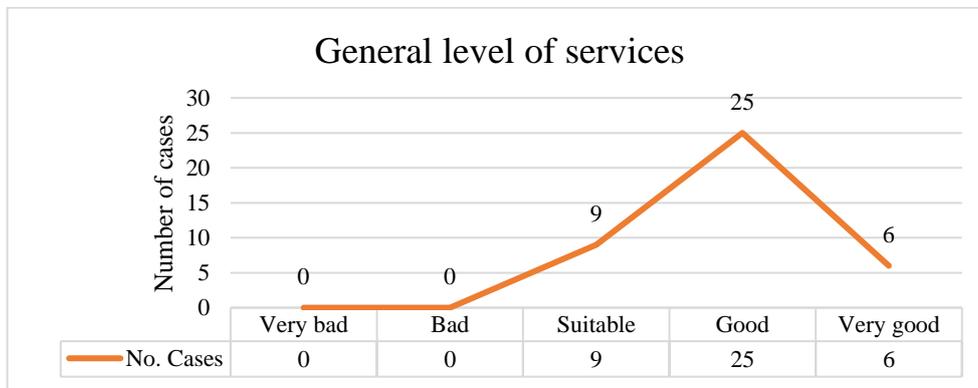


Fig. 2. Evaluation of the general level of medical services provided in the Outpatient Clinic



Fig. 3. The degree of satisfaction with the medical services provided in the Outpatient Clinic

Similar results were obtained in the evaluation of medical services provided in the Orthopedics and traumatology departments of County Clinical Emergency Hospital Oradea, 80.5% of patients being satisfied with the medical services provided. (Daina C. et al, 2018)

Long waiting time for the patient can be one of the most frustrating situations providing health care services. Three parameters were analyzed in the study: convenient scheduling hours, compliance with schedules and waiting time from the moment of entering the unit to the actual consultation. Thus, after analyzing and synthesizing the data from the questionnaires we can see that 87.5% of patients were very satisfied or satisfied with the convenient scheduling hours, 90% of patients were very satisfied or satisfied with compliance with appointments in the Outpatient Clinic respectively 95% of patients they were very satisfied or satisfied with the waiting time.

Ensuring optimal staff levels in terms of quantity is crucial to achieving the organization's objectives and maintaining cost-efficiency ratio in a sustainable way for the organization. Thus, 92.5% of patients were very satisfied or satisfied with the number of medical staff.

The location of the Outpatient Service/ Outpatient Clinic can facilitate the increase of the satisfaction regarding the provision of medical services as well as the attraction of new possible patients. Thus, it was found that 85% of patients were very satisfied or satisfied with the location of the hospital compared to 82.5% of patients who were very satisfied or satisfied with the location of the integrated Outpatient Clinic.

CONCLUSIONS

1. The reputation of the County Clinical Emergency Hospital Oradea and of the doctors from this institution have a major contribution for

attracting patients with orthopedic diseases in the Integrated Outpatient Clinic in order to benefit from medical services.

2. Short waiting times and compliance with appointments have helped to increase satisfaction with the medical services provided.

3. Relocation of the Integrated Outpatient Clinic within the hospital would increase patient satisfaction and facilitate access to medical services.

5. A percentage of 85% of patients were satisfied with the medical services provided in the Integrated Outpatient Clinic, 77.5% considering the level to be good or very good.

6. Maintaining a quantitatively optimal staff had a major impact on the low waiting time and satisfaction with the medical services provided, 92.5% of patients were very satisfied or satisfied with their number.

6. The number of female patients is almost twice as high as the number of male patients who go to the integrated outpatient clinic for orthopedic consultations.

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CERTAIN APPLICATION OF DIFFERENTIAL SUBORDINATION

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Abstract

The object of this paper is to derive some inclusion relation regarding a new class of analytic functions using a generalized Ruscheweyh operator.

Key words: differential subordination, generalized Ruscheweyh operator, analytic functions.

AMS Subject Classification: 30C45.

INTRODUCTION

1.

In the first section we will recall some definitions and results used for the new obtained results.

Let \mathcal{H} be the class of analytic functions in the open unit disc of the complex plane

$$U = \{z \in \mathbb{C} : |z| < 1\}$$

and for $a \in \mathbb{C}$ and $n \in \mathbb{N}$ let $\mathcal{H}[a, n]$ be the subclass of \mathcal{H} consisting of functions of the form

$$f(z) = a + a_n z^n + a_{n+1} z^{n+1} + \dots, z \in U.$$

Let $\mathcal{A}(p, n)$ denote the class of functions $f(z)$ normalized by

$$(1.1) f(z) = z^p + \sum_{k=p+n}^{\infty} a_k z^k, (p, n \in \mathbb{N} := \{1, 2, 3, \dots\})$$

which are analytic in the open unit disc.

In particular, we set

$$\mathcal{A}(p, 1) := \mathcal{A}_p, \text{ and } \mathcal{A}(1, 1) := \mathcal{A} = \mathcal{A}_1.$$

Let

$$\mathcal{A}_n = \{f \in \mathcal{H}(U), f(z) = z + a_{n+1}z^{n+1} + \dots\}$$

with $\mathcal{A}_1 := \mathcal{A}$.

If f and g are analytic functions in U , then we say that function f is subordinate to g or g is said to be superordinate to f , if there exists a function w analytic in U , with $w(0)=0$ and $|w(z)| < 1$, and such that $f(z) = g(w(z))$. In such case we write $f \prec g$ or $f(z) \prec g(z)$.

If g is univalent, then $f \prec g$ if and only if $f(0)=g(0)$ and $f(U) \subset g(U)$.

Further, we will recall here a differential operator introduced earlier.

Let the function f be in the class \mathcal{A}_n . For $m, \beta \in \mathbb{N}_0 = \{0, 1, 2, \dots\}$,

$\lambda \geq 0, l \geq 0$,

we will use the following differential operator

$$(1.2) I^m(\lambda, \beta, l)f(z) := z + \sum_{k=n+1}^{\infty} \left[\frac{1 + \lambda(k-1) + l}{1+l} \right]^m C(\beta, k) a_k z^k$$

where

$$C(\beta, k) := \binom{k+\beta-1}{\beta} = \frac{(\beta+1)_{k-1}}{(k-1)!}$$

and

$$(a)_n := \begin{cases} 1, & n = 0 \\ a(a+1) \dots (a+n-1), & n \in \mathbb{N} - \{0\} \end{cases}$$

is Pochhammer symbol.

Using simple computation one obtains the next result.

