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CLASS MANAGEMENT AS AN EDUCATIONAL GROUP

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Abstract

Education management has the capability to achieve only interdisciplinary, as it targets the main criteria of efficiency and effectiveness, as well as educational success, using the superior parameters of human resources, processes and key relationships that occur, but especially specific strategies.

The expansion of management in the field of education has been essential, since it has not been limited solely to the level of school as an organization and its leadership, overcoming obstacles that originate in the economic, management and last but not least, the fight against the bureaucratic mentality typical of staggered structures, as well as the unconditional compliance with certain normative acts.

The field of study of educational management, regarded as art, science, theory and practice, is clearly systematized as a complex social activity which is carried out in conscious, systematic and organized actions, with a view to becoming an active and creative personality, corresponding to contemporary social conditions.

Education is a complex process with a variety of tasks, with an impact on society as a whole, and it is possible to identify the changes brought about by education and numerous educational factors, with schools playing a fundamental role by focusing efforts on achieving the educational ideal, thus contributing to the achievement of the social ideal.

Kay words: management, school, class, students, efficiency

INTRODUCTION

Achieving a successful management in education is dependent on compliance with fundamental requirements such as: putting quality first, clear objectives, motivating the factors involved, rational use of resources and permanent corroboration of processes with results.

The educational process, at the level of the study formation, class and group of students, must be coordinated by teachers who plan the didactic activity, realizing didactic activity projects.

The teacher organizes the class of students according to the objectives pursued, the main goal being to create learning situations favorable to study. It establishes the training objectives by choosing methods and means

of education, controlling, guiding, evaluating, both the students' activity and the results obtained by them.

Through his entire contribution regarding the design and realization of the training, the teacher carries out a specific leadership activity at the classes he coordinates, the group of students constituting the psychosocial framework that follows the instructive-educational activity.

MATERIAL AND METHOD

The contemporary social and pedagogical reality highlights the fact that the role of the school as an institution of education has become more and more complex, the reforms promoted in this difficult period having the purpose of moving the education center on the student, the main beneficiary of the educational inductive process. Largely formative education system, focused on respecting individual particularities.

RESULTS AND DISCUSSION

The school proposes to the students the paths of intellectual formation that involve them actively in their own formation and that determine them to practice their behaviors, attitudes, reflective power and acquisition of new information through their own intellectual efforts, emphasizing the freedom. intellectual development of the student and autonomy, fundamental values of education.

In the contemporary educational magement, the term *class management* is used with a double connotation: *in a broad sense* , it constitutes the accomplishment by the educator of all the recognized managerial functions; *in a narrow sense* , it aims to achieve the managerial function of operational management of human resources in order to apply the established objectives and obtain the expected results.

The manager is one of the main factors of any educational change, this being the one who procures, allocates and uses financial, physical and human resources to achieve his goals in the context of managerial activity.

In the case of any educational unit, the modernization of its own classroom management consists in objectives of improvement and efficiency of the teacher's activity, each having its own style based on experience and personality, being able to decide the approach style (authoritarian, participatory) to achieve success.

Knowing the group of students, as a social group, pursuing educational actions meant to contribute to its development, implicitly to the formation of the personalities of which it is constituted. Just as the object of students' psychological knowledge consists in their personality, so the object of

students' knowledge must represent their sensitivity having as features: structure, dynamics, team cohesion, respectively socio-affective climate, features of students' personality. Personality results from the way in which the various psychic components are hierarchized, while the spirituality results from the concrete content and the way in which different group traits are manifested in a concrete collective. The identification of the syntax of the group of students and of the personality of each of them is mutually complementary from the double perspective: gnoseological and methodological.The qualitative difference is determined by the specifics of the reality to be known, the content of the syntality being different from that of the personality. Knowing the sensitivity we will be able to appreciate some components of the personality and, conversely, knowing the personality of the students we will be able to interpret certain manifestations of the sensitivity. Thus, taking into account the interdependence that exists between the sensitivity of the team and the personality of its students, we will use methods specific to both areas to provide us with as much information about the team, as a social unit , as a whole. In order to get to know the group of students, we will take into account both methods and specific teaching techniques, listing as follows:

Method –observation, the questionnaire, experiment, appreciation scales

Sociometric *techniques*:- test, matrix, sociometric indices, dials.

If some methods are applied periodically, others are applied at any time, knowing the group of students being a continuous action; combining these methods in a certain way we will penetrate the structure and internal dynamics of the group of students. Regarding the psycho-pedagogical knowledge of the students, from the perspective of the fundamental elements of the training (the student, the work tasks, the learning strategies, etc.) the students' knowledge represents a premise of the efficient development of the differentiated training-education activity. The principles of psycho-pedagogical knowledge involve two stages: observation, documentation and exploration stage, the stage of discrimination of the information gathered for interpretation, for comparison. The scientific methods of psycho-pedagogical knowledge of students know a great truth and diversity, using observation, experiment, texts and surveys, case study. The empirical methods of knowing human individuality keep our attention on the most common:knowledge based on the extrapolation of personality traits *physiognomy*, psychological knowledge through the analysis of graphic productions - graphology

Thus, the principles of psycho-pedagogical knowledge of students take into account the fact that: the educator knows the student, educating him, and at the same time educates him by knowing him; the knowledge activity is a continuum throughout the student's school life; the student's knowledge has

as finality a correct school and professional orientation as an indicator of personal fulfillment. Modernizing one's own classroom management involves listening to students patiently, knowing the opinions, needs and interests they have, being a repositioning of the student's role and status in the educational process.The teacher-teacher relationship must be democratic, the teacher having the role of organizer, guide, counselor and last but not least manager of the educational instructional process, being able to facilitate the emergence of new relationships and activities that take place in groups. As a competent manager he is a body and soul devoted to his students, learning by them, permanently concerned with the accessible implementation of knowledge, treating them fairly, knowing their individual differences, giving them the opportunity to develop cognitive skills, but also encourage them to learn, to maintain self-esteem. The teacher is thus responsible for the management and modernization of the way students learn, inspiring both honesty and fairness and honesty, being a model for his students, permanently engaged in lifelong learning.

CONCLUSIONS

Therefore, any educational activity takes place under certain objective and subjective conditions, but without them being sufficient. Various competencies of teachers are involved in their realization, such as communicative, pragmatic, normative and decisional competence, but especially the evaluative component, information and knowledge being the defining ones.In the last decade, rapid and sometimes unpredictable social changes determine the reconsideration of the role and functions of the teacher in the new social context.

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THE ESTABLISHMENT AND FINANCING OF A BISON FARM IN BIHOR COUNTY

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Abstract

At EU level, the surface of agricultural land used for family gardens is 0,2% of the total, but 52,1% of these family gardens are located in Romania, with the average country being 1,2%.

The fact that most subsistence farming in the European Union is carried out in Romania also results from the degree of fragmentation of agricultural holdings.

Romania's integration into the European Union in 2007 brought with it a difficult transition to market economy, felt especially in the agricultural sector. Subsistence farming is an important way of ensuring a living for farmers and, in many cases, rural and urban housing is based on food produced in the home or close relatives. In addition, the public perception is that household products are organic and of much better quality than imported food, available in supermarket and hypermarket chains. [1]

The mission of the farm is to provide customers with specimens of bison and meat of the highest quality, in order to offer customers a novel product with inestimable nutritional value, rarely found in Romania.

Key words: bison, subsistence farming, busines

INTRODUCTION

SC The healthy bison S.R.L., starts its activity in 2019 with a herd of 42 bison, of which 40 are females and 2 are males. The farm initially has an area of 65 ha of pasture and 25 ha of arable land. The 65 ha are divided into two large pens where the bison are kept. Of the 65 ha of pastures, 35 ha are in the possession of the farm, and the difference of 30 ha is taken by lease from the Association of Grazing and Foresting INFRĂȚIREA BATĂR.

MATERIAL AND METHOD

The methods used in this study were diverse: the historical method, the comparative method, the descriptive method, the sociological method, the logical method and the analytical one, their aim was the systematic analysis of the information selected from the sources studied in order to develop personal points of view and conclusions about the stated objectives.

[1] Alecu I.N. 2013, Situația agriculturii și a exploatațiilor agricole în țările membre ale Uniunii Europene, Editura Ceres

RESULTS AND DISCUSSION

The farm's mission is to offer customers specimens of bison and meat of the highest quality, in order to offer customers a unique product with inestimable nutritional value, rarely found in Romania.

For the next perspective, we want to develop this business as much as possible both for meat consumption for potential customers and for activities related to rural tourism. Being a farm whose field of activity is the breeding of American bison, it is something new in the area, especially, and this attracts tourists. Groups of pupils and students interested in the activity of the farm, in the animals that are not specific to the place and are not met too often or even interested in the running of the business itself.

The business is being set up with the help of European funds. The owners access the support for the installation of young farmers, through which they obtain non-reimbursable support worth 60,000 euros. Thus, the project has an implementation duration of 5 years. These funds will buy the livestock and agricultural equipment needed to produce bison food, supplementing grazing.

The SWOT Analysis:

A. Strong points:

-Experience in the field of agriculture and animal husbandry;
-Cheaper labor compared to the urban environment;
-The bison is an unpretentious animal-being a wild steppe animal;
-Bison meat is considered "high premium";
-The rarity of the activity of this farm-vegetable crop combined with the raising of animals-> the breeding of American bison;
-The existence of the fertile soil necessary for the cultivation of cereals necessary for animal feed.

B. Weaknesses:

-It is difficult to manage being a wild animal;
-There are high costs for feeding and maintenance;
-High costs in terms of pens in which they are kept-being resistant strong pens;
-Lack of equity;
-The level of development of human capital is lower compared to the urban environment;
-Investing in the qualification of local staff;
-High cost of purchasing an American bison;

C. Opportunities:

-Partnership with SC Euro Buffalo SRL;
-Positioning the locality in the plain area-the possibility of expanding from an unlimited territorial point of view;

-Option to access non-reimbursable European funds for farm development;
-Increasing the standard of living in the locality.
-The subsidy offered by the state per head of animal and per hectare of land.

D. Threats:

- The disease ”Malignant bluetongue” that is transmitted from sheep or lambs;
-Unstable agricultural legislation;
-The educational system in Romania is quite little related to the requirements of the labor market.

In order for the “Healthy Bison” farm to be able to carry out its activity as well as possible, the management and execution staff is needed, which is in accordance with the necessary skills and knowledge and is structured on salary categories:

Nr. Crt.	function	Gross Salary (lei / month)
1.	Administrator / Zootechnical Engineer	3,000
2.	Agronomist Engineer	2,500
3.	Veterinarian	1,000
4.	Workers	2,500
5.	Tractors	2,500

The administrator of this farm is a graduate of Animal Husbandry and Engineering and Management in Public Food and Agrotourism, thus, he deals with both administrative affairs and animal feed rations. He also has a gun permit needed to stun the bison, being the only possible way, given that we are talking about wild animals.

The veterinarian does not have to be permanently on the farm, so he is employed on a 2-hour basis, being called only when needed, and twice a year all animals go through squeeze chutes.[2] for weight verification, vaccination and eartags.

The workers (2 in number) have the task of putting the food and preparing the fodder for the bison. Because the feed is done with the tractor, a man must be to close and open the gate every time the tractor enters the pens. And the tractor drivers (2 in number) take care of the agricultural work.

The farm will help the sustainable development of Tăut by encouraging the use of local labor, by promoting tourism in the area, by attracting European structural funds, improving infrastructure and last but not least by increasing the level of revenues collected from the local budget.

By promoting the farm and visiting it by tourists (pupils, students or just curious) the locality is also highlighted, and by the example of good practice they will certainly be willing to bring something unique from other areas in the area, on the principle "If they can , why can't I? ”

a. Product description:

The business plan aims to launch a new product on the agri-food and livestock market, involving the activity of breeding and marketing the bison.

The American bison is a ruminant in the cattle family and the feed is similar to that of Angus cows. It is a wild steppe animal, so far no methods have been found to domesticate it.

For a genetically controlled breeding, groups of 25-30 cows with a compatible bull are formed, groups that move freely in 30 ha pens.

The products obtained from breeding are sorted, the males being sold mostly alive, and the females kept for breeding. Due to the high demand on the food market, some males, after about three years, reached the optimum slaughter weight (700-1000 kg) are processed in the slaughterhouse and delivered as a carcass.

b. Market segment:

This product is addressed to niche businesses that sell rare and luxury products, but also to those who want to develop a similar business.

The advantages of the business stem from the innovative character which consists in the premiere growth of the American bison in the Tăut area and in the high premium quality of the meat.

The population is on an upward trend towards a healthy lifestyle, we are looking for quality products that have superior nutritional qualities, and the pandemic has not changed this. Bison meat has always been addressed to niche customers, and the pandemic has done nothing but make these customers even more eager to adopt a healthier lifestyle in order to have a strong immunity.

c. Market location:

It is sold in Romania in the form of a carcass in restaurants such as Piata 9 or the Slavia Hotel (in Bihor County), as well as live abroad in countries such as Kazakhstan and the Czech Republic.

We want to enter the menus of several restaurants in the Bihor area such as *Allegria, RA-Bistro & Caffee, Rivo, Spoon* (Oradea); *Restaurant Ancora, Milenium, Mădăras Inn* (Salonta area); *Principesa Margareta Guesthouse*, *Time Out* (Beiuș).

Abroad, in countries such as France, Kazakhstan we export live specimens. The export is done by plane, the animals are locked in large metal boxes, they are transported in maximum safety.

d. Application features:

Demand for bison is low because it is a niche product. On the other hand, for economic operators marketing this type of product, the demand is unsatisfied, as there are not enough local and national producers on the market.

e. Possible risks:

Regarding the risk factors that could negatively influence the demand are: high costs in terms of production and marketing, which implicitly lead to an increase in the selling price.

Another risk is unstable weather conditions. Also, contact with malignant catarrhal fever from sheep and lambs is a risk, being fatal to bison, due to the fact that it is a very strong animal, it leads on its feet until the last phase of the disease, when nothing can be done.

Marketing strategy

a. Product policy:

The marketed product has two components: the carcass and the live animal. Both are rare and new products on the local market.

Bison meat, one of the healthiest types of red meat, rich in vitamin B, an excellent source of iron and zinc \, with fewer calories than beef, slightly more expensive than Angus beef, a tender meat, considered a luxury product, it also penetrated Romania.

The largest bison farm in Europe is located in Bihor, near Salonta; 800 specimens are raised on the plains of Salonta by an Austrian investor. It exports meat to the Czech Republic, Kazakhstan and France, but also has orders in the country.

The product has reached the menus of local restaurants where we find it in the form of steak, goulash or burger with bison meat.

In the case of bison meat, the fat-protein ratio is better than in beef and other types of red meat available on the Romanian market. From this point of view, bison meat is an excellent alternative for those who want to eat leaner and healthier red meat.

b. Price policy:

The activities of obtaining this product involve high costs, which implicitly leads to high marketing costs.

Being considered a luxury product, a premium product is obvious that the price of this product will be high. Bison meat sells for 10 euros / kg, and a specimen under one year can reach 1750 euros.

In restaurants, in Oradea, a burger with bison meat costs 35 lei, while a burger with bison meat on the menu of a restaurant in Salonta costs 29 lei. A steak can reach 200 lei.

c. Distribution policy:

The distribution is made in the country in the form of a carcass in restaurants in the Bihor area, and in the form of live specimens abroad - the Czech Republic, Kazakhstan and France.

This farm, whose main object of activity is the breeding of American bison, is not difficult to find channels, because their product is addressed to niche customers, and after it reached the market and the demand began to grow, the number also increases customers.

d. Promotional activities:

The promotion of the business is done through its own website, on social networks, through the media, respectively radio and by participating in agri-food fairs.

We place billboards at the exit from Oradea to Arad, in Salonta and Beiuș, on which to appear the address of the farm.

We also propose to restaurants that sell products based on bison meat to advertise our products, to highlight them.

Financial analysis

State subsidies:

- Per animal head: 98 euros;
- On a ha of arable land: 175 euros;
- On a ha of pasture: 140 euros;

A bison under one year is sold for about 1750 euros, and one over 3 years for about 1900 euros and weighs about 700-800kg. If it is sold in a case, the cost is 10 euro / kg.

The cost borne by the company for slaughtering a bison is 150 lei.

Nr. Crt.	Naming of the indicators	Year 1 (lei)	Year 2 (lei)	Year 3 (lei)
1	Buildings, land, landscaping and animals	585,350	0	0
2	rent	0	10,000	20,000
3	Expenditures on raw materials	34,500	35,000	40,000
4	Fuel expenses	30,000	30,000	35,000
5	Staff costs	340,000	340,000	500,000
6	Slaughtering expenses	300	1,650	5,850
7	Export costs	100,000	100,000	200,000
8	Other expenses	7,000	8,000	9,000
9	**Total expenses**	**1,097,150**	**524,650**	**809,850**

Nr.crt.	Name of indicators	Year 1 (lei)	Year 2 (lei)	Year 3 (lei)
1	Non-refundable funds	526,815	0	0
2	Subsidies per head per animal	22,569	37,416	46,432
3	Subsidies per ha of arable land	36,225	52,325	60,375

4	Subsidies per hectare of pasture	28,980	41,860	48,300
5	Revenue from the sale of bison	0	177,100	
6	Revenue from the sale of bison in carcases	70,500	361,900	
7	**Total income**	**685,089**	**670,601**	

Nr. Crt.	Naming of the indicators	Year 1 (lei)	Year 2 (lei)	Year 3 (lei)
1	Income	685,089	670,601	1,618,207
2	Costs	1,097,150	524,650	809,850
3	**Advantage**	**-412,061**	**145,951**	**808,357**

CONCLUSIONS

In agriculture and animal husbandry we first invest, and then we reap the fruits;

The success of the business is guaranteed by offering on the market a high premium product whose demand is insufficiently satisfied;

The business encourages the local workforce;

It contributes to the development of the locality through taxes and at the same time of the rural tourism;

The pandemic affected all sectors of the economy, but to a lesser extent the food sector.

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THE CONTRACT - ESSENTIAL LEGAL INSTRUMENT IN CARRYING OUT COMMERCIAL ACTIVITY -part II-

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Abstract

The commercial contract named, according to the Civil Code - simple contract - is the main legal instrument with which the domestic and international trade is carried out. The contract is an agreement of will between the parties participating in a commercial relationship, an agreement by which a commercial legal relationship is created, modified or extinguished. At first sight, a commercial contract seems to be an ordinary contract, similar to other contracts regulated by the Civil Code. However, a closer analysis of the specifics of this contract shows that it presents itself as a legal institution different in its characteristics from other contracts, benefiting from its own rules and bears the impact of the rules of the Civil Code. The commercial contract is the most important source of commercial obligations, but not the only one.

Key words: contract, commercial activity, manifestation of will, contracting parties, contractual freedom

INTRODUCTION

Carrying out a commercial activity involves the production and circulation of goods, the execution of works, the provision of services. Due to this aspect, the commercial activity implies the conclusion of some legal acts - contracts -, in order to commit legal deeds and economic operations.

The commercial contract is a legal instrument to carry out the trade, which, due to its specificity, gives the signatory parties a security in terms of acquiring rights and assuming obligations.