MATERIAL AND METHOD

2. PRELIMINARY RESULTS

Proposition 1.1 Form, $\beta \in \mathbb{N}_0, \lambda \geq 0, l \geq 0$

(2.1)

$$(l+1)I^{m+l}(\lambda, \beta, l)f(z) = (1-\lambda+l)I^m(\lambda, \beta, l)f(z) + \lambda z(I^m(\lambda, \beta, l)f(z))'$$

and

(2.2)

$$z(I^m(\lambda, \beta, l)f(z))' = (1+\beta)I^m(\lambda, \beta+1, l)f(z) - \beta I^m(\lambda, \beta, l)f(z).$$

Remark 2.1 Special cases of this operator includes the Ruscheweyh derivative operator $I^0(l, \beta, 0)f(z) \equiv D_\beta$ defined in [7], the Sălăgean derivative operator $I^m(1, 0, 0)f(z) \equiv D^m$, studied in [8], the generalized Sălăgean operator $I^m(\lambda, 0, 0) \equiv D_\lambda^m$ introduced by Al-Oboudi in [1], the generalized Ruscheweyh derivative operator $I^l(\lambda, \beta, 0)f(z) \equiv D_{\lambda, \beta}$ introduced

in [4], the operator $I^m(\lambda, \beta, 0) \equiv D_{\lambda, \beta}^m$ introduced by K. Al-Shaqsi and M. Darus in [2], and the operator $I^m(\lambda, 0, l) \equiv I_I(m, \lambda, l)$ introduced in [3].

To prove the main results we will need the following lemma.

Lemma 2.1 (Hallenbeck and Ruscheweyh [5]) Let h be a convex function in U with $h(0) = a$ and let $\gamma \in \mathbb{C}^*$ with $\operatorname{Re} \gamma > 0$.

If $p \in \mathcal{H}[a, n]$ and

$$p(z) + \frac{1}{\gamma} z p'(z) \prec h(z)$$

then

$$p(z) \prec q(z) \prec h(z)$$

where

$$q(z) = \frac{\gamma}{nz^n} \int_0^z h(t) t^{(\gamma/n)-1} dt.$$

The function q is convex and is the best (a, n) -dominant.

3. MAIN RESULTS

Definition 3.1 Let $f \in \mathcal{A}_n$, $n \in \mathbb{N}^*$. We say that the function f is in the class $S_n^m(\lambda, l, \alpha, \beta, \eta)$, $\lambda > 0$, $\alpha \in \mathbb{R}$, $\eta \in [0, 1)$, $m \in \mathbb{N}$, if satisfies the condition

(3.1)

$$\operatorname{Re}[(I^m(\lambda, \beta, l) \tilde{\Psi}(\alpha, f; z))'] > \eta, \quad z \in U,$$

where

(3.2)

$$\tilde{\Psi}(\alpha, f; z) = z \Psi(\alpha, f; z)$$

and

(3.3)

$$\Psi(\alpha, f; z) = (1 - \alpha) \frac{z f'(z)}{f(z)} + \alpha \left(\frac{z f''(z)}{f'(z)} + 1 \right).$$

Theorem 3.1 If $\alpha \in \mathbb{R}$, $\eta \in [0, 1)$, $m \in \mathbb{N}$, then

(3.4)

$$S_n^{m+1}(\lambda, l, \alpha, \beta, \eta) \subset S_n^m(\lambda, l, \alpha, \beta, \delta)$$

where

(3.5)

$$\delta = \delta(\lambda, l, \eta, n) = 2\eta - 1 + 2(1 - \eta) \frac{l+1}{n\lambda} \beta \left(\frac{l+1}{n\lambda} \right)$$

and

(3.6)

$$\beta(x) = \int_0^1 \frac{t^{x-1}}{t+1} dt$$

is the Beta function.

Proof. Let $f \in S_n^{m+1}(\lambda, l, \alpha, \beta, \eta)$. By using the properties of the operator $I^m(\lambda, \beta, l)$ we have

$$(l+1)I^{m+1}(\lambda, \beta, l)f(z) = (1-\lambda+l)I^m(\lambda, \beta, l)f(z) + \lambda z(I^m(\lambda, \beta, l)f(z))'.$$

If we denote by

(3.7)

$$p(z) = (I^m(\lambda, \beta, l)\tilde{\Psi}(\alpha, f; z))'$$

where

$$p(z) = 1 + p_n z^n + \dots, p(z) \in \mathcal{H}[1, n],$$

then after a short computation we get

(3.8)

$$(I^{m+1}(\lambda, \beta, l)\tilde{\Psi}(\alpha, f; z))' = p(z) + \lambda z p'(z), z \in U.$$

Since $f \in S_n^{m+1}(\lambda, l, \alpha, \beta, \eta)$, from Definition 3.1 we have

$$\operatorname{Re}(I^{m+1}(\lambda, \beta, l)\tilde{\Psi}(\alpha, f; z))' > \eta, z \in U.$$

Using (3.8) we get

$$\operatorname{Re}(p(z) + \lambda z p'(z)) > \eta$$

which is equivalent to

(3.9)

$$p(z) + \lambda z p'(z) < \frac{1+(2\eta-1)z}{1+z} \equiv h(z).$$

From Lemma 2.1 we have

$$p(z) < q(z) < h(z),$$

where

(3.11)

$$q(z) = \frac{l+1}{n\lambda z^{\frac{l+1}{\lambda n}}} \int_0^z \frac{1+(2\eta-1)t}{1+t} t^{\frac{l+1}{\lambda n}-1} dt.$$

The function q is convex and is the best $(1, n)$ -dominant.

Since

$$(I^m(\lambda, \beta, l)\tilde{\Psi}(\alpha, f; z))' < 2\eta - 1 + \frac{2(1-\eta)}{n\lambda} \frac{1}{z^{\frac{l+1}{\lambda n}}} \int_0^z \frac{t^{\frac{l+1}{\lambda n}-1}}{1+t} dt, \quad z \in U,$$

it results that

(3.10)

$$\operatorname{Re}[(I^m(\lambda, \beta, l)\tilde{\Psi}(\alpha, f; z))'] > q(1) = \delta$$

where

(3.11)

$$\delta = \delta(\lambda, l, \eta, n) = 2\eta - 1 + 2(1-\eta) \frac{l+1}{n\lambda} \beta\left(\frac{l+1}{n\lambda}\right)$$

and

(3.12)

$$\beta\left(\frac{l+1}{n\lambda}\right) = \int_0^1 \frac{t^{\frac{l+1}{n\lambda}-1}}{t+1} dt.$$

From (3.10) we deduce that $f \in S_n^m(\lambda, l, \alpha, \beta, \eta)$ and the proof of theorem is complete. \square

Corollary 3.1 If $\alpha \in \mathbb{R}$, $\eta \in [0, 1)$, $m \in \mathbb{N}$, then
(3.13)

$$S_n^{m+1}\left(\frac{l+1}{n}, l, \alpha, \beta, \eta\right) \subset S_n^m\left(\frac{l+1}{n}, l, \alpha, \beta, \delta\right)$$

where
(3.14)

$$\delta = \delta(l, \eta, n) = 2\eta - 1 + 2(1 - \eta) \ln 2.$$

Corollary 3.2 If $\alpha \in \mathbb{R}$, $\eta \in [0, 1)$, $m \in \mathbb{N}$, then
(3.15)

$$S_n^{m+1}\left(\frac{1}{n}, 0, \alpha, \beta, \eta\right) \subset S_n^m\left(\frac{1}{n}, 0, \alpha, \beta, \delta\right)$$

where
(3.16)

$$\delta = \delta(\eta, n) = 2\eta - 1 + 2(1 - \eta) \ln 2.$$

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POLICY AND TECHNOCRACY IN THE MANAGEMENT OF HEALTH UNITS WITH BEDS

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Abstract

The first decisions regarding the initiation of the decentralization process of the sanitary units with beds in Romania concerned the hospitals in Oradea and several hospitals in Bucharest. Politicians at the time understood that the process of decentralizing hospitals was inevitable. The premises of such a process were quite shaky and uncertain. Discussions on the responsibilities and obligations that will be transferred from the central to the local level were numerous. It was also obvious that the transfer of power at the local level involves the takeover of responsibilities by local politicians. Were they ready for a real local health administration? Is there a need for specialized studies in the medical field for the efficient management of hospital units? How important is the involvement of politics in the administration of hospitals? What is the demarcation line between local politics and the technocracy of medical management?

Key words: centralization, decentralization, health services, hospitals, politics, expertise, management.

INTRODUCTION

Local public administrations are usually composed of representatives of political parties. However, there are exceptions to this rule, namely when the so-called "independents" are elected in these authorities, ie politically unaffiliated persons. Trecerea spitalelor în subordinea administrațiilor locale reprezintă implicit o trecere în subordinea oamenilor politici locali.

In Romania, starting with 2010, the hospitals became subordinated to the county councils, respectively to the local councils. The attributions of hospital management and administration were received both by the local / county councils and by the mayors / presidents of county councils.

How important is the "policy" in the management of sanitary units with beds?

Where and how much should "politics" be involved in local health life, but also what is the line between politics and the technocrats of the medical system?

What is the way of communication and collaboration between the political area and the technocrats of the medical system?

How and where does the need to obtain the support of citizens combine with the obligation to streamline the health system through continuous reform?

MATERIAL AND METHOD

In conducting this study, the main working method is the "analysis method", in addition to this we also use the "comparison method". The data are obtained from official documents issued by the Local Council of Oradea, as well as by the City Hall of Oradea. (dispositions and decisions of the local council of Oradea municipality), of the Ministry of Health-ministerial order.

RESULTS AND DISSCUSIONS

"Politics" is an integral part of the administrative area. Without the involvement of politicians, no decisions can be made that influence the city.

Thus, the fields of activity of zonal interest are administered and managed, respectively: education, health, local finances, social assistance policy, etc.

Most sanitary units with beds in Romania are subordinated to local or county councils. Between the local public administration, here referring to the leading area (ie the local and primary council), there is often an overlap between politics and administration.

The political system in Romania, as well as the way of organizing the territorial administrative units imposes a subordination of the hospitals to some politicians who temporarily fulfill certain administrative management functions.

I. To the question "how important are the politics in the management of the sanitary units with beds?", The answer is clear and without a doubt: very important, unavoidable and dominant.

Although at first glance the three characteristics of the importance of politics seem difficult to digest, they still have positive connotations.

The overlap of the local administrative area (at management level) with local politics, can give rise to two possible scenarios in the management and administration of the sanitary units with beds in a municipality:

-a first scenario would be for people elected or appointed to leadership positions to be enslaved only to party interests and that's it. These are the so-called tricksters, inefficient people in the administration. This variant is to be avoided.

-a second scenario is represented by politicians who have a professional quality, a moral attitude doubled by consistency, which helps them in understanding the medical reality and which determines them in choosing specialists in the field of medical management. In this case, the local politician will work with the technocrats of the medical system, and will obtain excellent results.

The technocratic politician, in the medical area, is represented by the person who carries out his activity in the hospital (doctor or other medical category), but outside working hours he works in the political world, out of the conviction to serve the public interest. The technocracy of the medical system is a form of involvement of medical technicians and scientists in the activity of coordination and decision-making regarding the medical system.

Certainly, the involvement of scientists in the management of hospitals is beneficial to all but directly to the patient.

II. Where and how much should politics be involved in local health life, but also where is the line between politicians and technocrats?

The involvement of politicians in the health field will depend on how they understand this system. If the quality of politician is doubled by professional qualities in hospital management, involvement becomes mandatory, so the one who understands the system evaluates and then makes the informed decision. If the politician has a non-tangent profession with the hospital administration area, then he can take advantage of his position and will choose to collaborate with the technocrats. This situation is ideal, and the performance of the sanitary units with beds will be at a maximum level. The line between local decision-makers and hospital technocrats needs to be well defined. This demarcation must be highlighted by delegating responsibilities in the exercise of hospital management.

Example: the local council and the mayor must delegate the management of medical services at the level of the health unit.

Politicians will not be involved, in any form, in the exercise of hospital management at the hospital level except in the following cases:

1. the existence of power slips at the level of the hospital manager;
2. defective or ignorant exercise of activity management at the level of the health unit;

Also, politicians will provide full support in managing any situations that require the involvement of the mayor / president and the local / county council;

III. What is the way of communication and collaboration between the political area and the technocrats of the medical system?

The local health and well-being policy must focus on the "patient".

Communication between politicians and managers of health facilities with beds must be based on several attributes:

- continuity during the mandate of delegation of attributions / management contract;
- efficiency, respectively the concretization of the results desired by both parties;
- focusing on the "patient";
- honesty on both sides.

The support of the city's citizens must be permanent. Most importantly, the involvement of citizens interested in the health system is manifested by voting. Once every 4 years, citizens elect their politicians to local leadership positions. It should be mentioned that they will manage the health and the hospitals in the cities.

Locals can show up and get involved periodically through verbal and written notifications brought to the attention of policy makers and hospital managers. They have the duty to make decisions to streamline the management and administration of medical services, to improve the conditions in hospitals, to maintain buildings, to equip them with modern equipment, to improve medical staff, etc.

CONCLUSION

The positive results of an efficient, honest, permanent and professional collaboration will be translated into evidence for the benefit of the patient, in providing medical documents corresponding to the needs of patients by doctors with a high professional attire, with state-of-the-art medical devices.

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RESEARCH ON REMOTE CONTROL OF DEDUSTING SYSTEM VIA SMART PHONE

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Abstract

The paper contains research on remote control, through smart phone, of dedusting machines, with a view to finding a solution to make them more efficient, as well as to modernize agriculture.

The modernisation of agriculture has well-defined causes, one of which is the explosive growth of the world's population, to which the food problem is closely linked.

The quality of the cereals is given by the proper drying, dedusting and storage of cereals, so it depends on the performance of the deduster.

The cyclone serves to pre-purify the air aspirated from pneumatic transport facilities and from the dedusting of the conditioning machines of the cereal or oil raw materials.

Key words: smart phone, dedusting system, pneumatic separator, cyclon, controller

INTRODUCTION

The pneumatic separator operates on the principle of separating particles into the air current, acting as a pre-cleaner and distributor in several fractions, based on aerodynamic properties. The principle of operation of pneumatic separators is the same, although in a constructive aspect there are machines with the supply of air flow and particles from the bottom or top. (Iancu C 2010, Iancu C 2010)

The cyclone serves to pre-purify the air aspirated from pneumatic transport facilities and from the dedusting of the conditioning machines of the cereal or oil raw materials. The effect of separating dust and mild impurities is 70 ... 90 %.