MATERIAL AND METHOD

The materials used in writing this paper are composed of specialized books such as: specialized courses, treatises, legislation

. The methods used are legal, namely the formal method, the historical method, the comparative method, the logical and sociological method, the analytical method. The use of these methods has the role of performing a systematic analysis of the information from the studied sources in order to elaborate the points of view and the conclusions.

RESULTS AND DISCUSSION

One of the fundamental requirements of trade is the speed with which commercial obligations are born, executed and extinguished, meant to allow participants the access to the circuit of values, so as to ensure their safe and fast profit.[2]

Contracts concerning commercial activity are legal acts concluded by professionals in order to operate an enterprise from the economic point of view. The economic aspect of the manifestation of will of the parties, in order to conclude a commercial contract is its final goal - obtaining the profit by producing / circulating the goods and executing works / providing services.

The particular rules or derogations that apply to commercial contracts are provided both in the Civil Code and in the special laws. Regarding the Civil Code, we find these rules in the articles 1650 - 2278.

According to art. 1169 Civil Code corroborated with art. 11 of the Civil Code "The parties are free to conclude any contracts and determine their content, within the limits imposed by law, public order and morals" respectively "It is not possible to derogate by conventions or unilateral legal acts from the laws that concern the public order or from the good morals".[3]

The principles governing the conclusion of commercial contracts are the principle of contractual capacity and freedom. The principle of contractual freedom is the one that prevails at the conclusion of a commercial contract.

Taking into account this aspect, the essential elements of such a contract must be met cumulatively, more precisely the will (manifestation of will). This principle of contractual freedom is a principle that we find in civil and commercial law. In commercial law, it has a general applicability because it concerns both the contractual legal relations in which the individual professionals (traders) or the commercial companies participate and the

[2] Ioan Schiau, *Commercial Law*, Hamangiu Publishing House, Bucharest, 2009, pg. 370
[3] art. 1169, art. 11 of the Civil Code of 2009 (Law no. 287/2009) - Republished, published in the Official Gazette of Romania, Part I, no. 409 of June 10, 2011

relations in which the commercial companies with state capital and the autonomous utilities participate. Thus, according to art. 47 of Law 15/1990 on the reorganization of state economic units as autonomous companies and commercial companies, the commercial relations between the autonomous companies, between the commercial companies with state capital and the relations between them or between them and the state are developed on a contractual basis.

The contracts concluded between the economic agents mentioned above are governed by the principle of contractual freedom and by the regulations contained in the Civil Code and in the special laws, with the exceptions deriving from this law.[4]

Thus, at the conclusion of the contracts, the parties freely express their will in order to shape, modify, transmit and extinguish certain rights and obligations. The freedom of expression of the contracting parties is a contractual freedom and reflects the existing human rights and freedoms. The freedom of will expression of the contracting parties is a contractual freedom and mirrors the existing human rights and freedoms. [5]

Due to the fact that contractually it is the main source of commercial obligations, both the legislator and the doctrine paid special attention to this institution because it has an essential role in the realization and development of goods circulation between producer and consumer.[6]

In this respect, of course, an important role in the development of commercial activities, in addition to the general and special legislation governing commercial activity, we also have the legislation on consumer protection which briefly outlines the obligations of professionals (traders) regarding the production and implementation in circulation of products regardless of the category to which they belong.

In order to conclude a commercial contract, certain stages must be completed, with the aim of choosing, contacting the business partner as well as conducting discussions or negotiating, the terms and conditions according to which the transactions will take place. This stage is known as the pre-contractual phase and aims to establish the clauses that will materialize the final contract. The advantages of completing the steps mentioned above are: concluding rigorous commercial contracts, reducing the risk of litigation, contracts adapted to the requirements of the contracting parties.

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[4] art. 47 Law 15/1990 on the reorganization of state economic units as autonomous companies and commercial companies, published in the Official Gazette 98 of August 8, 1990, Version from: November 2, 2019

[5] Stanciu D. Carpenaru, Romanian Commercial Law Treaty, Universul juridic Publishing House, Bucharest, 2012, pg. 402

[6] Ioan Schiau, Commercial Law, Ed. Hamangiu, Bucharest, 2009, pg. 370

The legal consequences of the existence of the principle of contractual freedom are: the freedom to express the will at the conclusion of the contract, the freedom to administer evidence in case of disputes related to the proper conduct of business and implicitly the contracts under which this activity is carried out, the freedom of the parties to opt for the institution of arbitration, in case of a dispute.

CONCLUSIONS

The activity of professionals - traders implies a multitude of contractual relations concluded both with domestic partners and with foreign partners, on the Romanian market or on third markets. These contractual relations are governed by the provisions of the Romanian Civil Code or of the special laws, as well as by the European ones, on the one hand, or by the provisions of the laws chosen by the parties, laws with which the contract has at least a connection point, or of international conventions. or the standard laws that the parties have agreed to apply.

The contract is the main legal instrument through which domestic and international trade is carried out.

When drawing up an contract, it is important to be as clear as possible, containing all the identification data of the contracting parties, of the patrimonial mass being traded, payment terms and other clauses depending on the type of contract.

Regardless of the type of contract concluded, we must know that it has legal force and in resolving possible disputes between the contractual partners, the courts always resort to the contract.

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STUDY REGARDING THE EFFECTS OF THE SARS COV 2 PANDEMIC ON TOURISM IN THE NORTH WEST REGION OF ROMANIA

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Abstract

The pandemic has had a lasting and damaging effect on all aspects of the human society and economics. One of the most affected area of the economy was the tourist activity. The travel limitations, the lockdowns, the medical dangers have made travel virtually impossible in the first half of 2020 while the second part of the year was a tumultuous one, with a lot of restrictions put into place that have seriously hinder the tour operators and hotels activities. This global and European situation also affected the national tourism in Romania. Although later one in 2020 the European wide restrictions were more relaxed at the national level we often had some restrictions imposed by the local circumstances. All too often the tourists were affected. Even if the great majority of Romanian tourists preferred visiting the country yet this influx was all too often not enough to ensure a real prosperity of the tourist agencies and hotels. This paper analyses the impact of these restrictions on the North-West Region of Romania, by emphasising the local peculiarities and how the pandemic affected a specific region of Romania in the tourist area.

Key words: pandemic; SARS COV 2; tourism; crisis; recovery; evolution

INTRODUCTION

Tourism is a complex ecosystem that includes many actors: offline and online information and service providers (travel agencies, digital platforms, and travel technology providers); travel agencies and tour operators; accommodation service providers; management organizations of destinations; tourist attractions and passenger transport activities (European Commission, 2020). The SARS COV 2 pandemic put tourism in a difficult situation due to the restrictions imposed at European and national level, respectively, it practically completely blocked in the first quarter of 2020, which led to very high losses in the tourism and hospitality industry. Tourism employees were forced to stop working overnight, and the uncertainty about the future of the industry created major problems for all actors involved in its smooth running. The imposed restrictions increased the fear, anxiousness, troubled people behaviour and changed the life style, obliging them to stay home, to work from home or to lose their jobs and income (Popescu, 2021).

Thus, the pandemic had very large effects, both social and psychological, due to the general uncertainty that has spread throughout the world.

In accordance with the *COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Tourism and transport in 2020 and beyond*, the "revenue losses at European level have reached 50% for hotels and restaurants, 85% for tour operators and travel agencies, 85% for long-distance rail and 90% for cruises and airlines (European Commission, 2020). The SARS COV 2 epidemic puts the EU tourism industry under unprecedented pressure. It has led to the suspension of most domestic and international travel, causing a significant reduction in revenue and creating liquidity problems for all tour operators (Volkmann et al., 2021). The virus has not only raised unprecedented challenges for healthcare systems, but has also had a dramatic socio-economic impact worldwide, forcing states to take extreme measures, including lockdown of citizens, prohibition of public gatherings, closing schools, interruption of businesses and introduction of border/ travel restrictions. (European Tour Operators Association, 2020, p. 2 & Harba, 2020).

The tourism industry has always been affected by natural disasters or health crises, but the effects were local and could be dealt with. The global nature of the SARS COV 2 crisis has caused a domino effect that has profoundly affected the entire industry at the systemic level (Vărzaru et al., 2021). The incidence of the new Coronavirus pandemic (SARS-COV 2) on worldwide tourism is interrupting the steady increase in the number of tourists and the number of overnight stays in the last decade, especially in terms of international tourism. The measures taken by most governments in countries around the world on all continents (travel restrictions, closure of borders, isolation of the population or categories of the population at home or their quarantine, etc.) have drastically reduced tourist travel to almost zero, from March until June 2020 (Jugănaru, 2020).

Starting with 16 March, 2020, when the State of Emergency was established in Romania, tourism went on vacation, but not one that would bring benefits. Since then, tourism consultants have predicted the collapse of the industry (Crețu et al., 2021). The summer of 2020, brought a timid resumption of tourism at the national level in compliance with the restrictions imposed by the epidemiological situation in each region of the country, but even so, after the period of blockage, there was a great need to spend the summer holidays outside the homes and the holiday vouchers have brought a breath of fresh air to tourism. In 2020 in Romania, all cultural events and tourist trips were cancelled or rescheduled to reduce the crisis impact on tourist's health (the tourist reception structures left open were those that

housed quarantined people or medical staff) (Stoicea et al., 2021). This has also led to huge declines in the hotel industry, with a decrease in the number of tourists who constantly attend such events, so hoteliers have had to reinvent themselves through advantageous offers, free offers just to increase the number of overnight stays of the tourists. The crisis caused by SARS COV 2 pandemic had negative effects that are difficult to compensate for the global, European and national tourism. Thus, the effects were easily highlighted by indicators that are used in tourism to highlight the tourist activity for a country, region, county, accommodation unit. Thus, taking into account the considerations presented regarding the repercussions of the pandemic crisis on tourism, this paper analyses the effects of the pandemic on tourism in the North West Region of Romania.

MATERIAL AND METHOD

For the purposes of this paper was used the method of qualitative analysis of the specialized literature and also were reviewed the pandemic restrictions in the tourism sector in Europe. Also methods of quantitative analysis were used with a focus on the use for analysis of the database of the National Institute of Statistics - online tempo. The indicators used are the following: tourist arrivals in tourist reception structures; detailed Romanian tourists, foreign tourists; the number of total tourists and the number of accommodation units.

RESULTS AND DISCUSSION

Romania has been severely affected by the crisis caused by the SARS COV 2 pandemic in several areas, but especially in the hospitality and hotel industry. The losses were very high and the reopening of tourism after the end of the lock-down period was a difficult one due to the restrictions imposed at national and local level. Although most Romanians have chosen to spend their summer vacation in Romania, this has failed to compensate for the huge losses in the spring of 2020, but also throughout 2020. As can be seen in Figure no. 1, the restrictions applied in April 2020 up till February 2021 in Europe, caused great problems for the hotel industry, so that for a very short period of time it was possible to travel without restrictions in Europe, which also affected our tourism in the country in terms of the number of arrivals

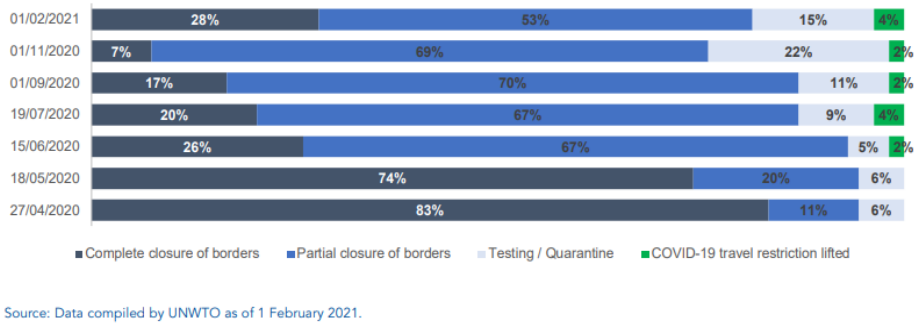

Figure 1 - Evolution of Travel Restrictions April 2020 to February 2021 in Europe
Source: *** Covid-19 Related Travel restrictions

In terms of hotel performance, hotel occupancy reached its lowest level of 5.1% in May 2020 due to government restrictions on hotels and travel. With the easing of restrictions, employment began to rise in the summer, reaching its highest level (17%) in September 2020, before starting to decline again as a result of the second wave of infections with COVID-19 (Moisoiu, 2021). The study presents the effects of the COVID-19 pandemic on tourism in the North West region, the region formed by the counties: Bihor, Bistrița-Năsăud, Cluj, Satu Mare, Sălaj and Maramureș. The analysed region is one with a high tourist potential, so it will be highlighted how high were the losses for accommodation units in the area, losses that are easily observed by the situation of arrivals in 2020, compared to 2018 and 2019, used as a reference for this paper. At national and regional level, there has been an increase in the number of arrivals in the last three years (except for the year of the beginning of pandemic 2 of COVID-19), which is natural in the context of the development of the tourism sector in Romania.

The year 2020 has led to a drastic decrease in the number of tourists worldwide. The pandemic and the restrictions applied all over the world have generated a real crisis in the tourism sector. It is observed that in Romania, the total number of tourists in 2020 is only 47.84% of the total number of tourists in 2019, and the North West region was even more affected. Also, the number of foreign tourists who visited Romania was decreasing very much, due to the uncertain situation of the travel conditions, conditions that changed from one day to the next.

Table 1

Situation of tourist arrivals in tourist reception structures with tourist accommodation functions by types of tourists, North-West Region, comparison of 2019 and 2020

Types of tourists	Total Country/Region	Years			
		Year 2019	Year 2020	Year 2020 - 2019	2020 / 2019
		Number of persons			%
		Number of persons	Number of persons	Number of persons	%
Total	**TOTAL**	13.374.943	6.398.642	-6.976.301	47,84
-	**NORTH WEST Region**	1.766.289	791.158	-975.131	44,79
Romanians	**TOTAL**	10.691.195	5.944.775	-4.746.420	55,60
-	**NORTH WEST Region**	1.494.798	746.214	-748.584	49,92
Foreigners	**TOTAL**	2.683.748	453.867	-2.229.881	16,91
-	**NORTH WEST Region**	271.491	44.944	-226.547	16,55

Source: Own calculus based upon data available at the National Institute of Statistics.

Regarding the situation of the tourist reception structures at the level of the country, respectively of the North-West region, it is observed from table 3 that their number had a slight increase in the pandemic ship 2020, compared to 2019, which underlines the optimism of investors with projects already started to complete them or even start new ones.

Table 2

The situation of the tourist reception structures with tourist accommodation functions at the level of Romania, respectively the North West Region

Total/ Region	Years			
	Year 2018	Year 2019	Year 2020	2020 / 2019
	Number			%
	Number	Number	Number	%
TOTAL	**8453**	8402	8610	102,48
NORTH WEST Region	**1127**	1124	1225	108,99

Source: Own calculus based upon data available at the National Institute of Statistics.

CONCLUSIONS

The end conclusion of this paper was that the tourist sector was not prepared to deal with a pandemic. The losses were severe and the human and monetary losses were significant. Yet at the end of the day the tourist sector has just barely managed to survive. Despite all the challenges the tourist operators would restart in the upcoming period as the lessons of the pandemic have been learnt by those interested and involved in the area. We need to use this as an opportunity to reset the tourism and not go on with business as usual. One thing that might make a difference is to improve the tourism infrastructure and service provisions throughout the region and especially in the cities. Secondly improving the access infrastructure is a must. Another priority should be under the general cover of diversifying and extending the tourist experiences. New tourist trails, new types of tourism, new sensations need to be provided. Finally there is a need for a continuous professionalization of all those involved in this sector as well as for a more green and sustainable tourism. The green and digital transition are to be used in this process of making the tourism sector more resilient.

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VAD-BOROD DEPRESSION IN THE PERSPECTIVE OF RURAL TOURISM DEVELOPMENT

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Abstract

The Vad-Borod Depression, as a component part of the Apuseni Mountains, although it has a rich tourist heritage, is not capitalized on its entire tourist offer. In recent years the area has become known and and thereforeis visited by tourists.They came in large numbers to take advantage of the natural environment, practicing winter sports, mountaineering, rafting, visiting tourist attractions belonging to the natural environment (caves, gorge, waterfalls). There are few those who have visited villages in the depression, although rural civilization is waiting to be valued.

Key words: perspective, rural tourism, cultural heritage.

INTRODUCTION

Rural tourism embraces all tourist activities carried out in rural areas, with the aim of capitalizing on the natural and human potential of villages.

The development of rural tourism manifests its influence in economic, social and cultural plan. The development of rural tourism has a major contribution to the economic life of the village through the possibility of achieving a long-term development policy, while contributing to the development of policies in the agricultural, infrastructure and environmental protection sectors. It also provides support for the development of new businesses, with an effect on increasing the number of jobs locally, encourages traditional local activities, capitalizes on local resources (preparation of agri-food products for tourist consumption and sale), aspects that contribute to increasing incomes, as well as increasing the quality of life in rural areas (Tacu A., 2001).

Rural tourism is no longer a novelty. A significant number of the world's inhabitants love their holidays in the country more and more, both through users (tourists) and providers (pension owners). The tourist activity in the village world proved to be profitable to the detriment of mass or "industrial" type tourism.

The Romanian village, in general, and the one with a tourist vocation, in particular, represent an undiscoveredtourist product for both the national

and the world market. On the other hand, the Romanian touristicvillage can contribute to the discovery of our country as a possible tourist destination, creating interest in Romania as a place that offers a wide range of experiences, quality vacations and even business opportunities.

MATERIAL AND METHODS

The *Vad-Borod Depression* is located along the upper course of the Crișul Repede River, in the northwestern part of the Apuseni Mountains.

The main rural localities in the depression that can become tourist villages are Vadu Crișului, the most important, Șuncuiuș, Bratca and Borod.

Each of them has in its composition a series of villages. So,Vadu-Crişului commune includes *Vadu-Crişului*, Birtin, Tomnatic, Topa de Criş; Şuncuiuş commune includes *Şuncuiuş*, Bălnaca, Bălnaca-Groşi, Zece Hotare; Bratca commune includes *Bratca*, Beznea, Damiş, Lorău, Ponoară, Valea Crişului, and Borod commune consists of the villages *Borod*, Borozel, Cetea, Corniţel, Şerani, Valea Mare.

These rural localities are complex, on one side they can serve rural tourism, and on the other one having near them tourist attractions of great beauty (Wind Cave-the longest cave in the country, Vadu Crișului Waterfall, Crișului Repede Gorge, Cave Vadu Crișului) can serve the following types of tourism:

1. mountain tourism, by practicing recreational activities in the Pădurea Craiului Mountains;
2. adventure tourism and speotourism, which is linked to the practice of extreme sports and attracts more and more followers, especially young people. Rafting, climbing, paragliding, mountain biking are practiced;
3. cycling tourism, due to the relief and the numerous forest roads;
4. fishing;
5. ecotourism;
6. cultural tourism, which consists in visiting rural sites whose distinction is due to the existence of historical monuments, memorial houses, museums or participation in social events in the life of the community: patron saints, gatherings, weddings (eg The Fair atVama Sării in Vadu-Crișului).

Rural tourism through its form of manifestation agrotourism would find within the Vad-Borod depression traditional constructions of a special variety. Thus we can meet:

a) households made to meet their own needs that were not built for the tourist offer but that allow additional arrangements that provide minimum conditions for rural tourism or agrotourism;
b) households built for their own needs and for the alternative of rural tourism and agrotourism, which preserves the local architecture and ensures minimum conditions of comfort, and tourists appreciate the authenticity of the accommodation and the ambiance;
c) specially built households, with agrotourism destination.