The principle of operation of cyclones is based on the deposition of air-driven particles through detente and the movement of turbines in a cylindroconical metal container (1), with tangential input at the top (5), (fig. 1). In order to prevent direct exit through the clean air outlet (6), located in the middle of the upper part, a central tube (3) is provided, which obliges the air flow to receive a turbonary downward route around the cyclone wall (2). The formed turbon creates, when hitting the bottom, another tip from the bottom up. (Iancu C 2010, Iancu C 2010) Due to the hitting of the walls and

the gradual loss of speed, dust particles tend to settle on the bottom, being removed with the help of the lock (4).

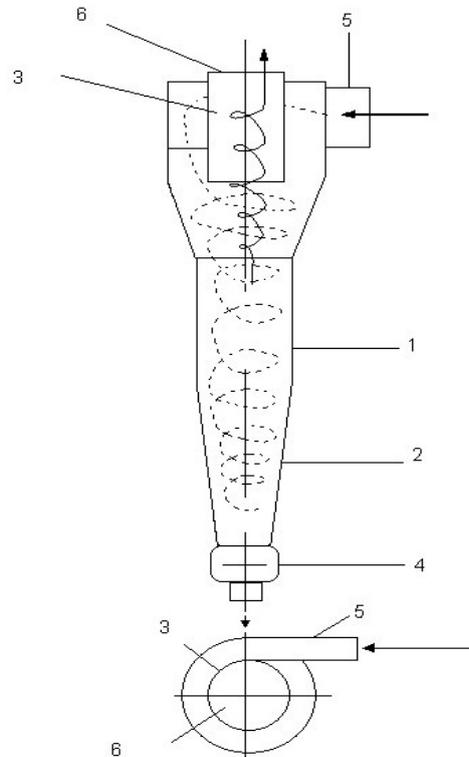


Figure 1. – Cyclone:

*1 – cylindrical part; 2 – tapered part; 3 – central tube;
4 – lock; 5 – input mouth; 6 – outlet*

MATERIAL AND METHOD

To carry out the remote control of a cyclone used in the preliminary dedusting of cereal or oil raw materials, modern, numerically implemented controllers were used with the block scheme shown in Figure 2, sensors and a smartphone. (Iancu C 2010, Iancu Carmen 2010)

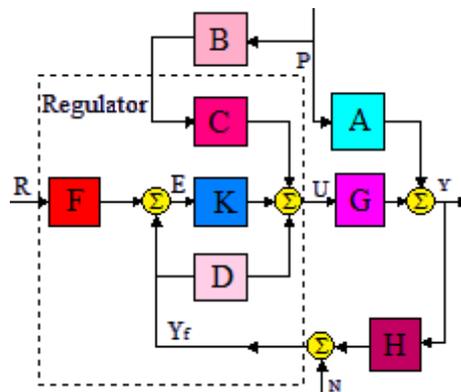


Figure 2. Controller PID numeric with two degrees of freedom

The controller used consists of a comparator and the offset K. Block G on the direct path shapes the execution element and the automated process. The translator is represented by block H. (Iancu C 2010, A. Bara Iancu C 2010, Astrom K. J. 2002, 1984, Borangiu Th et all, 1986, Dionissios P et all 2006, C. Popescu 2001, C. Volosencu 1997, E.F. Zanoelo et all 2008, F. S. Blaga 2009)

The shape of the algorithm, called the parallel PID algorithm, is linear in the parameters. In this case, proportional action (amplification), integral action (automatic recovery) and derivative action are clearly highlighted.

The actual algorithm, used by the controller at the helm of the process, is different, however, because the term, corresponding to the derivative action, that appears in the function of transferring the PID compensator is not physically feasible., for this reason, we choose the approximation. (Iancu C 2010, A. Bara Iancu C 2010, Astrom K. J. 2002, 1984, Borangiu Th et all, 1986, Dionissios P et all 2006, Crispin Allen 1990, H. Silaghi et all 2009, K. Leiviskä et all 2005)

The automation device is composed according to Figure 3 of an EP prescribing element that helps to fix the automatic system program; we also have a C comparison element that compares the reference work schedule $r(t)$ with the output size obtained through the Tr transducer; the EA amplification element; the EE execution element and the EC correction element, which ensure the proper functioning of the whole system. The technological installation (IT) is subject to pi disturbances. (Iancu C 2010, A. Bara Iancu C 2010, Astrom K. J. 2002, 1984, Borangiu Th et all, 1986, Dionissios P et all 2006, Carmen Jover et all 2006,)

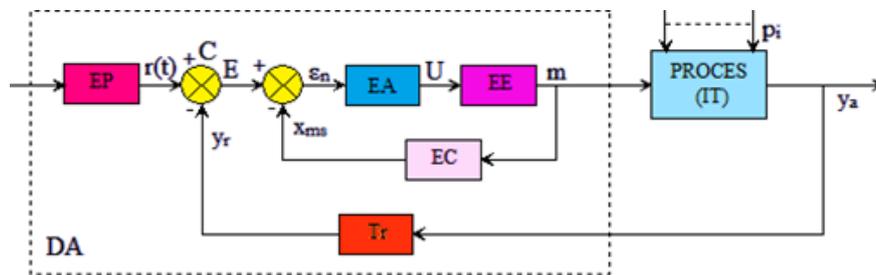


Figure 3. Technological installation

RESULTS AND DISCUSSION

The problem of leadership therefore has two problems, namely, the first, expressing the rejection of disturbances and the second, expressed by that of the exact follow-up. Both issues explain an external input-output desire.

Naturally this desiderat is supplemented with an internal one on the internal utility of the closed loop driving system.

Thus was implemented the remote driving system of a cyclone via mobile phone. A smart phone app has been created via a software.