If we were to create a typology of villages for rural tourism, we could say that in the Vad-Borod depression we find:

ethno-folk tourist villages, which are characterized by the existence of a traditional wearing, of a specific architecture, of a certain type of furniture and interior decoration, of a popular music and choreography that are imposed as defining features of the respective village: Vadu-Crișului, Bratca, Șuncuiuș;

tourist villages of artisanal creation, recognized by highly appreciated artisanal creations that can be purchased directly from producers: Vadu-Crișului through the art of pottery;

climatic and landscape tourist villages, which address to the tourists seeking peace, solitary walks, in a picturesque setting away from crowded centers and traffic arteries: here we can include most of the rural localities;

tourist villages for practicing sports, presents excellent conditions for practicing winter and water sports on inland rivers: Vadu-Crișului, Șuncuiuș.

The development of rural tourism in the Vad-Borod Depression must be based on domestic tourism with an emphasis on creating new attractions in addition to existing ones (new types of services, leisure programs).This can be made possible by collaborations, common products that include several points of attraction to increase the interest to come to the area and at the same time to alleviate the discomfort of a single attraction.

Rural tourism in the Vad-Borod Depression is a component of local development, because it is growing, but its role in relation to resources must be much more important.

Increasing the contribution of rural tourism in the development of the Vad-Borod depression requires a correlated and balanced development of general conditions (environmental culture, transport, public safety) with the services that make up the tourist product (accommodation, entertainment, tourist information, promotion of attractions), the level of these services and other elements that make up the tourist product.

CONCLUSION

In order for the rural tourism in the Vad-Borod Depression to be capitalized at maximum quotas, the following recommendations are required:

- reactivation of crafts and development of services in a diverse range;
- creation of associations at the level of communes in the area;
- conservation of natural heritage.

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EVOLUTION OF TOURIST ACCOMMODATION STRUCTURES AND TYPES OF ACCOMMODATION IN BIHOR COUNTY BETWEEN 2019-2021

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Abstract

In this paper I tried to analyze the evolution of tourists that visit the Oradea city between 2019-2021. Following this evolution we noticed that the largest number of tourists who visited the city was in 2019 being preceded by 2020, when due to the coronavirus crisis number of tourists was lowest. We also analyzed in what types of units did these tourists stay when they arrived here.

We started by presenting the city and a bit of its history. After which we wanted to get acquainted with this locality from a cultural point of view being the capital of art nouveau, from the point of view of hydrography there are thermal waters invested in the Nymphaea Aquapark park, from a gastronomic point of view Oradea has a network of public food units specialized in local gastronomic products. All these strengths bring Oradea to the first tourist cities in the country.

Key words: a public-private partnership, thermal water, tourist destination.

INTRODUCTION

Oradea, a while ago named Oradea Mare, is a municipality located in western Romania, on the banks of the Crişul Repede river, in the immediate vicinity of the border with Hungary, the county seat of Bihor, being the most important city in historical region of Crişana. Located only 13 km from the western border of Romania, Oradea city occupies a privileged Central European position, constituting an important communication node, located at almost equal distance from the capitals of the region: Bucharest (651km), Vienna (518km), Budapest (248km), Prague (676km).

At an altitude of 126 m above sea level, Oradea is located at the opening of the Crișul Repede Valley towards the plain, in a contact area between the extensions of the Apuseni Mountains and the Banato-Crișana Plain, a passage area from the hilly relief (The Western Hills, The Hills of

Oradea, the Gepișului Hills) to that of the plain. The climate of the city is determined by the West Winds, being a temperate continental climate, with an average annual temperature of 10.4 C, for July the average does not exceed 21 C, while in January it is recorded an average of -1.4 C, with rainfall recording an annual average of 585.4 mm.

The official area of Oradea is 11,556 ha, placing it among the top 10 cities in terms of extent. The population of the city (not taking into account the metropolitan area) is 206,463 inhabitants, according to the 2002 census, of which 54% is an active population. In Oradea, the majority of the population is of Romanian ethnicity ("70,4%"), and there is also an important Hungarian minority ("27,5%"). In addition to Romanians and Hungarians, the city also hosts Gypsy ("1.2%"), German ("0.3%") and Slovak (0.2%), with other ethnic groups (Jews, Ukrainians, etc.).

It is a city with a rich history that was not necessarily the result of a foundation, but on the contrary it was the result of a long evolution throughout history, crossed by a series of events that represented a factor of harmonious development, a hindrance or stopping the growth of the city.

In the period between the two world wars, the municipality maintained itself as a powerful industrial and commercial center. As in the case of other large cities in Western Transylvania, the efforts were directed towards the transformation of Oradea into a powerful Romanian cultural center.

Our city has experienced, in years of the communist dictatorship, an undeniable development. Starting from 1949-1950, after nationalization, the enterprises carried out their activity in accordance with the five-year plans, characteristic of the time. The focus of industrial development was on the machine -building, energy, steel and chemical branches, but light and food industry was also representative. As a result of these economic developments, Oradea's population increased significantly, the natural increase being added to it an important component of population movement towards the more developed areas. Progress has also been made in the area of public services, transport, health. Also, tourism was a concern for the authorities of the time, in this respect Baile Felix and Băile 1 Mai, whose thermal water resources with curative effects had a reputation constituted since the XVI century, were brought to the standards of the time.

As far as the economy of Oradea is concerned, it has always been one of the most prosperous cities of Romania, largely due to its proximity to the hungarian border, thus becoming a gateway to the West. Gdp per capita is about 150% higher than the average in Romania. After 1989, due to the large number of consumers, Oradea experienced an economic revival, not so much in the industrial sector but in the service sector.

The unemployment rate in Oradea is 6.0%, slightly lower than national average, but much higher than the average for Bihor County, of about 2%. 60% of Bihor's industrial production comes from Oradea, the population representing 34% of the total per county. The main industries are: furniture, textile, lohn, footwear and food.

From the point of view of tourism in Oradea it has been demonstrated, year after year that there would be potential. In 2015, the Association for the Promotion of Tourism in Oradea and the Region (Visit Oradea) was founded. This organization is realized on the basis of a public-private partnership with the purpose of promoting the city of Oradea as a tourist destination. The marketing work highlighted the main strengths of this municipality and from that moment on all the investments that were made had as a starting point the rehabilitation of the anthropogenic objectives in this area.

The first major investment was in the restoration of Oradea fortress. In turn all the important buildings have been rehabilitated, with the main purpose of highlighting the nouveou art style. From 2015 until now, the change in architecture and the city is visible. The purpose of these investments was to increase the standard of living in the city, as well as to increase the number of tourists visiting Oradea.

MATERIALS AND METHODS

For this work we used statistical data provided by the National Institute of Statistics and the department of statistics in Oradea. The work covers well the field of qualitative research, seen as a first-order alternative, but also as a necessary complement to quantitative methods. For the research method we used qualitative exploratory research.

RESULTS AND DISCUSSIONS

On July 31, 2021, the accommodation structure in Bihor County was 278 tourist units, the number of accommodation places was 6889 and a number of 14304 people can be accommodated here. We analyzed the evolution compared to 2019 and 2020 and we noticed an increase, small but still an increase. In the total accommodation structures you can see the figure and table number 1.

Table no. 1

Tourist accommodation structures by classification categories, as of 31 July 2020

Structure	%
5 stars	1,7
4 stars	12,3
3 stars	54,6
2 stars	24,3
1 star	5,9
not classified by stars	1,2

Sourse:Tempo online

We can easily see that depending on the classification category of the tourist units, the 3-star ones predominate. The 3-star accommodation units in Oradea are RHC Royal Hotel, Impero, Hotel Lyra, each with its own specificity. Among them the Stokker Hotel is representative due to the authentic restaurant and wine celrii and the strategic positioning in the middle of the city, surrounded with a lot of greenery. Within Oradea municipality, according to the structure of the accommodation places, the hotels predominate, after that the pensions according to table number 2.

Table no. 2

Structure of the existing tourist accommodation places, by type of structures, as of 31 July 2021

Types of tourist accommodation structures	%
Hotels	55.0
Agrotourism pensions	15.3
Tourist pensions	9.7
Tourist villas	4.7
Hostels	3.9
Other types	11.4

Sourse:Tempo online

Number of tourists who visited Oradea was increasing from year to year, according to INS dates in 2018, 250395 tourists visited Oradea. In 2019 the number was 256487 tourists and in 2020, due to the pandemic, the number dropped to 113122 tourists. Usually most tourists came to Oradea in August, 34,395 in number. In July, the city was visited by 27,661 people, and in June by another 22,044. At the opposite pole, the month with the fewest tourists was February: 14,281 visitors.

CONCLUSIONS

Since 2015, when the Association for the Promotion of Tourism in Oradea was founded from year to year, the number of tourists visiting the city is increasing. Due to the well-thought-out promotion through the participation in national and international fairs and exhibitions, through the printing of brochures with the cultural edifices of the city as well as due to the fact that Oradea is the second time the city of good deeds from radio Zu, the number of tourists in our city is increasing.

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CHALLENGES AND OPPORTUNITIES FOR A SUSTAINABLE AGRICULTURE IN THE CONTEXT OF THE GREEN AND DIGITAL TWIN TRANSITION. HOW CAN WE INCREASE THE RESILIENCE OF THE AGRICULTURE IN THE CURRENT CONTEXT?

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Abstract

The climate changes and the impact of the COVID-19 pandemic most recently have generated an increase interest and support for the topic of agricultural resilience. First of all the European Union Member States have discovered that the current pandemic has generated immense troubles in both the supply chains (that were often over extended and vulnerable) and the supply of the population inside the EU. This only added to the troubles generated already by climate changes (draughts, water shortages, extreme climate variations, etc.) All these acted like a wakeup call for the policy makers and other stakeholders. We have started to realise that we need to build up a resilient agricultural system that can sustain all the citizens involved. This resilience building process is a very complex and requires a lot of transversal actions and a whole-of-society approach. What is it needed? First of all we should innovate and train the farmers. Secondly we should developed the local and national infrastructure needed for agriculture. The use of financial instruments and institutional mechanisms are also needed to support the farmers. All these measure should be taken only after a thorough research process that draws a map of the realities in place, of the upcoming challenges and of the measures needed to solve them.
Key words: resilience; agriculture; whole-of-society approach, innovation, training, foresight.

INTRODUCTION

In the last couple of years we have been witnessed to the rise in both academic and practitioner speech of the concept of "resilience" seen as a way to promote a better European Union and a better agriculture.

The term has started to make a name on itself and became a buzzword as the COVID-19 pandemic generated the need of a new approach towards the development of the European Union. The economic crisis generated by the supply problems, the long chains of production generated the need for a redrawn of the economic system. In the context the recovery and resilience mechanism one first official definition of the resilience "means the ability to

face economic, social and environmental shocks or persistent structural changes in a fair, sustainable and inclusive way" (Regulation (EU) 2021/241). Thus the main idea was to have a coordinated European answer that implies both a financial effort and new approaches than in the same time favours the economic and social cohesion, the resilience and the twin green and digital transition. The solution was NextGenerationEU (European Commission, 2021a).

This came on an already strong trend toward developing a resilient agriculture that can only further profit from this penchant for the green and digital transition.

The COVID-19 Pandemic forced the realisation that the European Union is over reliant on outside suppliers for agricultural products. That made the green dimension even more important at time when the EU needs to support "a sustainable bio economy seeks the transformation of Europe's agricultural and industrial base through the creation of new bio-based value chains, as well as greener, more cost-effective industrial processes." (European Commission, 2020).

Furthermore a series of 2021 analyses done at the EU level show a dramatic impact of the climate changes on agriculture. "Over 40% of the EU's agricultural imports could become highly vulnerable to drought by 2050, inducing competition for water and fertile land" (European Commission, 2021b).

As a result of these evaluations at the EU level was also drafted a European Resilience Dashboard that has a green dimension. According to the European documents the green resilience is "about reaching climate neutrality by 2050, while mitigating and adapting to climate change, reducing pollution and restoring the capacity of ecological systems to sustain our ability to live well within planetary boundaries." (European Commission, 2021c).

Besides the EU made analyses, we also have to take into consideration the important role of the agriculture in the realization of the UN 2030 Agenda and its 17 Sustainable Development Goals (SDGs). The agriculture has a critical role as achieving food security is a prerequisite for achieving the goals of the 2030 Agenda (FAO & OECD, 2019).

MATERIAL AND METHOD

The current research papers is built upon the use of desk research methods. It is built upon the literature review of academic literature and official documents. It explores the concept of resilience, the economic and social context that requires a new sort of approach. These would be applied in the area of agriculture in order to see how and if the agricultural sector could become more resilient.

RESULTS AND DISCUSSION

Taking into consideration the above mentioned issues it is clear that the link between climate change and agriculture has been established as the main challenge is to buld what the experts call climate-resilient agriculture. This sort of agriculture needs to adress both the climate change related challenges, the aspect related to food security and the sustainability part. For some experts it is composed of three aspects, as follows:

- increasing the agricultural productivity and incomes in a sustainable manner;
- building resilience to climate change;
- reducing and/or removing greenhouse gases emissions. (Parvatha, 2015).

This requires a complex effort, on various areas and is not an effort that a single farmer can do it but it is a collective effort that needs to go beyond the strict agricultural approach and toward a whole of society approach.
It is obvious if we analyse the other related term, that of sustainable agriculture, that for some authors is just another synonim of the resilient agriculture. One such definition, from 1990, describes the sustainable agriculture as: "an integrated system of plant and animal production practices having a site-specific application". It is a system that over the long term, needs to accomplish a series of five conditions, described below:

1. "satisfy human food and fiber needs
2. enhance the environmental quality and the natural resource base upon which the agricultural economy depends
3. make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls
4. sustain the economic viability of farm operations
5. enhance the quality of life for farmers and society as a whole" (Lengnick, 2015).

So the question arises: how to deal with all these challenges and yet inculcate resilience to agriculture? How to develop a strategic framework to ensure the resilience of agriculture in face of challenges?

One such answer is the need of a leap of knowledge, especially when we are dealing with abiotically stressed environments. We need to know more about the physical impact of such stressors and develop proper simulation models to see how they affect the agricultural policies. Another answer is the use of new technologies meant to reduce the stress. We can therefore mention

the use of techniques and approaches ranging from conservation agriculture (CA) to Integrated Farming Systems (IFS), from integrated soil fertility management to agroforestry, etc. (Paramjit et al., 2017).

Of the above mentioned techniques I would just mention further the issue of conservation agriculture that implies a series of practices meant to have a reduce mechanical soil disturbance; to maintain a permanent mulch cover with organic matter and also implying the diversification of species (Friedrich et al., 2017).

Another envisaged solution for increasing the agricultural resilience is the use microbial nanotechnology for climate resilient agriculture. "Nanotechnology in combination with microbial biotechnology has led to the rapid development of marketable formulations involving deployment of artificially designed nanoparticles for crop improvement and combating biotic and abiotic stresses." (Kashyap, 2018).

Another similar set of policy recommendations aims at accelerating the process of resilience building trough innovation and training. Adopting modern technologies, drought-tolerant and water-efficient crop varieties and technologies and the use of information and communication technologies are key for a more resilient agriculture. Also enhancing the technical, financial and business management skills and capacities of the farmers is a critical thing to do (Abebe, 2018).

Facing the climate changes requires a climate-smart agricultural value chains that are up to the task. For that is required a profiling of each link in the value chain, have a clear map of all the connexions and of the associated risks (Mwongera, 2019).

A special attentions needs to be directed toward the use of degraded lands area that have been so far ignored due to high costs associated. Yet now by using specifically adapted crops and plants, with the use of supplements we can use the degraded areas for enhancing food security and climate change resilience (Saqib, 2019).

Also non-technical measures can be taken in order to have a resilient agriculture. A series of authors spoke about a series of institutional mechanisms that includes measures such as: crop insurance, which would provide financial stability to farmers; the existence of remunerative prices and well developed agriculture markets and other similar measures (Anantha, 2020).

CONCLUSIONS

The above mentioned aspects show that at the level of practitioners as well as in academia there is a real interest in transforming the agricultural sector into a resilient business. The causes are multiples. First and foremost is the inescapable reality of climate changes that generated a huge level of stress on the agricultural production. Secondly is the ever-changing reality of today societies, marked by a rapid urbanization and increase of the population that requires a good level of food security. All these makes the process of building agricultural resilience an urgent one. The approach is been rather clear and is being teste throughout the world, not only in Europe but also on other continents. Is a mix of innovation of all sorts and training, of institutional and financial reforms and institutional building.

At the end of the day the end result would be a resilient agricultural system that would withstand all challenges and provide to all those involved with substantial benefits.

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THE CUMULATIVE EFFECT OF KINETIN AND ANA ON SOYBEAN ORGANOGENESIS

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Abstract

In our study kinetin and ANA were used for making the culture medium more effective. The nature of the phytohormones used, and also their concentration, the differences of the hormonal balances have an important role in the organogenesis processes.

Key words: soybean,, organogenesis, cytokinins, phytohormons,auxines,hormonal balance ;

INTRODUCTION

The cumulative physiological effect of auxins and cytokines, called hormonal balance, is highlighted in the literature. (CACHIŢA-COSMA and colab., 2004; CACHIŢA-COSMA and Camelia SAND, 2000; RAICU and colab., 2000) .

Analyzing the effects of artificial auxins on soybean ontogenesis, it is found that its reaction differs in terms of percentage depending on the genotype analyzed. This leads us to believe that in the process of in vitro multiplication of soybeans, the individualization of the process must be deepened, in the sense that each cultivar has a specific profile of the reaction to hormonal activity and as such there is a need for each genotype to individualize the structure. culture media.

SKOOG and MILLER (1957), they founded the concept of phytohormonal control of organogenesis, demonstrating experimentally that the differentiation of the roots and stems of seedlings in vitro, is dependent on the ratio auxin / cytokinin, present in the environment.

Auxins are involved in many physiological processes and interact with various endogenous substances, especially other phytohormones, especially cytokinins, gibberellins and ethylene.

Auxins, cytokines and less often gibberellins are used in vitro for cell and tissue culture (BOXUS and colab., 1995).

MATERIAL AND METHODS

In the present study, soybean cultivars were used: Diamond, Pearl and Agate, introduced into the Murashige-Skoog culture medium (1962). The auxin used was alpha-naphthylacetic acid (ANA) at a concentration of 0.5-2.0 mg / l.

The physiological action of auxins on plants, although very complex, can be reduced to the fact that they act on the growth of cells in length; permeabilizes plasma membranes for water and certain ions; along with cytokinins, auxins stimulate cell division; net rhizogenic action (CACHIŢA-COSMA and colab., 2004).

The synthetic cytokinin used was kinetin (K) (6-furfuryl-aminopurine). MILLER et all, identified the first cytokinin - kinetin (6-furfurylaminopurine), which has been shown to stimulate caulogenesis and bud formation in the inocula, from which stems are generated.

Four experimental variants were performed, in terms of the germplasm used, the explant source, the culture media and the combination of growth regulators. During the experiments, observations were made at 15, 30 and 60 days of culture, regarding the number of shoots on meristems, the height of the shoots and the rooting (number of main roots).