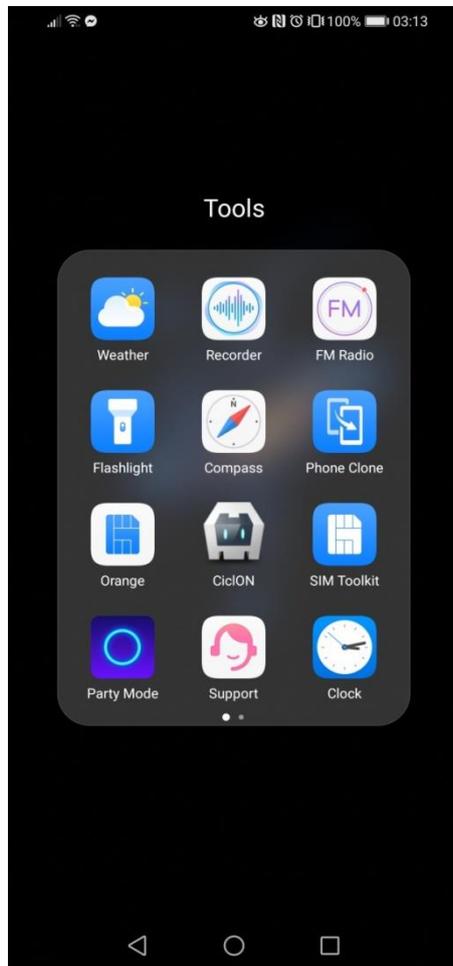


Figure 4. Smart phone app

A software has been created for the dedusting system:

```
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
HypeText
1 <!DOCTYPE html>
2 <html>
3 <head>
4 <meta charset="utf-8">
5 <meta name="viewport" content="width=device-width, initial-scale=1">
6 <link rel="stylesheet" href="css/jquery.mobile-1.4.3.css">
7 <script src="js/jquery.js"></script>
8 <script src="js/jquery.mobile-1.4.3.js"></script>
9
10 </head>
11 <body>
12
13
14
15
16
17 <!-- Start of FIRST page -->
18 <div data-role="page" id="Menu">
19
20 <div data-role="header">
21 <h2> Ciclon </h2>
22 </div> <!-- /header -->
23
24 <div role="main" class="ui-content">
25 <a href="#Connectare" class="ui-btn" data-transition="slide"> Căutare </a>
26 <a href="#Comenzi" class="ui-btn" data-transition="slide"> Comenzi </a>
27 <a href="#Setări" class="ui-btn" data-transition="slide"> Setări </a>
28 </div> <!-- /content -->
29
30 <div data-role="footer" data-position="fixed">
31 <h2> <a href="#Ajutor" class="ui-btn" data-transition="slide"> ? </a> </h2>
32 </div> <!-- /footer -->
33
34 </div> <!-- /page -->
35
36
37
38
39
40
41 <!-- Start of SECOND page -->
42 <div data-role="page" id="Connectare">
43
44 <div data-role="header">
45 <a href="#Menu" class="ui-btn" data-transition="slide" data-direction="reverse"> </a>
46 <h2> Căutare </h2>
47 </div> <!-- /header -->
48
49 <div role="main" class="ui-content">
50 <p> Se solicită pentru dispozitive valabile... </p>
51 </div> <!-- /content -->
52
53 <div data-role="footer" data-position="fixed">
54 <h2> </h2>
55 </div> </div>
56
```

Figure 5. Software for the dedusting system

And the operation of the system is as follows:

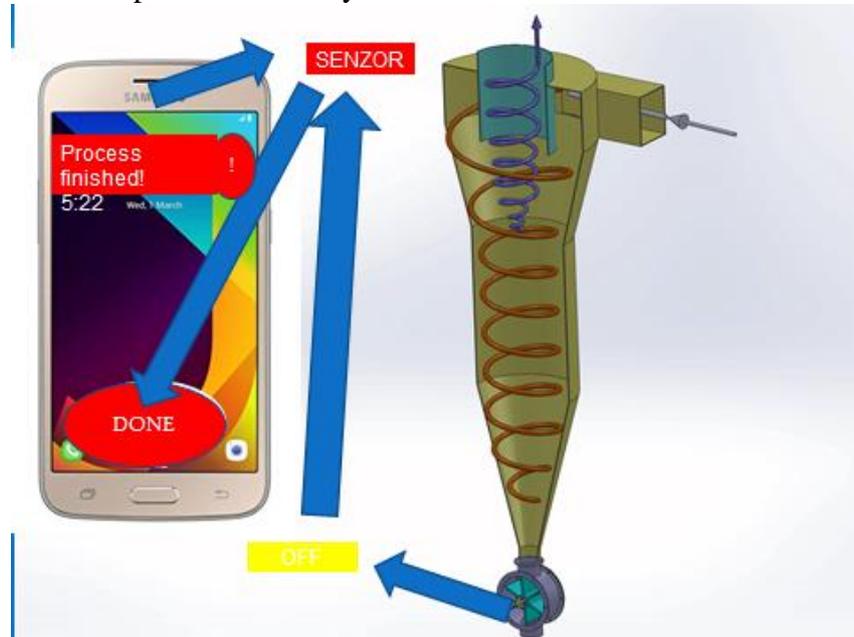


Figure 6. Remote driving of a cyclone via your smart phone

CONCLUSIONS

By accessing the remote control app in the smart phone and pressing the cyclone start key, it gives signal to the sensor at the cyclone's power mouth allowing it to be fed to the raw material.

When the raw material has completed the dedusting cycle, the sensor at the lock gives the end-of-life signal to the smart phone. Thus a dedusting cycle is closed.

The problem of the synthesis of management systems essentially pursues a driving purpose expressed by the requirement that the quality size pursue a specified aprior reference size in the context of the disturbance.

This is achieved by drawing up a decision on the appropriate evolution of the order size, elaboration resulting from the processing of the measured information and possibly, where possible, the disturbance.

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DIETARY NUTRIENTS AGAINST AGE RELATED MACULAR DEGENERATION AND DIABETIC RETINOPATHY

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Abstract

The human retina is susceptible to pathological changes such as oxidative stress and inflammation due to a high oxygen consumption, prolonged exposure to light and an abundant amount of polyunsaturated fatty acids in the photoreceptor cell membrane. Additionally, ageing and hyperglycemia further promote a lot of pathological mechanisms leading to retinal damage and vision loss. Due to their benefic effects not only into the whole body, but especially for the eyes, dietary carotenoids, vitamins, omega-3 fatty acids, zinc and polyphenols are seen as a therapy that could prevent damage to the retinal pigment epithelium and photoreceptor layer as well as visual impairment, characteristic to age related macular degeneration (AMD) and diabetic retinopathy (DR). The purpose of this article is to review the main dietary nutrients and their proposed mechanism of action into the body and to the eyes.

Key words: AMD, DR, carotenoids, vitamins, omega-3 fatty acids, zinc, polyphenols, oxidative stress, inflammation

INTRODUCTION

Nutrition plays a major role in human health as it can improve and maintain it. Good dietary habits and an active lifestyle have been associated over the years with the prevention of certain diseases. Age related-macular degeneration and diabetic retinopathy make no exception and studies show that certain dietary nutrients can prevent the onset and later progression to more severe stages. The nutrients that have been shown to exert benefic effects are carotenoids (lutein, zeaxanthin, meso-zeaxanthin, beta-carotene), omega-3 fatty acids, vitamins (A, C and E), minerals (zinc) and polyphenols.

AGE RELATED MACULAR DEGENERATION AND DIABETIC RETINOPATHY

Age related-macular degeneration is a complex and multifactorial disease that affects individuals over the age of 60 resulting in irreversible vision loss. Literature describes 2 types of AMD: the atrophic or dry form and the exudative or wet form [1] [2]. Between these 2, the wet one is characterized by a severe retinal damage. The pathological mechanism is

still uncertain and warrants more research, but previous studies identified several processes that may contribute in a major way to the onset of AMD and its progression to later stages. Oxidative stress and inflammation are the main processes involved [3] [4]. Oxidative stress results from an imbalance between the antioxidant systems and the reactive oxygen species/ROS generated in higher amount due to factors such as high content of PUFAs, high O₂ consumption, prolonged exposure to light and ageing [5][6]. Besides the above mentioned ways of inducing damage to the macular RPE layer and photoreceptors, the presence of lipofuscin and drusens is also important since lipofuscin promotes photooxidation through photosensitizing substances[1] [7], whereas drusens, the hallmark of AMD produce RPE detachment[1] [8]. Inflammation occurs as a result of cellular damage, lipofuscin-induced lysosome dysfunction, and the presence of drusens between the RPE layer and Bruch's membrane [8] [9][4].