Table 1

Layout of the experiments carried out to optimize a protocol for direct organogenesis of soybean meristems

Experi-ment	*Explant source*	*Cultivars*	*Medium and plant growth regulators*
I	*Stem and crown meristems*	Diamant Perla Agat	B5 (0,2 mg/l ANA +0,2 mg/l 2iP); *at 30 days transferred to the same medium* LS (0.004 mg/l PIC+1 mg/l K *at 30 days transferred to RL*(0.2 mg/l ANA)
II	*Stem meristems*	Diamant Perla Agat	MS (*plant growth regulator free*); *at 15 days transferred to the same medium* LS (0.004 mg/l PIC+1 mg/l K *at 15 days transferred to RL*(0.2 mg/l ANA)
III	*Stem meristems*	Diamant Perla Agat	MS (0.004 mg/l PIC+1 mg/l K; *at 15 days transferred to MS (0.2 mg/l ANA)* LS (0.004 mg/l PIC+1 mg/l K) *at 15 days transferred to RL*(0.2 mg/l ANA)
IV	*Stem meristems*	Diamant Perla Agat	LS (0.003; 0.004; 0.005 mg/l PIC şi 0.5; 1.0 mg/l K) *at 15 days transferred to RL*(0.2 mg/l ANA

RESULTS AND DISCUSSION

The best results on the behavior of genotypes were observed at 60 days of culture, when 25% of the meristems grown on the LS medium developed plants suitable for transplantation, compared to 10% on the B5 medium. It is also found that both the coronary and stem meristems formed normally growing seedlings, with the observation that the coronary meristems develop a large number of explants.

Observations on the reaction of soybean genotypes to the culture media and growth regulators used showed that callus (variant I) formed on the B5 medium supplemented with ANA as a source of auxin. The explanation of this phenomenon consists in the presence of naphthylacetic acid (ANA) in the culture medium, knowing the influence of this auxin on the generation of callus.

Table 2

Comparison of media MS (plant growth regulators free) and LS (0.004 mg/l PIC+ 1,0 mg/l K, for 15 days, RL+0.2 mg/l IAA afterward) after 60 days of culture (Experiment II)

Cultivar	*Number of shoots/meristem*	*Number of roots/meristem*	*Height (mm)*
Diamant	5,6	1,7	2,6
Perla	5,0	1,1	1,8
Agat	5,8	2,3	2,6
Average MS	5,5	1,7	2,3
Average LS	6,6	3,7	3,2
General average	6,0	2,7	2,5
Signification			
Cultivar	*	*	Ns
Medium	*	ns	Ns
Cult.×Medium	ns	ns	Ns
LSD 5%			
Cultivar	0,82	1,00	-
Medium	0,53	-	-

The reported differences are entirely due to the surplus of growth regulators that benefited the LS culture medium, referring to the presence of kinetin (K) and indolylacetic acid (ANA).

From the presented data, the behavioral differentiations of the genotypes under the influence of ANA introduced in the culture environment are highlighted. If in all three cultivars the phenomenon of caulogenesis does not show any evolution, in the case of rhizogenesis and callusogenesis some notable aspects appear. it is found in the case of naphthylacetic acid (ANA) that it has a positive influence especially on callusogenesis. Under the influence of this auxin there is also a process, quite modest, of differentiation of caulogenesis at the level of the three cultivations (table 3).

In the case of the Agat cultivar, at a concentration of 1.5 mg / l of ANA, a percentage of 9% caulogenesis is achieved, obviously superior to the other two cultures. Under the influence of this phytohormone, callusogenesis and rhizogenesis are fully favored, a fact found, in fact, in the case of AIA and AIB (CHIRILEI et al., 1970; BANDICI, 2001).

Analyzing the obtained results, it seems that there is a negative correlation between in vitro cultures, at least in soybeans, between rhizogenesis and callusogenesis, on the one hand, and the process of caulogenesis, on the other hand..

Table 3

Cumulative effect of K and NAA on organogenesis

Cultivar	K+ANA *K+NAA* (mg/l)	*Evolution of organogenesis %*			
		No development	*Calusogenesis*	*Risogenesis*	*Caulogenesis*
Diamant	0,0	100,0	0	0	0
	0,5	53	32	27	46
	1,0	50	36	33	50
	1,5	48	46	38	54
	2,0	60	38	28	50
	3,0	63	16	14	29
	%	54,8	32,4	28,0	45,2
Perla	0,0	100,0	0	0	0
	0,5	49	38	31	39
	1,0	45	38	38	46
	1,5	43	46	38	56
	2,0	56	32	26	42
	3,0	60	19	18	30
	%	50,6	34,6	30,2	42,6
Agat	0,0	100,0	0	0	0
	0,5	46	39	36	51
	1,0	43	43	39	58
	1,5	40	48	46	63
	2,0	46	40	42	48
	3,0	58	26	19	26
	%	46,6	39,2	36,4	49,2
$\overline{X}$ /genotip		**50,7**	**35,4**	**31,5**	**45,9**

The mentioned ones are illustrated by the values of the average percentage of the genotypes, highlighting the fact that the hormonal balance achieved at the K + ANA combination, is a very balanced one. Of the three cultivars, the Agat variety had the best results in the case of the K + ANA combination: in the case of caulogenesis (49.2%) and rhizogenesis (36.4%).

In terms of recommended concentrations, it is found in all variants that the doses of 1.0-1.5 mg / l of stimulants are the most favorable in triggering soybean organogenesis.

It is found that in plant vitro crops, organogenesis can be regulated, within certain limits (the reaction depending on endogenous factors) by changing the concentration, respectively the ratio of the two main types of phytohormones - auxins and cytokinins - present in the culture layer.

The hormonal balance response highlights the existence of a negative correlation between caulogenesis and rhizogenesis if we look at the percentage ratios highlighted by the K + ANA combination.

CONCLUSIONS

The presented data show the favorable effect of the combinations between kinetins and auxins, in the sense of favoring the process of organogenesis.

However, the fact of the appearance of some differentiations of answer according to the genotype is highlighted, the Agat variety having the most favorable answer to the combinations mentioned in the hormonal balance.

Analyzing the influence of auxins and cytokinins in the process of organogenesis in soybeans, there is an indisputable need for their presence in the Murashige-Skoog nutrient medium. In all cases it was found that the passage of the explant on the basic culture medium without the participation of growth hormones organogenesis is not triggered.

It can be concluded that the presence in culture media of an increased concentration of auxins, together with cytokinin, stimulates the processes of rhizogenesis, while an increase in cytokinin content stimulates the formation of buds, their growth and the generation of stems. It is also observed that the existence in the culture environment of equal concentrations of compounds with auxin and cytokinin action, can imply - along with the processes of morphogenesis - both the generation of calusm and its increase.

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CLIMATE ASPECTS IN THE PLAIN OF MIERSIG

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Abstract

Miersigului Plain is located between Crişul Repede and Crişul Negru; it has altitudes between 100 m to the west and 170 m at the contact with the Lăzăreni Hills From a climatic point of view, the area falls into the region where most of the precipitation falls in late spring and early summer, and the least during the winter. The average temperature of the warmest month is below 22° C, and seven months of the year have an average temperature above 10° C.

Keywords: plain, climate, Miersig, temperatures

INTRODUCTION

Miersigului Plain is located between Crişul Repede and Crişul Negru. This plain is also called Gepiului Plain. It is a typical Piedmont plain, with flat interfluves that descend, widening among divergent valleys: Valea Lupului, which passes through Apateu and turns south-west; Nojoridului Valley, which starts from the edge of the hills near Apateu; Mierlăului Valley, which is the widest and longest, with exit to Gurbediu. The limit with the hill oscillates around 160 - 180m. The Miersig Plain is one of the highest plains of the Western Plain.

From a climatic point of view, the Miersig Plain presents a plain climate, the western subtype of oceanic nuance, under the influence of the temperate maritime air.

MATERIAL AND METHODS

The present study aims to evaluate the climatic conditions of the Miersig Plain, considering the impact that the climate has on the characteristics of the local soil, flora and fauna.

Indicators were monitored such as: average annual temperature, cloudiness, duration of sunshine, precipitation, atmospheric humidity and wind regime. The values recorded by the Oradea Weather Station during the last 6 years were studied (2015-2020).

RESULTS AND DISCUSSIONS

The average annual temperature is 10.5° C. The month with the highest average temperature is June with 21.2° C, and the month with the lowest average temperature is January with 1.5°C (table 1.1.).

The absolute minimum temperature is -29° C and was recorded in January 1942. The maximum absolute amplitude is 68° C.

Average daily temperatures above 0°C are recorded from the second decade of February and last until the second decade of December. The sum of temperatures during the vegetation period (1.03 - 31.10) is 3,530°C or 3,214°C during the period (1.04 - 31.10) which satisfies the requirements of most cultivated plants.

The highest temperatures during the summer, determined by the strong insolation, adversely influence the evolution of the crop during this period, which is of interest the number of days with maximum temperatures over 25°C (summer days) and over 30oC (tropical days).

Analyzing the normal values of this climatic element, it is found that in July and August the hottest days are recorded.

A more detailed analysis shows that the second and third decades of July and the first decade of August have the highest number of days with very high temperatures.

The average monthly and annual cloudiness registered values are close to the normal ones during the two reference years. The duration of the sun's brightness and the average number of clear days have values inversely proportional to those of the nebula and are obviously correlated (tables 1.2. and 1.3.).

Table 1.1.

Average monthly and annual average temperartures
(Oradea Weather Sattion, 2015-2020)

Period	**Monthly average (° C)**												**Yearly**
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Normal	-1,5	0,1	5,7	10,9	16,1	19,3	21,2	20,6	16,5	11,1	5,3	0,9	10,4
2015	-12	0,8	5,3	11,7	16,0	19,9	22,0	25,6	15,8	10,5	5,7	-04	11,0
2016	1,3	-45	2,9	10,0	18,9	20,0	20,1	21,2	15,1	12,6	2,7	3,7	10,3
2017	3,1	2,4	6,6	11,3	15,9	19,2	23,4	22,0	19,7	9,8	5,1	1,0	11,6
2018	-14	4,9	5,5	9,8	15,1	18,8	23,2	20,6	15,0	11,3	1,9	0,6	10,4
2019	-17	-23	0,6	11,6	17,9	20,1	19,3	20,2	12,6	10,8	8,1	-0,8	10,55
2020	-18	1,2	3,6	6,7	16,7	19,4	19,2	19,6	14,8	7,8	6,7	2,6	10,35
Average 2015/2020	-17,5	12,1	2,1	9,15	17,30	19,75	19,25	19,90	13,70	9,30	7,40	1,7	10,45

Table 1.2

Normal average monthly and annual cloudiness
(Oradea Weather Sattion, 2020)

Period	Average cloudiness in the months												Yearly
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Normal	6,9	6,5	5,6	5,7	5,5	5,1	4,2	4,0	4,3	5,0	6,6	7,2	5,55
2015	6,6	6,5	5,7	5,6	5,5	5,2	4,0	3,6	4,5	4,9	6,8	7,5	5,53
2016	7,2	6,4	6,1	5,4	5,7	5,3	4,0	4,0	4,4	4,7	6,6	7,3	5,59
2017	6,9	6,3	5,9	5,7	5,3	5,2	3,9	3,9	3,9	5,2	6,5	7,2	5,49
2018	6,7	6,4	5,2	6,0	5,4	5,1	3,8	4,1	4,2	5,4	6,3	7,2	5,48
2019	6,7	6,9	6,1	6,3	6,2	4,3	3,9	4,2	4,8	5,7	6,2	7,1	5,70
2020	7,6	6,9	7,0	6,1	6,3	6,2	2,9	5,7	5,9	3,5	7,7	8,3	6,17
Average 2015/2020	6,83	6,48	5,34	5,80	5,62	5,13	3,92	4,15	4,52	4,95	6,60	7,44	5,59

Table 1.3.

Duration of sunshine, monthly and annual; normal values and in the studied years
(Oradea Weather Sattion, 2020)

Period	Durata de strălucire a soarelui (în ore)												Yearly
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Normal	63,9	77,2	141,2	186,1	234,4	263,0	294,7	277,5	226,5	183,6	76,4	55,9	2080,5
2015	67,9	90,7	151,9	197,2	254,6	273,7	312,6	285,6	235,7	171,8	82,3	69,8	2193,8
2016	75,9	93,5	163,5	195,4	257,8	278,9	311,5	287,8	236,5	167,9	83,9	75,7	2228,3
2017	80,5	94,7	167,2	199,8	259,0	285,9	321,2	290,3	237,9	160,0	90,2	80,9	2267,6
2018	93,4	97,8	169,9	197,9	260,3	293,5	329,8	291,1	240,3	145,3	97,9	91,8	2309,0
2019	181,0	110,0	170,0	194,9	265,0	312,1	339,3	291,0	240,2	135,0	134,0	157,0	2529,5
2020	139,0	'130,0	180,0	193,1	235,0	263,8	382,4	239,7	149,6	115,0	120,0	133,0	2280,6
Average 2015/2020	92,41	95,69	159,8	194,0	250,3	277,7	318,5	280,7	225,5	161,9	92,03	86,04	2234,54

Atmospheric precipitation. The annual amount of precipitation, on average for 20 years, is 605 mm, with a relatively uniform distribution during the year. The months richest in precipitation are: June, May and July, and the months with lower precipitation are March, February, October, January, September (Table 1.4.).

Table 1.4

Monthly and annual rainfall

Period	Monthly rainfall (mm)												Yearly
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Normal	35,6	37,4	29,7	46,5	68,1	86,3	65,5	50,4	38,9	34,7	50,2	61,7	605,0
2015	21,8	9,8	8,6	33,8	28,3	62,7	28,5	4,8	67,5	114,6	49,6	16,4	446,3
2016	18,8	9,6	31,6	61,5	18,7	51,4	66,7	23,4	49,8	37,0	57,6	78,4	504,5
2017	30,9	38,2	32,2	76,0	50,6	82,2	22,8	64,2	47,0	36,8	18,8	32,1	532,0
2018	43,3	41,9	37,9	49,0	43,0	119,1	54,1	37,9	40,8	2,7	77,7	82,0	629,4
2019	43,15	36,2	15,5	33,5	104,6	103,8	62,2	142,3	171,8	55,2	32,9	43,3	842,8
2020	21,9	27,5	5,5	60,1	51,9	116,5	162,4	75,4	47,1	35,1	20,7	81,15	705,6
Average 2015/2020	27,58	26,8	29,07	44,97	58,21	83,08	65,32	58,87	59,64	48,49	43,12	49,01	774,05

Atmospheric humidity. The relative humidity of the air, expressed in monthly and annual average values, shows more pronounced decreases in May, July and August and higher levels in the winter months (table 1.5.). In general, the annual average values of relative humidity in the experimental years do not vary much from normal values.

The wind regime indicates the predominance of winds during the winter months, December, January, February from the south, southwest direction, so that during the summer the dominant direction is from the east, southeast and north (table 1.6.).

Table 1.5

Realtive air humidity monthly and normal annual average

Period	Relative humidity (%)												Yearly
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Normal	86	83	73	68	66	68	65	67	69	77	85	87	69,3
2015	89	79	69	73	68	73	65	56	70	79	85	91	75
2016	83	89	85	75	66	60	68	66	81	82	92	87	78
2017	87	82	74	75	69	68	58	65	70	79	83	92	75
2018	87	81	78	70	71	73	59	63	73	69	81	86	74
2019	93	86	85	65	74	64	67	74	89	84	83	91	80
2020	96	83	71	75	75	81	83	81	83	77	82	80	87
Average 2015/2020	89,2	83,5	76,6	71,5	71,4	71,9	68,1	70,3	78,8	79,4	84,9	87,4	83,5

Table 1.6

Average wind intensity by direction

Direction	Months												Yearly
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
N	10,2	12,3	15,5	11,8	12,5	11,1	14,4	13,2	11	10,6	2,5	11,6	11,8
N-E	5,1	4,7	6,9	8	6,2	6,3	6,4	5,1	5	5,4	10,7	5,4	5,6
E	12,6	10,2	12,5	14	14,1	15,3	14,6	16,2	17,9	15,8	8	8,4	13,5
S-E	8,3	8,4	7,5	10,2	12,1	13,5	11,9	14	12,2	16	9,4	9	11
S	18,1	25,3	20,2	17,7	14,9	14,1	11,3	10,4	15	15,2	27,2	23	17,8
S-V	9,7	11	12,2	12,6	11,9	8,1	8,4	9,4	9,2	10,2	16	10,2	10,7
V	1,5	2,3	5,6	4,6	6,2	5,8	7,3	5,2	3,6	3	3,4		2,1
N-V	4,4	3,8	3,8	4	4,6	6,2	7,1	5,1	2,7	3	2,4	3,3	4,2

CONCLUSIONS

- The sum of temperatures during the vegetation period (1.03 - 31.10) is 3,530°C or 3,214°C during the period (1.04 - 31.10) which satisfies the requirements of most cultivated plants.
- There are exceedances of the number of summer and tropical days, especially in July and August, without the average values deviating too much from the normal ones.
- In general, the average annual values of relative humidity in the years being studied do not vary much from normal values.
- The winds from the south and south-west have the highest intensity, especially in the winter and spring months, as well as in November.

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RESEARCH REGARDING THE BEHAVIOUR OF APPLE VARIETIES DURING STORAGE IN UNEQUIPPED SPACES

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Abstract

Autumn and winter apples have the ability to evolve in ripening after harvest, which allows them to be kept for a certain period depending on storage conditions. During storage in unoccupied spaces, a series of qualitative and quantitative depreciations takes place, which, in turn, limit the duration of the storage period.

Key words: apples, consumption maturity, storage, unequipped spaces, qualitative and quantitative impairments.

INTRODUCTION

Autumn and winter varieties of extra and first quality apples are suitable for storage, valuable and appreciated by consumers, with a good storage capacity: Golden Delicious, Jonathan, Starking Delicious, Starkrimson, Red Delicious, Wagner Premiat, Jonagold, Florina, Idared, Granny Smith, etc.

Apples can be stored for a longer or shorter period of the time, depending on the physiological characteristics of the fruit and the storage conditions. Additionally, of significant importance are the ecological and agro-technical factors, harvesting at the optimal time, transport and packaging operations, handling and conditioning. The more on time and correctly undergone these operations are, lesser the integrity of the fruit is affected.

Technologies used to store apples are based on controlling and directing external factors, in order to reduce metabolic activity and maintain their quality.

The main environmental factors that must be carefully managed in the storage spaces are the temperature and the relative humidity of the air, chemical composition and speed of air circulation, light, etc.

Temperature plays a key role in the shelf life of apples, influencing the metabolic activity of the fruits. Research showed that low temperatures reduce the metabolic activity of the fruits, cosequently reducing the

biochemical reactions so that fruit ripening during storage is slow and the biological aging decreased. Moreover, low temperatures decrease or even inhibit the activity of microorganisms that cause qualitative depreciations of apples. However, it is recommended to keep the fruit at slightly higher temperatures, as practical results have revealed the appearance of certain physiological disorders in the superficial or deep states of the fruit, known as cold sores. This temperature threshold depends on the resistance of the varieties to low temperatures.

The relative humidity of the air (%) indicates the ratio between the amount of water in the air and the needed quantity to saturate it at a certain temperature. The relative humidity of the air directly influences the sweating process, which is more intense at low humidity values. At the same time, if high relative humidity is too high, an intense activity of microorganisms takes place, which, in turn, causes the fruit to rot, as well as a poor development of aroma and taste.

A relative humidity of the air in the storage spaces of 85-95% is recommended, being in close correlation with the ambiental temperature.

. The chemical composition of the air greatly influences the storage capacity of apples through the content of oxygen, carbon dioxide, ethylene, etheric substances, etc.

Decreased oxygen causes a reduction in the respiratory activity of fruits, the degradation of chlorophyll pigments, further inhibiting the oxidation of various organic components (sugars, organic acids, vitamins, pectic substances) and reducing the rate of ethylene production, preventing the appearance of various physiological disorders (scalding). Moreover, concentrations of 2-21% oxygen decrease the risk of disease, and concentrations below 5% lower the germination and spread of spores. In areas where the oxygen content is low, the carbon dioxide content is high. Fruits are sensitive to low oxygen concentrations. Thus, apples are sensitive to concentrations of less than 3%.

Carbon dioxide is naturally found in the environment at a concentration of 0.03%. An increase in the concentration of carbon dioxide above this value and up to 8% reduces respiratory activity, inhibits the oxidation of chlorophyll pigments and various organic components (sugars, organic acids, vitamins, etc.), delays fruit ripening and aging. Additionally, it reduces the intensity of metabolism of pectic substances, which, in turn, maintain the structure of the fruit. These higher concentrations inhibit the activity of microorganisms and

physiological diseases such as blemishes (Jonathan variety), scalding and internal browning of apples.

Carbon dioxide in high concentration, above the allowed limits, produces a series of undesirable phenomena: internal fermentation of fermentative nature, appearance of caves in the fruit pulp, pulp flouriness, accumulation of alcohol and acetic aldehyde and aroma degradation.

The air circulation in the storage spaces allows the homogenization of the temperature and humidity and proper dispersion of volatile products of metabolism released by the fruits. Air circulation prevents the formation of hot or cold nests in less accessible areas and corners, or the formation of hot and cold layers and the accumulation of volatile substances in certain parts of the storage unit. The speed of air circulation must also be carefully controlled, too high of a speed in conditions of low relative humidity causing the fruit to wither. An air circulation speed of 0.25 m / s is recommended, with a coefficient of 30 recyclings / hour.

Light also has a significant impact on the storage capacity of apples, due to its facilitation of redox processes in fruits. As a result, keeping the fruit in the dark is recommended.

Other factors with potential influence on the storage capacity of apples are foreign odors and the sanitation of storage spaces and packaging. Foreign odors may come from the coolant, the wood used for packaging, the development of fungi on the walls or from other species or varieties stored previously or simultaneously with apples.

Small quantities of horticultural products are stored in spaces with no utilities for short period of time, due to the fact that indoor environmental factors largely depend on outdoor weather conditions. In such constructions, the temperature varies greatly, the relative humidity of the air being much reduced, consequently causing weight loss and wilting of the products, and poor air circulation, which leads to the accumulation of volatile products that accelerate the maturation and aging of stored products.

During storage, the fruits may suffer qualitative and quantitative depreciation, primarily due to inadequate storage conditions, as well as non-compliance with all ecological and agro-technical factors. Moreover, the operations of harvesting, transport, packaging, handling and conditioning must be carried out correctly and on time.

The recorded qualitative impairments are due to physiopathies or the emergence of certain diseases.

Physiopathies occur due to physiological changes that take place in the fruit and may begin in the orchard, as a result of soil and climatic conditions and maintenance work applied to trees and soil or occur during storage, being favored by environmental storage conditions. Additionally, some varieties are prone to develop certain physiopathies.

Impairment caused by microorganisms may occur as a result of their introduction together with fruits or poor hygiene in storage units.

MATERIAL AND METHOD

The study included two varieties of apple: Golden Delicious and Jonathan, which were obtained in the 2020 harvest. The apples intended for storage were obtained in a semi-intensive orchard, in the 6th year of production. Regarding the maturity of the orchard, the orchard system and the varieties produced, the fruits are recommended for storage.

During the vegetative resting period of the trees, crown maintenance works were carried out, which are applied annually, aiming to achieve a balance between vegetative growth and fruit formations.

Plantation maintenance work reffers to autumn fertilizers using chemical fertilizers with phosphorus and potassium and phase fertilizers with nitrogen. No additional irrigation was performed. The control of diseases and pests was achieved with fungicides and insecticides, both during the vegetative rest and during the vegetation period.

The fruits were harvested by hand in buckets, in the first half of October. Simultaneously with the harvesting operation, the fruits were conditioned by sorting and calibration. The extra quality and first quality fruits were destined for storage, the second quality fruits for consumption in fresh condition, and the rest for industrialization. The extra quality includes fruits that have the shape, size and color specific to the variety, with the stalk intact and free of any defects. For the first quality, slight deviations from the shape, size and color of the fruit are allowed, the stalk can be broken or without the stalk, as well as other defects on very small surfaces (insect bites, spots, small, scarred wounds, lightly pressed fruit).

The storage was done in unequipped spaces, respectively, in the cellar. The cellars arranged for storing apples are equipped with wooden shelves, overlaid at a distance of 60 cm between them, the apples being placed in a single layer. In these spaces, the regulation of environmental factors (temperature, humidity, oxygen and carbon dioxide content) is achieved by opening doors and windows. Shelf life can be 3-5 months. These spaces are used in households, for quantities that satisfy the consumption during the autumn-winter period.

The storage space and the shelves on which the fruits were placed were previously disinfected by burning of sulfur flower (2.5 g / m3).

Being autumn- winter varieties, the metabolic activity of apples continues with a certain intensity, even after harvesting, depending on the environmental conditions in the storage spaces.

During storage, the parameters of environmental factors and the behavior of fruits during storage were monitored.

Adjusting the storage regime factors is difficult in this type of space, as they depend on the temperature and humidity of the ambient air. Thus, in the autumn when the fruit was introduced into the warehouse, the temperature was quite high at 140°C. During storage, in the autumn and winter of 2020-2021 the temperatures decreased. However, when compared to recent years, they were quite high, so that the storage space did not reach the value of frost.

The regulation of temperature, humidity and chemical composition of the air was done only by opening the windows and doors. Throughout the storage, the health status of the fruits was evaluated every three days, together with the qualitative depreciations that occur (Alina, Ardelean, 2019, Radu, I.F., Gherghi A., 1967 Marca, Gh., 1987, Beceanu, D., 1994, 1998, 2000, 2002, 2003, Ceaușescu, I., Iordăchescu, C., 1987, Gherghi, A., et al., 1981, 1983, 1984,1989, 1994, Burzo, I., et. al., 1984, 1986,. Marca, Gh., 2004, Potec, I., et. al., 1983, 1985).

RESULTS AND DISSCUSIONS

The qualitative depreciations that appeared were determined by the metabolic activity of the fruits, the activity of the microorganisms and the physiological disturbances.

Depreciation due to the metabolic activity of apples affects the organoleptic properties: taste change, loss of flavor, decreased nutritional value, degradation of color, firmness of the pulp, wrinkling of fruits, etc

The change in taste during storage is mainly due to oxidation processes and changes in the ratio of organic components in fruits (sugars, acids, tannins).

Flavor losses occur in storages where the temperature exceeds the optimum storage threshold, which causes the release of volatile substances from the fruit. When it comes to apples, the accumulation of volatile substances in the storage spaces accelerates the maturation favoring the appearance of physiological disturbances in some varieties (scalding).

Table 1 shows the types of qualitative depreciation (per 100 kg of stored fruit) for the two varieties of apples during storage.

Table 1

Qualitative depreciation recorded during storage

Soiul	Physiological malfunctions (%)	Alterations induced by the development of microorganisms (%)	Total qualitative depreciation (%)
Golden delicious	8	5	13
Jonathan	10	5	15

Among the alteration phenomena due to the development of certain diseases were moniliosis caused by the fungus *Monilinia fructigena* and alternariosis due to infection with the fungus *Alternaria tenuis*.

Physiopathies occur due to physiological changes that occur in fruits during storage, being favored by environmental storage conditions.

The recorded physiopathies recorded were bitter pit, browning of the pulp and Jonathan spot. It is known that some varieties are prone to develop certain pathophysiologies. In this sense, it was observed that the Jonathan variety is prone to bitterness and Jonathan's spot, and the browning of the pulp was recorded in the Golden variety.

The depreciated fruits were immediately removed, weighed, thus establishing the type of depreciation.

The storage period was 4 months. After this period, it was decided to stop the storage, because the outside temperature and implicitly the one in the storage space was increasing, which led to an increase in the percentage of qualitative depreciations.

The qualitative depreciations recorded were 15% for the Jonathan variety and 13% for the Golden Delicious variety.

Qualitative impairments can have several causes. First of all, after the conditioning operations, the fruits were not washed and treated with fungicides, which allowed the penetration of microorganisms into the storage spaces, and the values of environmental factors were higher than the optimal

ones for storage. These qualitative depreciations were also quantitative depreciations because the affected fruits could not be eaten.

CONCLUSIONS

The following conclusions can be drawn regarding the behavior of apples during storage in non-equipped spaces:

1. The qualitative depreciations that occurred were determined by the metabolic activity of fruits, the activity of microorganisms and physiological disorders (physiopathies).

2. The highest percentage of depreciation is represented by the physiopathies, being favored by environmental storage conditions (temperature, relative humidity, air composition, air circulation).

3. Apple varieties are prone to develop certain physiopathies. Thus, the Jonathan variety is prone to bitterness and Jonathan's stain, and the Golden variety was mainly affected by the browning of the pulp.

4. The metabolic activity of fruits affects the organoleptic properties: change in taste, loss of flavor, decreased nutritional value, degradation in color and firmness of the pulp, wrinkling of the fruits, etc.

5. The change in taste during storage is mainly due to oxidation processes and changes in the ratio of organic components in fruits (sugars, acids, tannins).

6. Flavor losses occur in warehouses where the temperature exceeds the optimum storage threshold, which causes the release of volatile substances from the fruit. When it comes to apples, the accumulation of volatile substances in the storage spaces accelerates the maturation and favors the appearance of physiological disturbances in some varieties (bitterness).

7. Qualitative depreciation also led to quantitative depreciation, as the affected fruit could not be eaten.

8. Recorded causes of qualitative depreciation were the failure to perform fruit conditioning operations (washing and treatment with fungicides), which allowed the penetration of microorganisms into storage spaces, together with the values of the environmental factors being higher than the optimal ones for storage.

9. Further research is recommended on changes in fruit during storage.

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IDENTIFICATION AND ISOLATION OF CAMPYLOBACTER JEJUNI

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Abstract

Campylobacter is widely spread in the nature, present in the intestine of numerous species of mammals as would be the she-goats, sheep, dogs, cats, rodents and birds and in the contaminated water with fecal matter. C. doylei was isolated only from the level of the human gastric mucous, C. jejuni from the intestine of the birds, of the pigs and bovines, and together with C. coli also from the residual water coming from slaughter houses. The source of infection in human beings is represented most frequently by the infected animals, including pets, dogs, cats, the infections with Campylobacter being in fact zoonotic. The most frequent epidemic outbreaks were quoted following the consumption of contaminated water or of the poultry with insufficient thermal preparation. The epidemics are more frequent in the warm months, but they can appear in any other period of the year.

Key words: campylobacter, isolated, epidemic, infection

INTRODUCTION

In 1886, Escherich observed organisms that resemble with campylobacter in the samples of stool of the children with diarrhea. In 1913 McFaydean and Stockman have identified campylobacter, called connate *Vibrio*, in the fetal tissues of the aborted sheep. In 1957 King described the isolation of connate *Vibrio* from the blood samples of the children with diarrhea and in 1972 the clinical microbiologists from Belgium have isolated for the first time campylobacter from the stool samples of the patients with diarrhea.

The bacilli are adapted to the colonization of the digestive tube and of the reproducing apparatus, presenting a particular motility that allows the bacteria to travel the covering epithelium by ”corkscrewing” movements. According to some authors, *Campylobacter* is transforming, in unfavorable conditions, in intractable coccoid form, ”dormient”, by which they survive for a long time in the environment and return to the cultivable, virulent form, when they reach in a favorable host.

The infection appears generally in the summer and is the result of the ingestion of food not prepared accordingly. The severe cases of enteritis with

Campylobacter jejuni were due to the unpasteurized milk and some defects in the drainage system. The meat not prepared enough thermally, especially the chicken one was also associated to the infection.
Not all the infections with Campylobacter become symptomatic. Among the factors involved in the appearance of the manifested disease we can mention: the size of the bacterial inoculum that reaches in the small intestine, the virulence of the infected strain, the specific immunity of the host towards the ingested pathogen.

The clinical manifestations in the enteritis determined by *Campylobacter jejuni* are not distinguished of those caused by other etiologic agents of the acute diarrhea disease, as Salmonella and Shigella. After an average period of incubation of 3-4 days, the infection is located in jejunum, ileum and then in the bowel and rectum. The mucous appears ulcerated, swollen, bloody, with crypt abscess and infiltrated with PMN and eosinophils in lamina propria.

MATERIAL AND METHODS

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

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

Necessary materials for the performing of the examination:

- A recipient of collection (collection recipient with collecting spoon) with transport medium
- Wooden 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 quantities larger than 10g because it will reduce the chances of isolating the pathogen bacteria.

RESULTS AND DISCUSSIONS

The coproculture needs samples as fresh as possible (fast transport, in low temperatures), in exchange the determining of the antigen from the fecal matters can be performed also in the conditions when the coproculture is no longer possible.

In the department of bacteriology, from the recipients with the native sample were introduced in the transport medium, then it was performed the inoculation with the bacteriological loop with the diameter of 3 mm on the culture medium for the isolation and differentiation of the *Campylobacter*, such as agar mCCD, agar Skirrow, agar Kar. The incubation of the inoculated media is made in a temperature of 41,5°C in conditions of microaerobiosis.

The growth of *Campylobacter* on culture media for isolation and differentiation is examined daily: over 24, 48 and finally 72 hours with the recording of the results obtained in the respective registration forms.

On the culture medium agar mCCD the typical colonies of *Campylobacter* are of grey color, dense-or with metallic gloss, flat and humid with tendency of expansion. There can appear other forms of colonies:
C.jejuni forms small colonies, up to 1 mm in diameter, flat, semitransparent, of grey shade with smooth surface and regular margins, and C.coli – large colonies, approximately 2-4 mm in diameter, convex, juicy, of grey-yellow color, with smooth surface and regular margins.

On solid culture media with blood *Campylobacter* produces two types of colonies, among which the first has an irregular form with diameter of 3-8 mm. The colonies of this type are colorless or light grey, transparent, homogenous, having the aspect of water drops, non-hemolytic.

Occasionally, the time of long term cultivation, the surface becomes mat silvery, with a non thick consistency. The colonies of S type have a round form, 1-2 mm in diameter, regular margins, glossy smooth surface, gibbous, transparent, homogenous, most frequently colorless, after the prolonged cultivation are capable to form yellow pigment, don't cause hemolysis, possess a non-thick consistency.

Fig.1. Campylobacter jejuni, agar – blood medium. Colonies of S type.

Some species being able to grow also in conditions of anaerobiosis. They are oxidase-positive and the catalysis, production of H2SO4, the sensitivity to the nalidixic and cephalothin acid is used as tests of differentiation between the different species. In cultures older than 48 hours, on solid and liquid media, or after repeated passages, you can observe round forms of 0,5μm or larger, called "coccoid bodies". These forms represent a "degenerative" phase of the bacteria under the influence of the medium conditions. C. fetus grows to 25°C, and C. jejuni to 42°C.

The major antigen of the type is lipopolysaccharide, situated on the level of the external membrane. The serologic heterogeneity of the strains of C. jejuni is determined by the presence of over 90 polyzaccharidic somatic antigens O and 50 of capsular antigens and flagellation. An important role in pathogenesis is that of the infective dose and the immune status of the patient. The patients contaminated with a large number of micro bodies, presenting gastric hypoacidity are more exposed and those that present hypogammaglobulinemia make prolonged and severe forms of disease.

The study "Campylobacter jejuni: molecular biology and pathogenesis", affirms the fact that *Campylobacter jejuni* is a major cause of the bacterial diseases of food origin and its prevalence rivals or even passes that of the infections of food origin with *Salmonella* in the developed world.

Another study, "Epidemiologic and clinical characteristics of the infections with "*Campylobacter jejuni*", affirms the fact that the greater incidence of the infections with *C. jejuni* and their tendency to invade the tissues and to induce the inflammation are compatible with a role in causing the Guillain-Barré.syndrome.

CONCLUSIONS

1. In the strains of *C.jejuni* it was detected the activity of some endotoxins and enterotoxins, whose precise role wasn't established yet. The enterotoxin is thermo-stable and is similar with the one secreted by *E. coli.*
2. They are microaerophilic microbodies, some species being able to grow also in conditions of anaerobiosis.
3. They are oxidase-positive, and the catalysis, the production of H2SO4, the sensitivity to the nalidixic and cephalothin acid is used as tests of differentiation between the different species.
4. In cultures older than 48 hours, on solid and liquid media, or after repeated passages, it can be observed round forms of 0,5μm or larger, called "coccoid bodies". These forms represent a "degenerative" phase of the bacteria under the influence of the medium conditions.
5. *C. fetus* grows to 25°C, and C. jejuni to 42°C.

6. The infection appears generally in the summer and is the result of the ingestion of unfit prepared food.
7. The severe cases of enteritis with *Campylobacter jejuni* were due to the unpasteurized milk and some defects in the drainage system. The meat not prepared enough thermally, especially the chicken one was also associated to the infection.
8. The etiology of the infections can be specified only by the diagnosis of laboratory.
9. The increased level of anti-*Campylobacte*r antibodies indicate, usually, a recent infection in progress, even if the cultures of fecal matters can be negative.
10. The best proof for e recent infection is the significant modification of the level of antibodies in two pair-samples collected in a period of 2-3 weeks.

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DIRECTIONS OF ACTION FOR THE DEVELOPMENT OF ROAD AND RAIL GOODS TRANSPORT IN ROMANIA

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Abstract

Transport is one of the sectors that lead to the economic development of a country. This paper aims to identify the main directions of action that Romania should implement in order to have a high-performance railway and road transport, which would, in turn, lead to sustainable development of this sector and solutions to reduce pollution.

Key words: transport, economic growth, goods

INTRODUCTION

Transport represents a part of economic activity through which goods or people are moved in space in order to meet the material and spiritual needs of the human society.[1]

Transport has become an essential element of life, providing members of society with the means to travel, communicate, perceive and assimilate as much of what civilization has to offer. Modern society, characterized by a huge pace of development in various fields, can only function with an efficient transport system.[8]

In modern economy, transport is a diminishing factor, which requires that the road transport of goods and people be optimized, in order to meet the requirements of openness and sustainable development[5].

Romania's economy has stabilized, showing growth tendencies in certain areas and, consequently, the demand for transport and mobility has increased as well. Customers are willing to pay for efficient transport services, production has increased, the population is moving more, these factors leading to substantial investments in this field.