Diabetic retinopathy is a chronic disease that leads to blindness in population aged between 30 and 60 years old. Similar to AMD, there are 2 stages in the progression of DR: the nonproliferative stage and the proliferative one [10] [11] [12]. Fluid accumulation in the macular region due to increased vascular permeability leads to thickening and vision loss. This form of edema is known as diabetic macular edema and it can occur in any stage of DR [12].

The pathological pathway is triggered by hyperglycemia that induces oxidative stress. Furthermore, oxidative stress leads to increased cellular damage and the activation of the polyol pathway, the advanced glycation end product (AGE) pathway, protein kinase C (PKC) pathway, the hexosamine biosynthesis pathway, activation of NF- κ B, increased caspase-3 activity, and promotes inflammation [10][13] [14]. Inflammation and hyperglycemia-induced VEGF upregulation are additional major processes that contribute to DR. Hyperglycemia, oxidative stress, inflammation, VEGF and the metabolic pathways mentioned above are interrelated and lead in the end to: pericyte apoptosis, endothelial cells apoptosis, capillary damage, ischemia, and retinal degeneration [12].

DIETARY NUTRIENTS

1. CAROTENOIDS.

Carotenoids are phytochemicals found in green leafy vegetables, corn, yellow pepper, eggs, carrots, tomatoes, zucchini, watermelon, red grapes, pink grapefruit, papaya, apricots, sweet potatoes, and cantaloupe [15]. Diet is the only source of nutrients due to the inability of the human body to synthesize them. The main 2 classes of carotenoids are carotenes and xanthophylls [16][17].

Lutein and zeaxanthin are xanthophyll carotenoids that accumulate in high quantities in the macular region of the retina, and along with meso-zeaxanthin are known as macular pigments or MP [19] [20]. The beneficial effects of carotenoids exert from their ability to neutralize ROS, reduce inflammation, protect against blue light, improve visual acuity, contrast sensitivity and maintain the integrity of the retinal membranes [22] [18][23] [24]. Between lutein and zeaxanthin, the last one is a more potent antioxidant and it is more abundant in the foveal region of the macula [16] [20]. Other carotenoids such as beta-carotene and lycopene have the same antioxidant, anti-inflammatory and anti-angiogenic properties [13]. Synergistic interactions that result in an increased antioxidant capacity are seen between carotenoids and also in combination with other classes of nutrients such as vitamins and omega-3 fatty acids [21].

2. VITAMINS A, C AND E

Vitamin A and C are essential nutrients since the human body cannot synthesize them. Vitamin A is obtained from cheese, milk, dairy products, eggs and liver as well as from carrots, spinach, kale as provitamin A or beta-carotene [25]. The main benefits of vitamin A are: improving vision in low-light, preserving the immunity, and cell growth [13]. Vitamin C is found in oranges, lemon, lime, pineapple, cabbage and tomatoes and possesses antioxidant properties as well as the capacity to regenerate vitamin E [26] [13] [27]. Vitamin E is obtained from dietary products like almonds, peanuts, hazelnuts, sunflower oil, corn oil and soybean oil [13], and it shares the antioxidant ability as the above-mentioned nutrients [28]. The human tissues and blood contain abundant amounts of α -tocopherol in comparison with the other forms of vitamin E: tocopherol, δ -tocopherol, and γ -tocopherol [28][29]. It is important to highlight that lipofuscin granules and oxidative stress can result due to the lack of vitamin E [28].

3. OMEGA-3- FATTY ACIDS

Omega-3 fatty acids are essential nutrients found mainly in fish, fish oil, chia seeds, flax oil and algae. The main omega-3 fatty acids located in the photoreceptor cell membrane that provide protection against inflammation, angiogenesis, and retinal degeneration are docosahexaenoic acid (DHA), eicosapentaenoic acid (EPA), and alpha-linolenic acid (ALA) [30] [31]. The mechanism of action consist of inhibition of Nf-kb (nuclear factor kappa-light-chain-enhancer of activated B cells), VEGF, and TNF- α and IL-1 β [26]. Besides omega-3 fatty acids, diet is also a source of omega-6 fatty acids that exert opposite effects.

4. ZINC

Zinc is mineral abundant in the RPE and photoreceptor layer, where it acts as a cofactor for antioxidant enzymes such as superoxide dismutase and metallothioneins, participates in POS phagocytosis, regulation of retinol dehydrogenase activity, and rhodopsin regeneration [5][34][35]. The main dietary sources of zinc are red meat, poultry, oysters, whole grains, beans, mushrooms and eggs. In addition, cytotoxicity can occur after ingestion of a higher dose of zinc than recommended [32][33].

5. POLYPHENOLS

Besides carotenoids, polyphenols are another group of phytochemicals that exert benefic effects against oxidative stress, inflammation, and angiogenesis. The main mechanism of action consist of increasing the intracellular production of antioxidants, inhibition of further ROS synthesis, and inactivation of pro-inflammatory cytokine production[37] [36]. Polyphenols are divided into 4 classes: phenolic acids, stilbenes (resveratrol), flavonoids (anthocyanins, quercetin, epigallocatechin gallate), and isoflavone and lignans [37]. Dietary sources that contain polyphenols are red wine, coffee, broccoli, blueberries, onions, kale, wheat, oranges, apples, cherries, soybeans, and linseeds. Additionally to the before mentioned properties, polyphenols exert antimicrobial and antiviral properties as well as improving ocular blood flow and vision [37].

THE AREDS 1 AND 2

In order to demonstrate the benefic effects of dietary nutrients against AMD and also the optimal dosages, trials, observational studies and experiments on rodents and cell cultures were warranted. The most relevant trials so far are the AREDS 1 and 2 due to the big cohort of subjects (4757 subjects in the first study, and 4203 in the second one) that were observed over a time span of 5 years. The first AREDS (Age-Related Eye Disease Study) trial assigned the 4757 participants aged between 55 and 80 years old with at least one eye being affected by AMD to 4 study arms, each receiving one of the following formulations : zinc (80 mg + 2 mg cooper) supplements, antioxidant (vitamin C: 500 mg, vitamin E: 400UI, and beta-carotene: 15 mg) supplements, formulation containing both zinc and antioxidants, or placebo. The results showed that the formulation containing both zinc and antioxidants had an efficiency in reducing the risk of progression from intermediate to advanced stage of AMD by 25% [9].

The second trial improved the initial formulation by removing beta-carotene, because of the higher incidence of lung cancer among smokers, and by adding lutein, zeaxanthin and omega-3 fatty acids. Following the same pattern, subjects where divided into 4 group and received 10 mg

lutein+2 mg zeaxanthin, 350 mg DHA +650 mg EPA, lutein+zeaxanthin and DHA+EPA, or placebo. When compared with the first trial, the most significant results were that lutein and zeaxanthin are safer than beta-carotene and that they have proven to reduce the progression to later stages of AMD in opposition to the placebo arm. A second randomization took place using the initial AREDS formulation or a modified version that had a lower dosage of zinc, or didn't contain either beta-carotene or beta-carotene and zinc [37]. In opposition to lutein and zeaxanthin, omega-3 fatty acids didn't exert any benefic effects [9] [6].