The transport sector has a major impact in all areas of social and economic life. For this reason, it is necessary to achieve an efficient transport system, as a precondition for economic development and growth of local, regional and international change. This involves the implementation of transport policies that take into account the achievement of minimum costs and reducing emissions.[6]

MATERIALS AND METHODS

Romania is located in Southeastern Europe and shares borders with Hungary and Serbia in the West, with Ukraine and the Republic of Moldova in the Northeast, and Bulgaria in the South. In the Eastern part, Romania has an exit to the Black Sea of a length of 245 km, between the Chilia arm of the Danube - Musura Gulf (border with Ukraine) and Vama Veche (border with Bulgaria). Going out to sea facilitates connections with the countries belonging to the Black Sea basin and, through it, with the rest of the world. In the South, Romania is crossed by the Danube, the second largest river in Europe, on a length of 1,075 km[3].

Romania's population is evenly distributed throughout the territory, with the exception of the Bucharest municipality. In 2009, Romania had a population of approximately 21.5 million inhabitants, being ranked 7th among the European Union states in terms of population. The country's capital, Bucharest, is the largest city with a population of about 1.9 million, representing 9% of the total population and 16.1% of the country's urban population. The cities with a population of over 300,000 inhabitants are: Iaşi, Cluj-Napoca, Timişoara, Constanţa and Craiova. Other important cities in terms of population are: Galaţi, Braşov, Ploieşti, Brăila and Oradea. Among the countries of Central and Eastern Europe (Bulgaria, Czech Republic, Croatia, Poland, Slovakia, Slovenia and Hungary), Romania is the second country in terms of both population and area. With an area of about 238.391 km² and an average population density of about 90.2 inhabitants per km², Romania ranks 6th among CEE countries in terms of average population density[11].

In 2020, Romania's GDP decreased by 3.9%, industry, trade and agriculture contributing negatively to the evolution of the economy. The National Institute of Statistics revised downwards the data on economic growth in Q4 / 2020, from 5, 3% to 4.8%, but maintained the estimate according to which Romania's GDP decreased by 3.9% in 2020 compared to 2019, the better evolution compared to that recorded in the Eurozone, the main economic partner, where the annual decline was 6.8%[11].

Most branches of the economy contributed to the decline of the GDP in 2020, among which the industry sector with one of the most significant impacts of 19.7% in GDP and whose volume of activity decreased by 9.3%; wholesale and retail trade; vehicle repair; transport and storage; hotels and restaurants with a share of 18% in GDP formation and whose volume of activity decreased by 4.7%[11].

Romania's trading partners are mainly the member states of the European Union, thus, in 2019, Romania's imports into the EU-27 accounted

for 73.1% of total imports, and exports to the EU-27 had a share of 74.3 % of Romania's total exports[11].

Romania is one of the most attractive countries in the EC for foreign direct investment. The main foreign investors in Romania in the last decade come from the Netherlands, Italy, Germany and France, and the main investments have been made in the industrial sector.

Regarding the transport sector, there was an upward trend in the volume of goods in road transport in 2020, i.e. an increase of 4.7% compared to the previous year, and, when it comes to road transport nationally, the increase was twofold, 11.8% more precisely[4].

Another important aspect is given by the fact that in the structure of international trade, the share of road transport is 70.5% of total exports, respectively 71.2% of total imports, which represents a significant difference from the share of maritime transport, being 19.5% and 15.4%, respectively.[6]

RESULTS AND DISCUTIONS

The SWOT analysis of the Romanian transport sector when it comes to the development of intermodal transport highlights the following aspects:

Strengths:

- the geostrategic position of Romania and it's potential in terms of intermodal transport opportunities with neighbouring countries and the Black Sea for international trade
- growing interest in the industrial sector for intermodal transport due to increased attention for environmental protection
- skilled labor and low costs,
- advantageous location on the TEN-T network accessible to neighboring countries,
- well organized and competitive road freight services,
- extended railway network, accessible to private operators, providing competitive local services

Weaknesses

- the lack of a General Master Plan for Transport, which should also include a strategy for intermodal transport,
- relatively low quality of transport infrastructures,
- the existence of reduced transport volumes prevents the organization of frequent and competitive shuttle transport services,
- Insufficient investment for the re

- habilitation / modernization of the national railway and road transport infrastructure; insufficient road connections with intermodal terminals and / or ports to attract potential beneficiaries of intermodal transport
- lack of subsidies in the infrastructure of existing terminals and their related connections,
- high maintenance costs for existing specialized rolling stock,
- decreased activity on the traditional freight transport market in the railway sector,
- lack of container warehouses,
- lack of information on the possibilities of intermodal transport in / through Romania,
- lack of performance contracts concluded with the national infrastructure manager,
- lack of promotion of the use of intermodal transport,
- lack of adequate tools for applying the legal framework.

Opportunities

- Community policies favorable to the development of intermodal transport,
- the existence of EU funding sources (SOP-T or TEN-T Program)
- reducing the negative impact of road transport on the environment by using rail transport,
- reduction of greenhouse gas emissions belonging to the road vehicle fleet,
- limiting the noise threshold in localities, which facilitates the use of rail transport,
- reducing the rate of road accidents,
- implementing intelligent traffic monitoring systems in order to increase traffic safety, real-time tracking of intermodal cargo and streamline intermodal transport
- encouraging less polluting modes of transport,
- the perspective of internalizing external costs,
- strengthening the business climate in order to increase the transport demand,
- encouraging the industrial sector to place production centers in the vicinity of intermodal terminals,
- promoting industrial parks in the areas covered by the network of intermodal terminals,
- cooperation between logistics operators and transport operators,
- integrating extended customs services in the intermodal supply chain.

Threats

- the precarious state of the railway transport infrastructure,
- the lack of actions for the development of intermodal transport leads to the country's impossibility to achieve the EU objectives on climate change,

- delays in project preparation, elaboration of feasibility studies, land acquisition and in auction procedures,
- delays in carrying out priority infrastructure projects,
- insufficient coordination between modes of transport,
- insufficient professional training of the consultants employed and of the beneficiaries involved in the preparation of the projects,
- reluctance of some customers towards the use of intermodal transport,
- fragmentation of the transport market,
- lack of investments in intermodal transport

The SWOT analysis shows that Romania's general objective is the development of the national intermodal freight transport system in order to streamline freight transport and improve the impact of transport on the environment and traffic safety in Romania.

Achieving this goal will directly contribute to increasing Romania's accessibility by decongesting national roads and protecting road infrastructure, promoting the balanced development of all modes of transport and improving the quality and efficiency of services, reducing gas emissions and minimizing adverse effects on the environment.

At the same time, this objective implies the need for regulation and coordination of the freight transport market by the state through a better distribution of traffic towards greener, safer and more energy efficient modes of transport.

The state coordination of the intermodal transport sector must take into account the principles of the free market, the existing competitive distribution and the current situation of the activity in freight transport, the coordination between the infrastructure managers, the transport operators and the local authorities.

The specific objectives considered for achieving the general strategic objective are:

- modernization and / or construction of intermodal terminals and related infrastructure;
- achieving quality intermodal services;
- implementation of a system for tracking, planning and managing the intermodal freight transport, using the intelligent transport systems available on the market;
- stimulating the promotion of the national intermodal transport system
- Modernization of road and railway infrastructure which will lead to competitive costs in the field

CONCLUSIONS

Currently, both companies and consumers demand efficient, quality and flexible transport services. The development of railway and road transport services in Romania is the basis of the country's economic development. In order to be able to develop this sector, Romania must invest in infrastructure and intermodal transport services. This will, in turn, minimize transport costs, further increasing the competitiveness of the sector. On the other hand, it is necessary to intensify the efforts that will lead to the reduction of pollution caused by this sector of activity.

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THE FREEZING IMPACT ON ANTIOXIDANT COMPOUNDS OF SOME BERRIES

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Abstract

A healthy diet includes the consumption of fresh fruits. Forest fruits are known as an important source of bioactive compounds such as phenolics, vitamins, carotenoids, anthocyanin. All those compounds have important benefits for human health. Six types of forest fruit were investigated in this study regarding the content of some bioactive compounds. The parameters were determined in fresh state and after freezing at -18^{0}C and -80^0 C, respectively. Total phenolic content ranges from 442 in white currants to 2,385 mg GAE/100g in black currants. Flavonoids content ranges from 110 in white currants to 420 mg QE/100g in black currants. The vitamin C content ranges from 10 mg% in blackberries to 138 mg% in blackcurrants. The anthocyanin content shows the greatest variability among the tested fruit, from 18 mg cianidyn-3-glucozid/100g FW in red currant to 547 in blackberries. Freezing at -18^{0}C is appropriate to preserve the content of investigated bioactive compounds.

Key words: currants, raspberry, mulberry, blackberry, bioactive compounds

INTRODUCTION

Fruits are an important part of a healthy diet. They are rich in phytonutrients and generally low in calories. Red fruits, among them forest fruit, are known as an important source of antioxidants as phenolic acids, flavonoids and vitamins. Flavonoids, compounds which include flavonols, flavones, flavanols, flavanones, isoflavonoids and anthocyanins as plant secondary metabolites have many biological functions, which are important for human health. (Meskin et al, Editors, 2008, Jideani et al, 2021) Those minor constituents are defined as food components that have an impact on physiological or cellular activities in the humans or animals that consume such compounds (Walia et al., 2019).

We can name a lot of commercial berry species consumed all around the world such as blackberry (*Rubus* sp.), bilberry (*Vaccinium myrtillus* L.), blackcurrant (*Ribes rugrum* L.), chokeberry (*Aronia melanocarpa* (Michx.) cranberry (*V. macrocarpon* Ait.), bayberry (*Myrica* sp.), raspberry (*Rubus ideaus* L.), black raspberry (*Rubus occidentalis* L.), strawberry (*Fragaria ananassa* Duch.), highbush blueberry (*V. corymbosum* L.), maqui (*Aristotelia chilensis*), murtilla (*Ugni molinae* Turcz.) and calafate (*Berberis microphylla*

G. Forst.) (Pena-Sanhuenza et al, 2017. Studies on cultivars from different geographical regions found red and black currant, raspberries, blackberries, gooseberries, cornelian cherries to be rich in phenolics, organic acids, microelements, vitamin C and also antocyans: Diaconeasa et al, 2019, Petrișor et al, 2013, in Romania, Ersoy et al, 2013, in Turkey, Pantelidis et al, 2007, in Greece. Those components are responsible for the health benefits of fruit consumption including anticarcinogenic effect (Li et al, 2016, Gordon and Derek, 2012).

Fruits are consumed mostly in fresh state for a scanty period of time, but they are preserved and sold in frozen state all year long. The present study focuses on the determination of some bioactive components of selected forest fruits and also to their preservation in different thermic conditions.

MATERIAL AND METHOD

Material

The tested material comprises six cultivated berry types codded as follows.

Currants: White (*Ribes niveum*) – WC, Red (*Ribes rubrum*) – RC and Black (*Ribes nigrum*) - BC

Berries: Raspberry (*Rubus idaeus*) – RB, Blueberry (*Vaccinium myrtillus*) – BB, Mulberry (*Rubus fruticosus L*) – MB

All samples where homogenised and split in three portions. The first was used for the determination in fresh state of the investigated parameters and the others two portions were frozen at -18^0C and -80^0 C, respectively. The experiments were conducted in the food control laboratory of the Food Engineering Department, Environmental Protection Faculty, Oradea.

Methods

The extraction technique is very important for all bioactive compounds determination (Garcia-Salas et al, 2010), so in order to have proper comparisons, for the present study experiments a unique procedure was applied on all tested samples for every determined parameter. Total phenol content (TPC) and flavonoids (FL) were determined using the same alcoholic extract, using methanol/water solvent 1:1. Homogenised blended fruit ware sonicated at 20°C for 30 minutes, then centrifuged for accurate separation. The reaction mixture contains appropriate diluted extract, Folin-Ciocâlteu reagent and natrium carbonate 7.5%. After 2 hours the absorbance was read at 765 nm. Gallic acid, from 0 to 250 mg/l was the used standard and the results were expressed as mg GAE/100g FW (Petcovics et al,2014, Singleton and Rossi, 1965).

FL was determined using the spectrophotometric method based on the formation of chelated compounds between flavonons, flavonols and aluminum chloride in methanol. (Kroyer and Molnar, 2011, Bahorun et al,

2004). The absorption of the reaction mixture containing alcoholic extract, NaNO 25%, 3 $AlCl_3$ $6H_2O$ 10% and NaOH 1M was read at 510 nm against reagents blank. The used standard was quercetine 0-100 mg/L in methanol and results were expressed as mg QE/100g FW.

Vitamin C was extracted from fresh fruits with metaphosphoric acid and spectrophotometric determined by the Beltran – Orozco et al., 2009, method. Ascorbic acid reacts with 2:6-diclorphenol indophenol (DCPIP) which changes its colour from blue to colourless in acetate buffer (pH 4) environment. The reaction product was extracted in xylene and the absorbance read at 520 nm. Pure ascorbic acid between 0.1mg/ mL and 1mg/ml concentration was used for the calibration curve.

Anthocyanins were determined through AOAC Int. 88, 1269 (2005) pH differential method. Monomeric anthocyanin pigments reversibly change colour with a change in pH; the colour oxonium form exists at pH 1.0, and the colourless hemiketal form predominates at pH 4.5. The difference in the absorbance of the pigments at 520 nm is proportional to the pigment concentration. Results are expressed on cyanidin-3-glucoside basis. Degraded anthocyanins in the polymeric form are resistant to colour change regardless of pH and are not included in the measurements because they absorb at pH 4.5 as well as pH 1.0. For all the samples we checked the appropriate dilution factor by diluting the test portion with pH 1.0 buffer, until the absorbance at 520 nm was between 0.2 and 1.4 AU.

The results represent the mean of two determinations at each sample for all tested parameters. The same methods were applied on fresh and on frozen samples, after gentle thawing at the refrigeration temperature of 4^0C.

RESULTS AND DISCUSSION

The experiment results are presented for each investigated parameter for fresh and frozen fruits in tables 1 to 4.

Looking at the results, we can see that all tested berries had significant, but different phenolic content, with a maximum value for blackcurrant. The content is higher than the one found by Petrişor et al, 2013 and Najda şi Labuda, 2013 for white currant (188 mg GAE/100g), red currant (from 95 to 237 mg GAE/100g), and blackcurrant (between 205 and 880 mg GAE/100g). But Pena-Sanhuenza et all, 2017 found higher phenolic content, up to 657 mg GAE/100g for white currant and up to 1,342 mg GAE/100g for the red ones. Anyway, all the comparisons are affected by the fact that the experimental design is different in terms of extract obtaining and experimenting protocol. The same reasoning is valuable for forest berries, which in our experiment presents a lower content than the one reported by De Ancos et al. 2000 (1137-2112 mg GAE/100g) or Pena-Sanhuenza et all, 2017 (1280-2494 mg

GAE/100g). However, all studies emphasise that blackcurrant are definitely the richest in bioactive compounds.

Table 1

Total phenolic content, mgGAE/100g FW

Sample	Fresh	Frozen -18˚C	Frozen -80˚C
	Mean		
	+/- Sd		
WC	442.47	455.575	536.8241
	11.09	23.21401	4.974431
RC	937.77	915.0453	979.9756
	22.76	47.73027	10.32006
BC	2384.94	2473.274	2635.945
	29.90	22.99532	10.22014
MB	1243.77	1187.81	989.51
	38.01	14.99	5.51
BB	1208.61	1115.66	1055.82
	18.34	6.11	26.03
RB	894.03	789.07	711.05
	18.36	15.55	8.05

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Table 2

Flavonoid content, mg QE/g FW

Sample	Fresh	Frozen -18˚C	Frozen -80˚C
	Mean		
	+/-Sd		
WC	110.56	51.67	64.44
	3.89	0.56	0.00
RC	249.44	151.11	170.00
	5.00	5.56	1.11
BC	420.56	321.11	332.22
	7.22	5.56	10.00
MB	296.67	276.67	218.89
	22.22	8.89	3.33
BB	322.78	305.56	248.33
	6.11	6.67	1.67
RB	180.00	168.89	119.44
	20.00	2.22	3.89

Flavonoids content present the same trend as TPC, with the lowest value for white currants (110.6 mg QE/g) and the highest for blackcurrants (420.6 mg QE/g). But freezing has very different impact on the tested fruits; for currants FL content drops up to 51% in the case of the black ones no matter the

freezing temperature, meanwhile for raspberry, mulberry and blackberry there are no changes at -18^{0}C which practically preserves their FL content and the content drops until -33% at -80^{0}C. The limitation of the spectrophotometric method cannot detail those results as it could be accessible only through a chromatographic one. (Biswas et al., 2013).

Table 3

Vitamin C content, mgQE/g FW

Sample	Fresh	Frozen -18°C	Frozen -80°C
	Mean		
	Sd+/-		
WC	22.03	92.88	97.34
	4.1	2.02	4,11
RC	53.5	119.0	122.58
	3.02	5.32	5.05
BC	138.2	144.92	162.83
	7.03	6.9	3.02
MB	23.11	14.45	27.11
	2.2	3.03	3.21
BB	10.01	14.02	11.78
	0.92	2.11	2.11
RB	24.31	51.05	31.09
	2.08	0.96	3.08

The Vitamin C content is very different for the tested samples, from a minimum of 10.7 mg/100 g in blackberry to 132.7 in blackcurrant. Studies in the field present similar results in red currant (46 – 52.9 mg/100g) or blackcurrant, from 99 to 126 mg/100g (Ersoy et al, 2018, Petrisor et al, 2013)

The evolution of vitamin C content after frosting shows an unexpected rise of the experimental values for the majority of the tested samples at both temperatures. This situation can be explained by the fact that only the fruit juice contains vitamin C and, after defrosting, the samples contain a different ratio of juice/seed than in fresh state. This reasoning is sustained by/ but the fact that fruits with high seed content present the maximum “rise of Vitamin C content, white currant (260%) and raspberry (132%)

Table 4 shows as expected, no anthocyanin content for white currant, low content for red currant and significant content for black currant and raspberries. Black currant, but especially mulberries and blackberries are a rich source of anthocyanin.

Table 4

Anthocyanin expressed as cianidyn-3-glucozid mg/100g FW

Sample	Fresh	Frozen - 18˚C	Frozen -80˚C
	Mean		
	+/-Sd		
WC	0		
RC	18.45	17.78	18.64
	0.42	0.55	0.14
BC	160.21	156.09	167.29
	8.45	3.13	0.20
MB	355.52	358.19	287.04
	3.05	0.38	3,39
BB	548.96	598.44	550.81
	0.89	0.97	3,03
RB	154.66	104.66	114.12
	0.77	3.17	0.44

Those results are consistent with the ones found by Horbonicz et al, 2008 (10 - 60 mg/Cy 3-glu /100 g FP for raspberries and 12-19 mg/Cy 3-glu /100 g FP for red currant) and Petrişor et al, 2013 for red currant (20,5 – 44,5 mg/Cy 3-glu /100 g FP or black currant 166,8 – 298,2 mg/Cy 3-glu /100 g FP, but lower than reported by Pena - Sanhuenza et al, 2017 (1.4 mg/Cy 3-glu /100 g FP white currant, up to 52 mg/Cy 3-glu /100 g FP in raspberries and 165 to 411 mg/Cy 3-glu /100 g FP for red currant).

All comparison regarding bioactive compounds in the investigated fruits should take into account the great number of cultivated species and the different cultivation conditions. As for the calculation itself ε is between 26900 and 34300 L x mol^{-1} x cm^{-1}, depending on the used solvent (Giusti and Wrolstad, 2001). The 26900 L x mol^{-1} x cm^{-1} value was used in the present study because it is the recommended one by AOAC method for the pH differential method of anthocyanin determination (AOAC Official Method 2005.02, 2005).