CONCLUSIONS

In conclusion, oxidative stress and inflammation seen as the major pathological mechanism involved in AMD and DR lead to the hypothesis that nutrients with antioxidant and anti-inflammatory could help fight against retinal degeneration and vision loss. The main nutrients that were associated with the property to scavenge ROS, enhance the intracellular defense mechanism, reduce pro-inflammatory cytokine synthesis, and prevent cell apoptosis are in carotenoids, vitamins, omega-3 fatty acids, zinc and polyphenols. In addition, the existing therapies on the market are expensive and they target mostly the neovascularization. Thus, nutrients are seen an additional low cost therapy that could aid the fight against vision loss.

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PRELIMINARY REPORT ON THE IMPACT OF THE COVID-19 PANDEMIC ON MEDICAL SERVICES PROVIDED IN THE ORTHOPEDICS AND TRAUMATOLOGY DEPARTMENTS

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Abstract

The need for an analysis about the sustainability of measures taken in the COVID-19 pandemic and the impact of these measures on patients with osteoarticular, muscle and connective tissue pathology is relevant to implement a strategic plan for prevention and control of the deterioration of health of patients with orthopedic diseases. Thus, a retrospective study was performed analyzing statistical data on patients admitted to the Orthopedics departments of the County Clinical Emergency Hospital Oradea between 01.01.2019-31.09.2020, including a total of 4731 patients. From the statistical data obtained it was found that the number of hospitalizations in the orthopedics and traumatology departments decreased dramatically since April 2020, when there were 63% fewer hospitalizations than in the similar period of the previous year, the number of chronic hospitalizations being reduced to almost 0, the number of acute cases being reduced by 52%. The monthly assessment of the average length of hospital stay in the orthopedic wards revealed significant fluctuations due to the measures imposed by the authorities and the decrease in the number of available beds.

Key words: pandemic, COVID-19, hospitalization, orthopedics, traumatology

INTRODUCTION

The COVID-19 pandemic has numerous implications in the management of patients with osteoarticular, muscle and connective tissue disorders, which derive from both the numerous problems associated with ensuring the treatment of urgent or chronic cases in the context of SARS-CoV-2 infection.

Surgery involves an integrated activity, which starts in the department where the patient is admitted, with the patient's preparation for the surgery, which is continued in the operating suite (preoperative, operative and postoperative) and is completed in the admitted department (patient monitoring and specific therapeutic indications). (Vladu A. et al.,2020) Thus, patients who require emergency surgical treatment and are infected with the SARS-CoV-2 virus are a real challenge for the medical staff. Chronic cases of infection with this virus can be delayed, but on return they must have an optimal biological status for surgery.

Given the fact that the County Clinical Emergency Hospital Oradea is part of the category of support hospitals for patients tested positive or suspected with the SARS-CoV-2 virus, a well-developed strategic planning is needed to cope with the pressure exerted by the pandemic on the system. local and regional health.

Strategic planning is a systematized and organized process by which an organization plans its future. The purpose of strategic planning is to adapt the organization to the ever-changing external environment, and to understand the current and future possibilities related to these changes. Managers do this by identifying economic, social and political trends in the external environment that will have an impact on the organization and evaluating the internal possibilities of the organization. A well-developed and implemented strategic plan makes an organization proactive and not reactive to a constantly changing environment. (Vâlceanu D., Școala Națională de Sănătate Publică și Management, 2006)

The activity of planning and the elaboration of health policies are intertwined and interconditioned. Thus, although policy-making focuses on value judgments, it cannot appear or be implemented in a void, but only on the basis of the existing situation and estimates for the future, which are essential features of the planning process. (Vlădescu Cristian et al., 2004)

The current situation created by the pandemic has led to the implementation of an effective strategic plan, which included the reorganization of hospitals in Bihor County, the Orthopedics I and Orthopedics II departments of County Clinical Emergency Hospital Oradea(CCEHO/SCJUO) being merged into the space where Orthopedics I operated, hosting a number of 33 beds.

Having implemented an internal managerial control system on the Orthopedics and Traumatology departments of CCEHO/SCJUO according to the published studies (Daina L. et al., 2018), the management has the possibility to consolidate the managerial decisions adopted with reference to the implemented strategic plan.

The need for analysis on the sustainability of these structural changes and the impact of the measures that stopped admissions in hospitals for surgery and other treatments and investigations hospital, which is not urgent and can be reprogrammed on period, is supported given the increased pandemic length, which can lead to long-term limitation of chronic patients' access to certain specialized medical services and thus to accelerated deterioration of their health.

MATERIAL AND METHOD

A retrospective study was performed analyzing the statistical data regarding the patients hospitalized in the Orthopedics departments of the Oradea County Emergency Clinical Hospital during 01.01.2019-31.09.2020. A total of 4731 patients were included in the study period, without exclusion criteria.

The evaluation revealed as follows:

- Situation of the number of available beds
- The situation of the number of hospitalized patients
- Situation of the number of patients with acute / chronic diseases
- The monthly evolution of the average duration of hospitalization

RESULTS AND DISCUSSION

The situation of the number of available beds in the studied period

Judicious management of the available resources in the departments is imperative for efficient management. One of the most important resources available to the wards is the number of beds, on which depends the number of hospitalizations made on those wards. Figure 1 shows the situation of the number of beds available on the orthopedic departments. Following the restructuring of the departments in the Oradea County Emergency Clinical Hospital, the Orthopedics departments were merged in April 2020, so the Orthopedics Department 1 has 18 beds and 15 beds the Orthopedics Department 2, thus creating additional beds for critical patients who need intensive care.

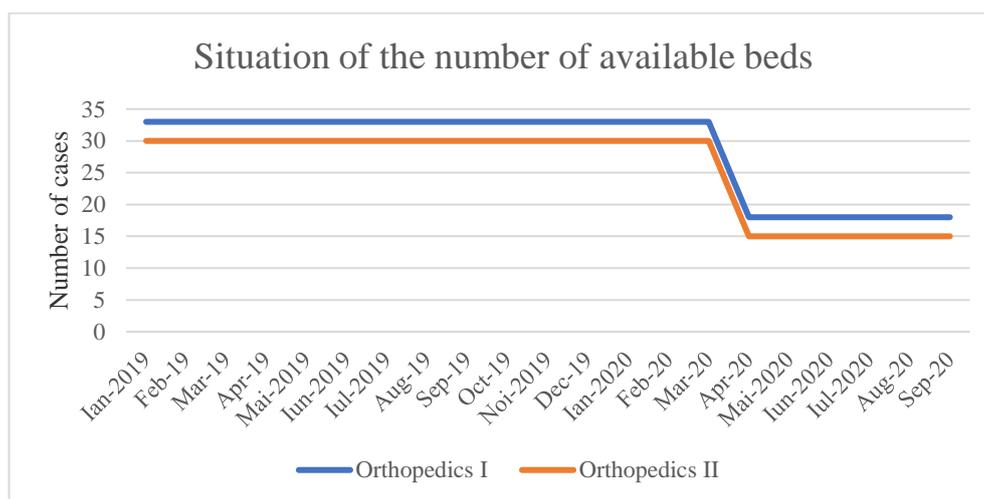


Fig. 1. Situation of the number of beds available in the orthopedic departments reported monthly

The situation of the number of hospitalized patients

The number of hospitalizations nationwide has decreased dramatically since April 2020, when there were 70% less hospitalizations than in the same period last year, following an increase between June and August 2020, but remains halved compared to the previous year. (Mixich V., Radu C., 2020)

Similar to data reported by countries in Figure 2 can be seen a significant decrease in the number of admissions in May April 2020 about 63% over the same period in 2019, following a rise in coming months.

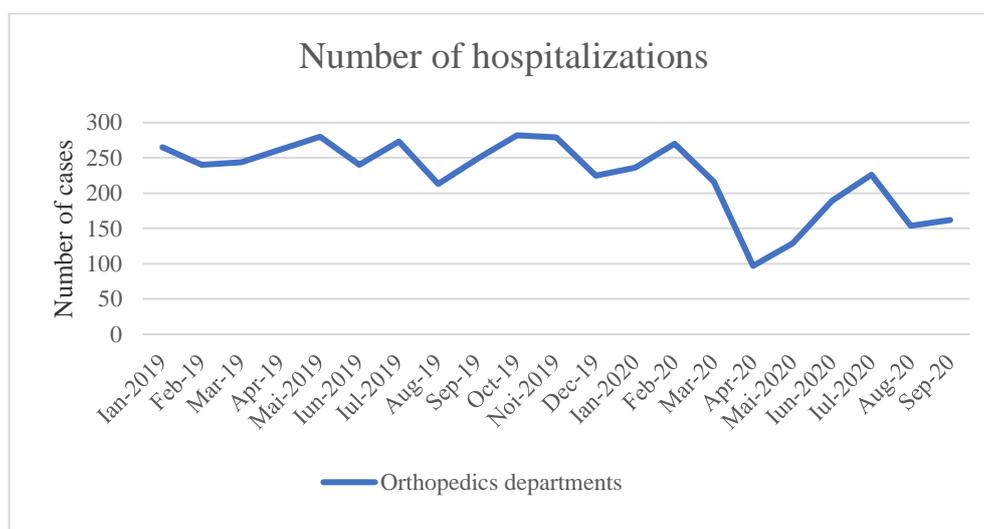


Fig. 2. The situation of the number of patients admitted to the orthopedic wards reported monthly

Based on the Order of the action commander no.74527 / 23.03.2020 issued by the Ministry of Internal Affairs, hospitalizations for surgeries and other hospital medical treatments and investigations were suspended, which are not an emergency and can be rescheduled for a period of 14 days. Thus, the number of chronic hospitalizations in April was reduced to almost 0, the number of acute cases being reduced by 52% compared to the same period in the previous year, the graphical representation in Figure 3 being relevant in this regard. In the following months, the number of hospitalizations increased, both scheduled and urgent ones until July, after which they decreased again by 32%..

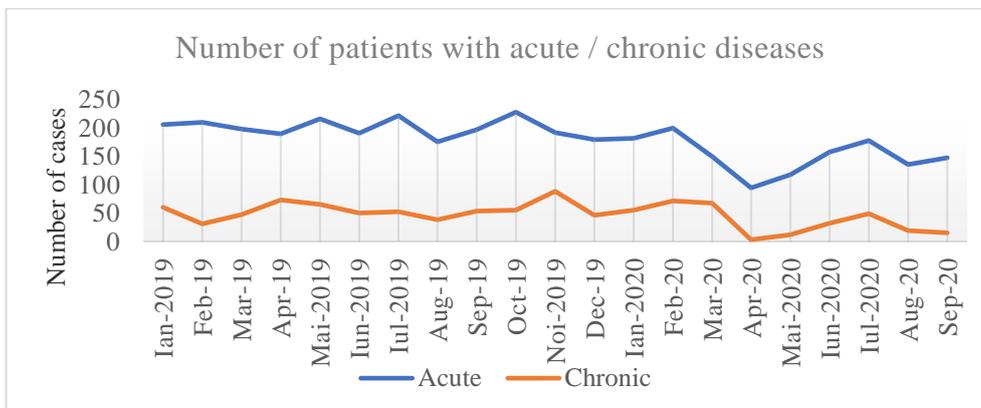


Fig. 3. Situation of the number of hospitalized patients according to the method of hospitalization in orthopedic departments reported monthly

Analysis of the average duration of hospitalization

The provision medical services in hospitals is granted on the basis of contracts concluded by hospitals with health insurance companies, taking into account hospital-specific indicators. The data presented above (number of beds established according to the organizational structure, number of cases discharged by continuous hospitalization) and those to be presented (average length of hospitalization) are essential quantitative indicators for assessing the financial and non-financial performance of hospitals. Thus, Figure 4 shows the monthly reporting of the average length of hospitalization in orthopedic departments, in April being a slight increase in the average length of hospitalization, by 12% compared to previous months, but similar to the same period in the previous year, following to decrease progressively until July, with about 35% compared to the same period in the previous year. In August of this year, the average length of hospitalization increased by 1 day compared to the previous month, and decreased again in September.

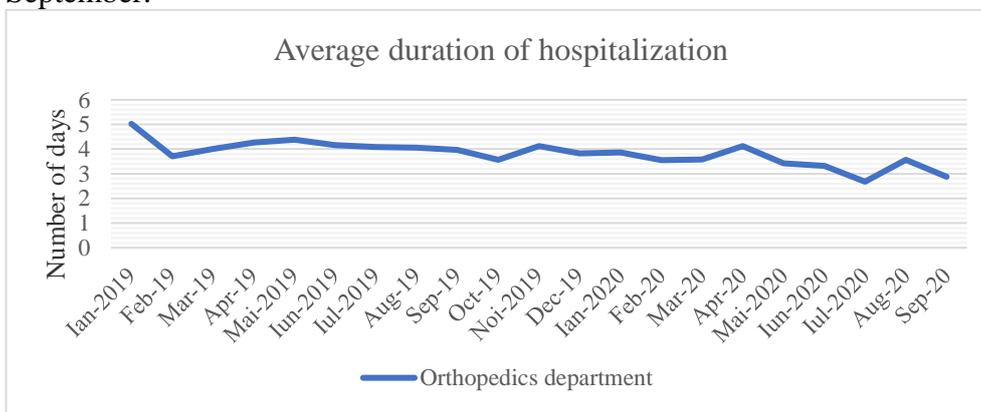


Fig. 4. Average length of hospital stay in orthopedic departments reported monthly

CONCLUSIONS

1. The impact of the COVID-19 pandemic on the number of hospitalizations in the orthopedics and traumatology departments was a negative one, decreasing dramatically starting with April 2020, when 63% fewer hospitalizations were registered than in the similar period of the previous year.

2. The measures taken by the authorities to limit the spread of SARS-CoV-2 virus infection in April 2020 have resulted in the limitation of patients' access to medical services in, the number of chronic hospitalizations being reduced to almost 0 and the number of acute cases being reduced by 52 %.

3. The monthly assessment of the average length of hospital stay in the orthopedic wards revealed significant fluctuations due to the measures imposed by the authorities and the decrease in the number of available beds.

4. Well-developed strategic planning at local and regional level is needed to facilitate access for patients with osteoarticular, muscle and connective tissue diseases to quality medical services.

Acknowledgments

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