For currants, no matter the frozen temperature, the influence is negligible -3.63% and +4.42%. For the berries the influence is more significant, until -20% for mulberries but the fact that rise of the content was found can be due to experimental design or to the lack of similar fruit/seed ratio between fresh and frozen fruits like in the case of vitamin C.

CONCLUSIONS

The tested Forrest fruits are characterised by high, but very different bioactive compounds content. White currants show the lowest TPH and FL content and blackcurrant is 5.4 and 3.8, respectively, times higher. The darker

the fruit is, the highest phenolic content is observed. As for Vitamin C, blackberries has the lowest content and again black currants the highest, but the difference is much more significant, by a factor of 13 tested fruits. Even if white currants are not in discussion, the anthocyanin content shows the highest variability among the tested bioactive compounds. Thereby black currants have a 30 times higher cianidyn-3-glucozid content then red currant.

Freezing at -18ºC practically does not affects TPC, FL or anthocyanin content; the effect is more obvious at -80ºC, but not significant. Therefore the usual domestic conservation by frosting is enough for maintaining the antioxidant content of forest fruits. The influence of frosting on Vitamin C content should be studied on fruit juice only in order to avoid experimental errors.

Anyway it is obvious that none of the investigated forest fruit is great at all investigated parameters even if generally, the darker the fruit is, the highest the bioactive compounds content is.

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CONCENTRATION IN ESSENTIAL FATTY ACIDS OF FISH OIL COMPARED TO YOGHURT ENRICHED IN ESSENTIAL FATTY ACIDS

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Abstract

Fish oil is a product rich in essential fatty with actions many health benefits. Milk is a product rich in saturated fatty acids with a large number of carbon atoms. Therefore, in this study, the aim is to enrich yogurt in essential fatty acids by adding fish oil to raw milk. For a better assimilation in the human body, the fat from the fish oil is tried to be incorporated into the membrane of milk fat globules. By homogenizing, the membrane of the milk fat globule splits and the fat in the fish oil will adhere to the milk fat. After that, the fat globules of the milk are restored with the incorporation of fatty acids from the fish oil. A It is being analyzed the concentration of three essential fatty acids that are characteristic of both fish oil and milk fat. It compares the proportion of these acids in the concentration of fish oil and yogurt samples. For this purpose, 4 yogurt samples were made: without addition of fish oil and with progressive additions in a concentration of 0,05%; 0.10% and 0.15%. The proportion of essential fatty acids is reported to the total fatty acids. The following values were obtained:

- in the case of fish oil the concentration in linoleic acid is 3.35%, in linolenic acid 9.20% and γ-linolenic acid 2.18%;

- in the case of yogurt the concentration in:

- linoleic acid is 2.55% for the sample without the addition of fish oil, 2.64% for the sample with the addition of 0.05%; 2.83% for addition of 0.10% and 2.88% for addition of 0.15% fish oil;

- linolenic acid is 0.97% for the sample without the addition of fish oil, 1.00% for the sample with the addition of 0.05%; 1.07 for the addition of 0.10% and 1.15% for the addition of 0.15% fish oil;

- γ-linolenic acid is 0.72% for the sample without the addition of fish oil, 0.76% for the sample with the addition of 0.05%; 0.85 for the addition of 0.10% and 1.05% for the addition of 0.15% fish oil;

Key words: yogurt, essential fatty acids, fish oil

INTRODUCTION

Yogurt is an acidic dairy product that contains lactic acid bacteria that role as probiotics in the body. On the other hand, due to its composition, it provides a nutritious substrate for the intestinal microflora with the role of

prebiotics. At the same time it has protein components indispensable to the human body.

The processing of milk and dairy products can induce several changes in proteins that change their structure due to enzymatic transformations that occur during digestion in the intestine. It has been found that non-thermal technologies, such as high pressure, ultrasound, pulsed light, microfluidization and microfiltration, induce structural changes in proteins that can increase enzymatic hydrolysis with their denaturation favoring digestion in the intestine. (Zuhaib F.Bhata, 2021).

The biochemical transformations of proteins during digestion have an effect on their absorption in the body. Acid coagulation of lactic proteins in the stomach is a unique interaction between the food source and their physiological action. Milk processing treatments (such as heat treatment and homogenization) beneficially influence the digestion of proteins in the body. The potential to produce healthy foods with different nutritional results by manipulating the restructuring properties of milk proteins is discussed (AiqianYe, 2021).

Lactose is a disaccharide made up of glucose and galactose, which is found exclusively in milk. Lactose is a food that provides energy to the body but also promotes the optimization of muscle and liver glycogen. Lactose can also act as a prebiotic, possibly promoting beneficial changes in the intestinal microbiota (Oliver Joseph, 2021).

Yogurt is a product consumed by people of all ages. Consumer preferences were analyzed according to fat content. Low-fat yogurt was more appreciated because of the the harder curd (P.G.I.Dias, 2020).

Milk fat is being studied more and more in the current period. The fat cell membrane is a component that seems to have very important components for the body. Genetic analysis showed that proteins in the fat cell membrane have important biological, nutritional and functional properties. The aim is to use these components to obtain functional dairy products (MohanLi, 2021).

The major effects of essential fatty acids (EFA) on brain structure and function are known. EFA determines the fluidity of the neural membrane and controls the physiological functions of the brain. EFA is also involved in the synthesis and functions of brain neurotransmitters and in immune system molecules. Because they must be provided from the diet, low bioavailability induces major disorders in the body. While the brain needs a continuous supply throughout life, there are two particularly sensitive periods - childhood and old age. EFA deficiency during childhood delays brain development, and during aging will accelerate the deterioration of brain functions (S.Yehudaa, 2005).

Despite the development of a number of vaccines for COVID-19, the need to prevent and treat the SARS-CoV-2 virus and the disease remains

resulting COVID-19. It analyzes the key elements of SARS-CoV-2 and COVID-19 that can be easily treated: viral entry, immune system, inflammation and cytokine storm. It is shown that the essential nutrients: zinc, polyunsaturated fatty acids ω-3 (PUFA), vitamin D and magnesium provide the ideal combination for the prevention and treatment of COVID-19prevention of SARS-CoV-2 entry into host cells, prevention of SARS-CoV-2 proliferation, inhibition of excessive inflammation, improved control of immune system regulation, inhibition of cytokine storms and reduction of the effects of acute respiratory crisis syndrome (ARDS) and non-transmissible associated diseases (Michael J.Storya, 2021).

Fish oil is very rich in essential fatty acids. Food supplementation with this product has been shown to have a positive effect against obesity-associated breast cancer (Jennifer M.Monk, 2021).

Consumption of fish is very important for human health. Better information is needed for the population, especially in rural areas or small towns, to educate young people about the benefits of eating fish. Information is also needed on the qualities of different species of fish
(Moarna Anamaria, 2017).

MATERIAL AND METHOD

For the manufacture of yogurt enriched in essential fatty acids, as a source of essential fatty acids, tuna liver oil from "HOFIGAL" was used, which was added to the raw milk. The raw material was sheep's milk from the first lactation period which has a lower fat percentage and an increased casein content. The mixture of sheep's milk and fish oil was pasteurized at 73º for 30 seconds. After that it was homogenized at temperatures of 70ºC and the pressure of 200 bar. It aimed to incorporate the essential fatty acids from fish oil into fat globule membranes. During the homogenization of this membrane, the fat in the fish oil adheres to the lactic fat and the membrane of the fat globules is restored, after which it incorporates the fish oil, thus enriching the product in essential fatty acids. Milk fat is 95% absorbed in the body and thus man also benefits from the positive effect of essential fatty acids in fish oil.

Next, the technological process used to obtain yogurt was the classic one.

The finished product was analyzed from an organoleptic point of view by 5 unauthorized panelists.

From a physical-chemical point of view, the density of milk was analyzed by the areometric method, the percentage of fat by the acid-butyrometric method and the acidity by the titratable method.

19 fatty acids were analyzed by gas chromatography. For comparison, three essential fatty acids that are characteristic of both fish oil and sheep's milk were analyzed.

RESULTS AND DISCUSSIONS

The coding of the samples is presented in table no. 1

Table 1

Coding of samples

No. cr.	Add fish oil%	Sample code	
		Yogurt	Fisf oil
1	0	Y_0	UP
2	0,0,5	$Y_{0,05}$	UP
3	0,10	$Y_{0,10}$	UP
4	0,15	$Y_{0,15}$	UP

After the sensory analysis, the taste and aroma of fish was felt in samples Y0,10 and Y0,15 but which disappeared after three days of maintenance at refrigeration temperature. The acidity and the percentage of fat evolved in the same way in both the sample without the addition of fish oil and the ones with the addition.

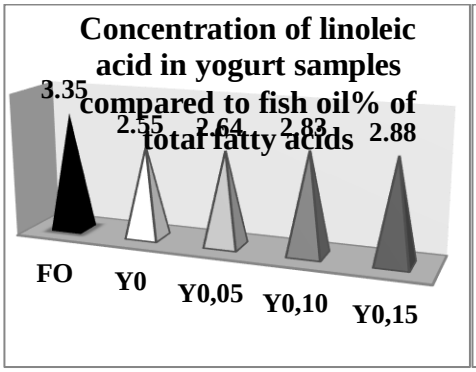


Figure 1 Concentration of linoleic acid (ω6)in yogurt samples compared to fish oil% of total fattv acids

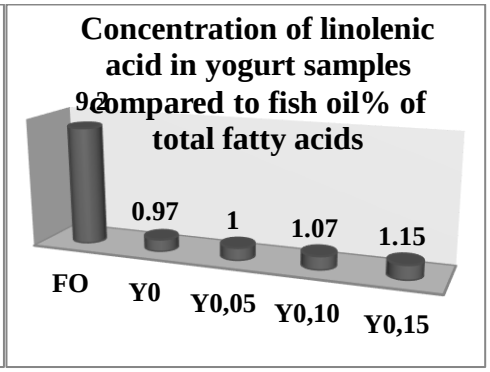
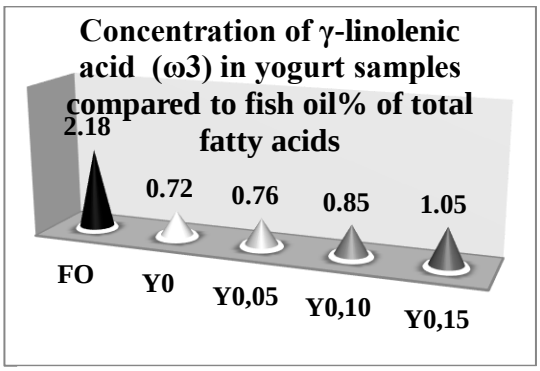


Figure 2 Concentration of linolenic acid (ω3)in yogurt samples compared to fish oil% of total fattv acids

Linoleic acid is found in yogurt samples compared to that of fish oil in a proportion of 6.03% in samples with 0.05% added fish oil, 9.3% in samples with added 0.1% and 7 , 37 in the samples with the addition of 0,15% (figure 1) and the linolenic acid in proportion of 5,52% in the samples with 0,05% added fish oil, of 9,2% in the samples with the addition of 0,1 % and 11.04% in the samples with the addition of 0.15% (figure 2).



With regard to linolenic acid, the situation is as follows: in samples of 0,05% it is found in a proportion of 1,74%, in, in samples of 0,1% in a proportion of 2,834% and in samples with an addition of 0,15 % in proportion of 4,796% (figure 3).

Figure 3 Concentration of γ-linolenic acid (ω3) in yogurt samples compared to fish oil%

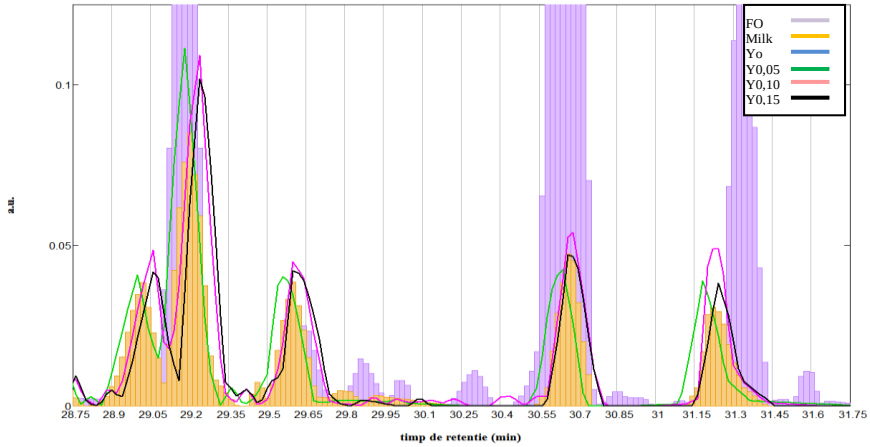


Figure 4 Graph of superimposed chromatograms of yogurt samples with and without the addition of fish oil – the area of detection of essential fatty acids

Figure 4 shows that the graphs of the chromatograms of the essential fatty acids in the enriched yoghurt samples fall between those of the fish oil and those without addition.

CONCLUSIONS

The proportions of essential fatty acids are approximately the same in samples with the addition of fish oil if the concentrations added to the raw milk are taken into account. There are differences if we consider different fatty acids. It is found that ω6 is found almost three times more than ω3 in fish oil samples compared to all of the fatty acids and taking into account the added concentrations.

In conclusion, the essential fatty acids in fish oil can be incorporated into the membrane of the fat globule of sheep's milk to obtain yogurt as a functional product.

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RESEARCH ON DRYING BARLEY WITH GEOTHERMAL WATER BY INCREASING THE HEAT TRANSFER SURFACE USING THE POROUS HEAT EXCHANGER

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Abstract

*By using a porous medium heat exchanger, which contains inside a core of porous material with a specific mass heat c convenient, the problem of heat transfer is solved by increasing the heat exchange surface, which greatly reduces the amount of geothermal water. necessary for heat exchange, thus leading to an increase in the thermal efficiency of drying the barley plant with geothermal water.***Key words:** Geothermal water, heat exchanger porous medium, drying malt.

INTRODUCTION

Industrial processes is an interesting target for the use of geothermal water.

Beach water temperatures below 423 K is considered geothermal used in basic processes such as preheating, washing, peeling, evaporation and distillation, sterilization and drying, etc.

Given the fact that the energy required pre-drying and drying process one tone of malt using the geothermal water heating is 3000 MJ, geothermal water temperature is 365 K, the temperature required for pre-drying Air Malta is in the range of 297 ÷ 318 K temperature of air required for drying malt 353 K and the temperature required pre-drying (withering) Malt humidity varies depending on such:

43÷34% moisture →296÷298 K

34÷24% moisture →299÷303 K

24÷12% moisture →313÷323 K,

By malt drying plant which used geothermal water, is recommended to use a heat exchanger with porous medium.

The porous core heat exchanger, heat transfer is achieved indirectly through a surface exchange (intermediate heat exchanger wall between the fluid and the environment). (Iancu C, 2011)

To maximize the heat transfer medium in heat exchangers of steel pipe or aluminum shot is necessary to increase the transport section and the

hydraulic pressure and water volume reduction facility. These goals can be achieved by using cores of porous materials with appropriate λ and c optimally placed inside the heat exchanger tubes. (Denis, 2008)

For drying malt plant uses geothermal water heat exchanger core of coke shown in Figure 1.

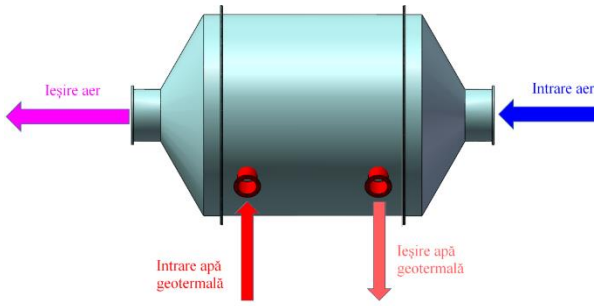

Figure 1. Heat exchanger with porous medium

This type of exchanger shown in Figure 2 consists of an insulated jacket to the outside, two baffles that are designed to swirl valve geothermal water pipes 3 and 4 foam core made of coke pore size of 0.1 ÷ 0.5 mm.

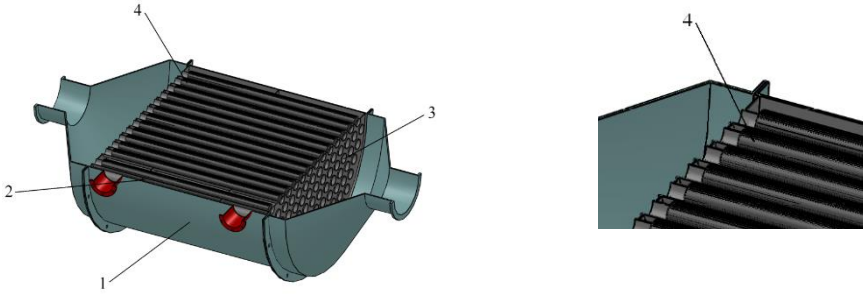

Figure 2. Section through the heat exchanger with porous medium

MATERIAL AND METHOD

Heat exchange surface area for porous media (SSP) with porosity size between 0.1 and 1 mm M^2/M^3 is 8000 while for plate heat exchangers with 4 mm distance between them (for air-liquid heat exchange) SSP is 630 M2/M3 porous medium, which provides a much smaller volume of the exchanger. (Iancu C, 2011)

Inlet and outlet temperature of air and water for geothermal exchanger is shown in Figure 3.

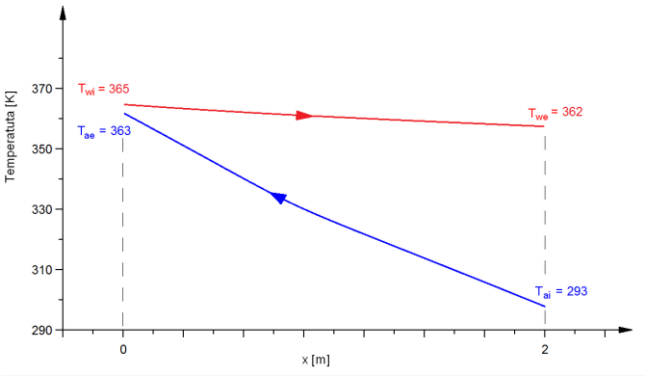

Figure.3. Inlet and outlet temperatures of air and water exchanger for geothermal

Use heat exchangers parallel beam pipes filled with coke. (Comsol 2008)

Required heat exchange surface is determined by the relationship:

$$S_w = \frac{Q_t}{\alpha_w \cdot \Delta T}\left[m^2\right], \qquad S_a = \frac{Q_t}{\alpha_a \cdot \Delta T}\left[m^2\right], \qquad S = \frac{Q_t}{k \cdot \Delta T}\left[m^2\right],$$

$$\Delta T = \frac{\Delta T_1 - \Delta T_2}{\Delta T_1 / \Delta T_2}\left[K\right], \qquad \Delta T_1 = T_{wi} - T_{ae}\left[K\right], \qquad \Delta T_2 = T_{we} - T_{ai}\left[K\right]$$

Air mass flow will be:

$$\dot{m} = \frac{n \cdot Q_t}{c_p \cdot T_{ai} - T_{ae}}\left[Kg/s\right],$$ Geothermal water mass flow will be:

$$\dot{m} = \frac{n \cdot Q_t}{c_p \cdot T_{wi} - T_{we}}\left[Kg/s\right]$$

For air, the relationship for calculating the convective heat transfer coefficient α_a is: (Comsol 2008)

$$\alpha_a = 0{,}024 \cdot \frac{\lambda_{CO2}}{d_i} \cdot \mathrm{Re}^{0.8} \cdot \mathrm{Pr}^{0{,}37} \quad \left[W/m^2K\right]$$

For hot water, the relationship for calculating the convective heat transfer coefficient α_w is:

$$\alpha_w = 1{,}72 \cdot \frac{\lambda_{ac}}{d_e} \cdot \left(d_{ech}\right)^{0{,}6} \cdot R_e^{0{,}6} \cdot P_r^{0{,}33} \quad \left[W/m^2K\right]$$ (Comsol 2008)

In these relationships, the similarity criterion Re is Reynolds and Prandtl Pr is the criterion of similarity.

At the macroscopic level is limited to solving Navier-Stokes equations by taking account of the border. Navier-Stokes's equations are a set of

equations, written in the form, differential or integral, noting relations between fundamental quantities.

$$\rho C_p\left(\frac{\partial T}{\partial t}+(u\cdot\nabla)T\right)=-(\nabla\cdot q)+\frac{\tau}{S}-\frac{T\partial p}{\rho\partial T}\bigg|_p\left(\frac{\partial p}{\partial t}+(u\cdot\nabla)+Q\right)$$

RESULTS AND DISSCUSIONS

Study techniques and computer analysis of the processes of heat transfer and flow, both aimed at using new methods and extension of methods already known and is the subject of widespread research. (Iancu C, 2011)

For analysis of porous filling the heat exchanger (temperature, heat flux, pressure drop and speed) Comsol Multiphysics to use program that allows a problem solving and post processing heat exchange.

For the porous medium, the analysis of heat flow variation highlights for each area of the section, the share of heat transfer by convection and conduction.

Value flow in Figure 4. A figure 5.și Figure 6. total stream flow is not porous medium heat transmitted from the air.

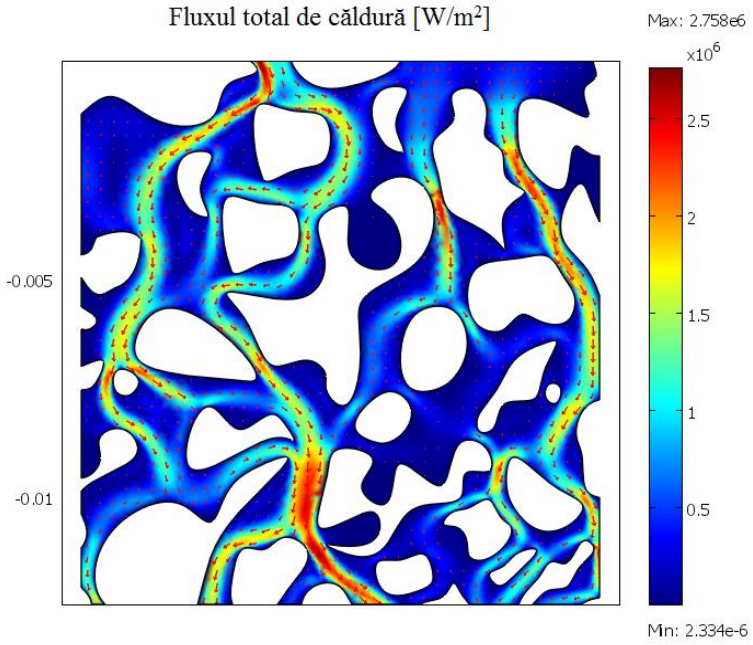

Figure. 4. Total flow of heat dispersion in porous medium

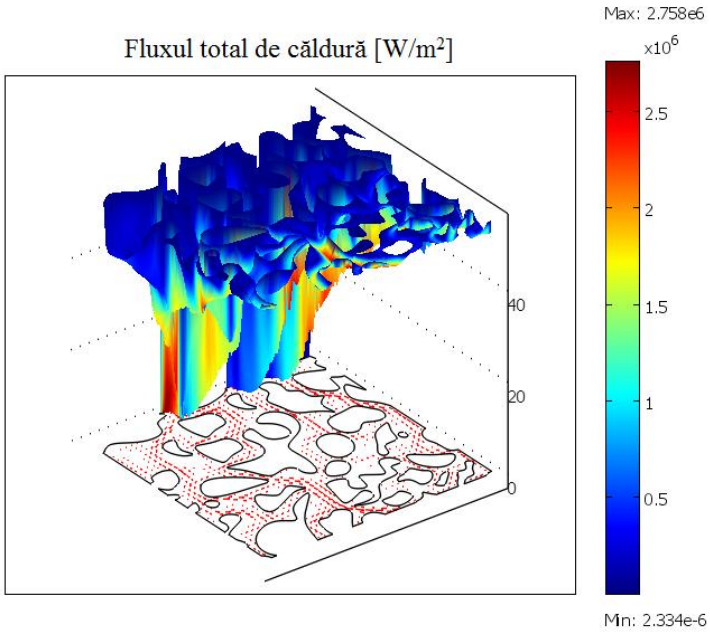

Figure. 5. 3D dispersion flow in porous medium heat total

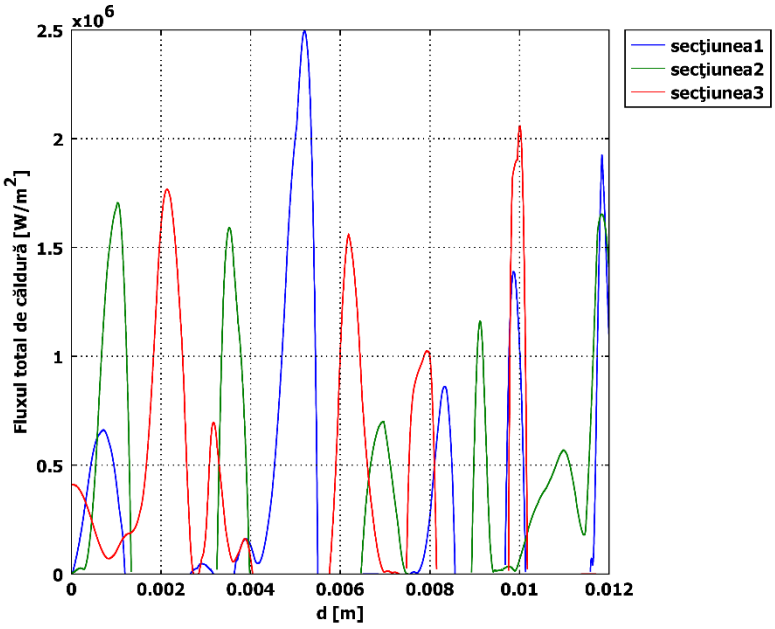

Figure 6. Diagram of variation of total heat flow in porous medium

It is noted that the total heat flow value is determined by the amount of air speed section. This is due to the weight of heat transfer by convection to the conduction.

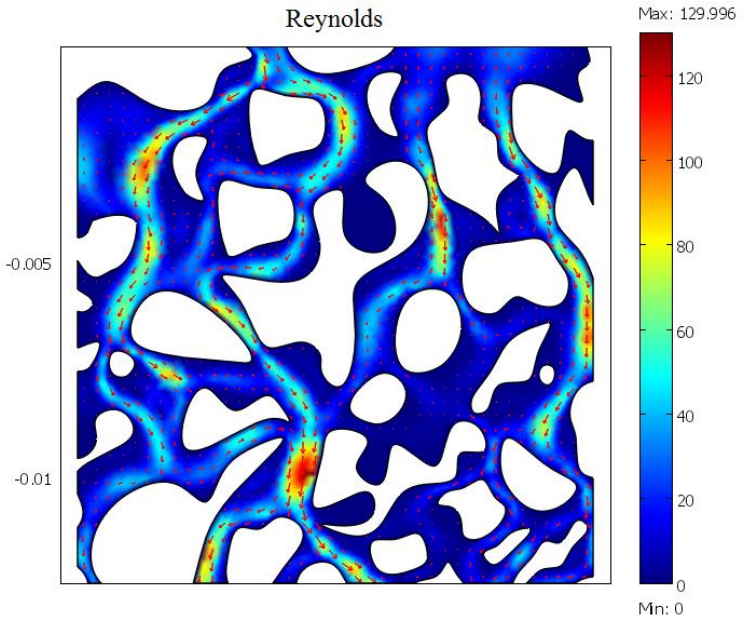

Figure 7. View Reynolds number in porous medium

It is noted that the porous medium, due to the randomness of the flow channel size and value their position, the Reynolds number is different on the same section.

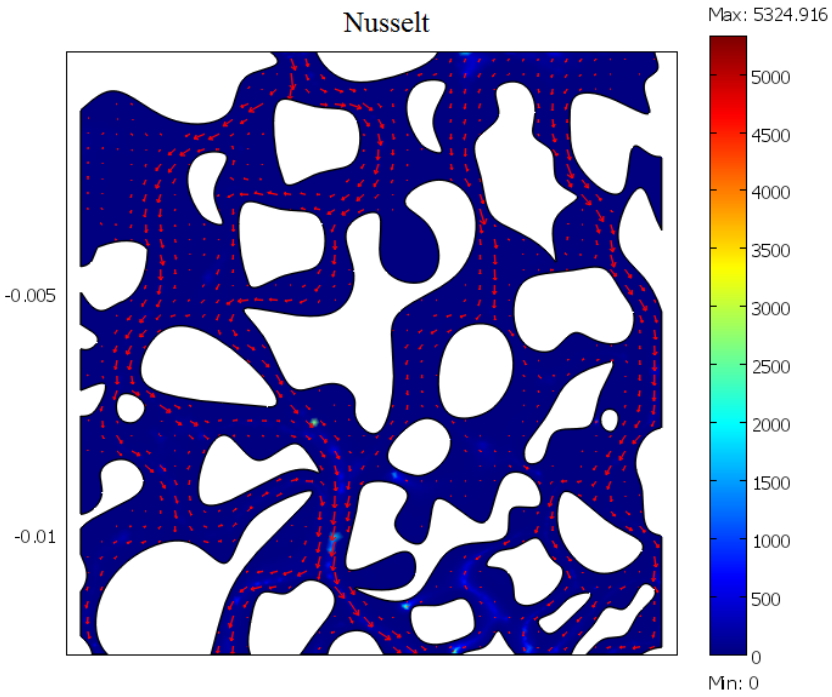

Figure 8. Nusselt number variation diagram of the porous medium

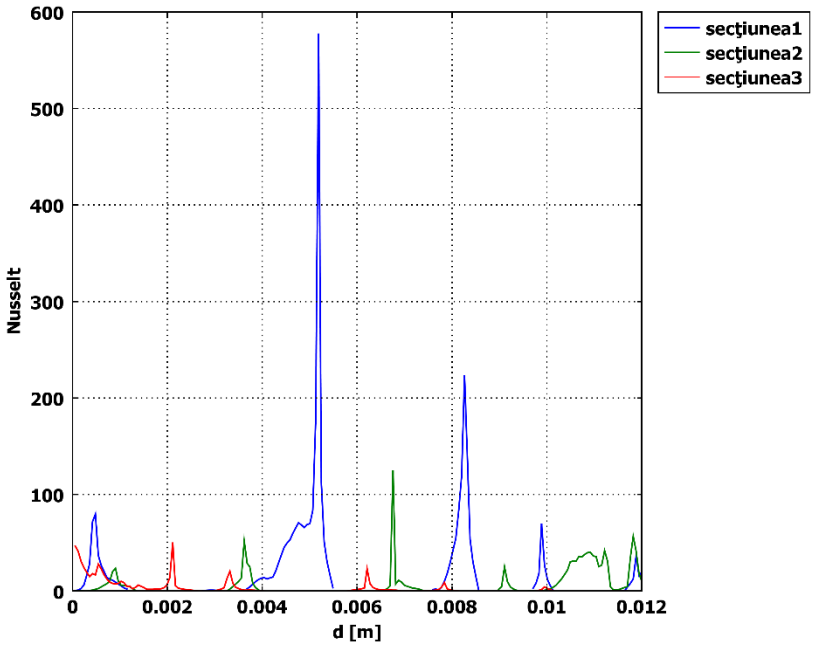

Figure 9. Nusselt number variation diagram of the porous medium

It is noted that due to large fluctuations in Nusselt number shows the speed values in a wide range (0 ÷ 600). (Iancu C, 2011)

CONCLUSIONS

Resource efficiency is a crucial issue given that resources are limited. Thus, the choice of heat exchanger is very important because the overall system efficiency is paramount and this can be done only benefit from the best technologies to minimize waste of resources. Optimizing resource consumption is a major issue in all areas of research for finding the optimal solution only in terms of technology we can achieve results in research. (Iancu C, 2011)

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THE RHEOLOGICAL BEHAVIOR OF MILK 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 milk 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 milk chocolate samples have 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.

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

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

INTRODUCTION

The characteristics and level of the fat phase, the cocoa dry matter, the emulsifiers and the solid phases, together with the changes they undergo during processing, have a major impact on the flow characteristics of a chocolate.

The flow characteristics of chocolate are important, because product quality control is a necessity (Afoakwa, E. O. et al., 2008; Alberts, H.C. and Cidell, J.L., 2006; Božiková, M., Hlaváč, P., 2013; Kumbár, V., et all., 2017).

In his work *"Effect of cocoa fat content on wetting and surface energy of chocolate"* (Ačkar, Det all., 2015), states that chocolate is unique as a food, because it is solid at normal room temperatures, but melts easily as temperatures rise.

There are many methods for testing the properties of chocolate, but in this paper we focus on rheological measurements and sensory analysis (Quiñones-Muñoz, T., et all., 2011; Rao, M.A., 2014; Trávníček, P., et all., 2016).

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

Chocolate is a complex rheological system with solid particles such as cocoa, milk and sugar dispersed in cocoa butter.

Chocolate can be described as a suspension of non-fat particles (sugar and cocoa solids and possibly milk powder particles) dispersed in cocoa butter as a continuous phase (Beckett, S.T., 2000; Hlavač, P., et all., 2016; Sokmens ; Gonçalves, E. V., et all., 2010).

Melted chocolates are a dense mixture of sucrose coated with phospholipids and cocoa particles in the liquid fat.

The characteristic aroma of chocolate must be developed in several stages of processing.

During processing, the components are mixed, refined and assembled to achieve the desired rheological properties for a defined product texture and melting characteristics (Cikrikci, S., et all., 2017; Fernandes, V.A., et all., 2013; Glicerina, V., et all., 2013; Hîlma Elena, 2016).

The chocolate fat will be released from the agglomerated chocolate mass and spread to cover these particles so that it can flow easily.

For processed foods, the composition and addition of ingredients to achieve a certain food quality and product performance, requires a deep rheological understanding of the individual ingredients related to food processing and final perception (Afoakwa, E. O. et al., 2009; Afoakwa, E., Paterson, A., et al., 2007; Abbasi, S.; Farzanmehr, H., 2009; Baker, B. Set all., 2006; Graef, V., et al., 2011; Hîlma Elena, 2016).

The taste can be influenced by the texture of the product.

The consumer evaluates the quality of food (fresh, aged, tender and ripe) according to the physical sensations (hard, soft, crunchy, wet and dry) of the food produced inside the mouth.

MATERIAL AND METHOD

This paper presents the analysis of the rheological and sensory properties of Africana, Laura, Primola and Milka milk chocolates.

Chocolate consumption is closely associated with rheological properties.

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 we started from to achieve the purpose of the paper were: analysis of the variation of the apparent viscosity of chocolate as a function of 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: Africana milk chocolate, manufactured by Mondelez Romania SA produced in Bucharest.
- Chocolate 2: Laura milk chocolate, manufactured by Kandia Dulce SA, produced in Bucharest.
- Chocolate 3: Primola milk chocolate, manufactured by Kandia Dulce SA, produced in Bucharest.
- Chocolate 4: Milka milk chocolate, manufactured by Mondelez Romania SA produced in Bucharest.

Viscosity measurements were performed on chocolate samples at two temperatures (45, 50°C), with the Brookfield viscometer (Brookfield Engineering Inc, Model DV-E) and 8 different Rpm speeds (0.3, 0.6, 1.5, 3, 6, 12 , 20, 30) with axis LV-3C no. 67.

Before testing, I chopped 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.

I checked the temperature with a technical thermometer, but without exceeding the melting temperature of 50 °C of milk chocolate.

When the chocolate reached the melting temperature, I added the remaining 20% chocolate in the solid state and mixed until I reached the working temperature of 45 °C and 50 °C, respectively.

RESULTS AND DISCUSSION

The first part of the results includes the analysis of the rheological behavior of melted milk 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 (24.5%) 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 as the temperature rises at a constant shear rate.

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

Next, I 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 of description of the data.

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

The Casson yield value is important in determining the flow rate of chocolate (Beckett 2000).

Apparent viscosity and yield are affected by fat content, temperature and emulsifiers.

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 Casson yield value (Pa) decreased, with increasing temperature, in the case of Laura, Africana and Milka melted chocolate samples, and increases in Primola.

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 value of the yield has been exceeded, thinning of the shear appears, the elastic deformation ceases and the plastic deformation is installed.

As the shear rate increases, the three-dimensional structure of the material aligns in the flow lines, which were previously collapsed and turned into asymmetric particles.

This incident causes a decrease in viscosity and, at some point, is independent of the shear rate at high shear force (Afoakwa, 2009).

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

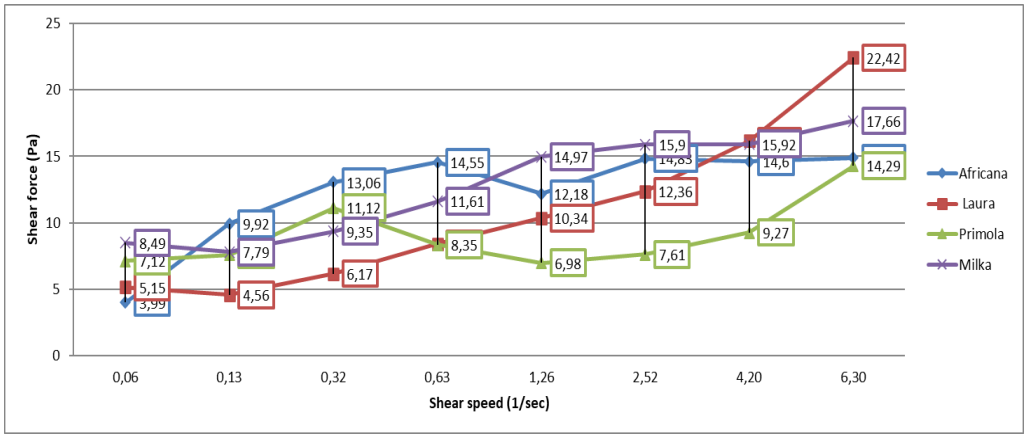

Fig. 1. Comparison of milk chocolate flow curve models at 45 °C

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 frame Milka and Africana chocolates as pseudoplastic liquids, and Laura and Primola as plastic liquids.

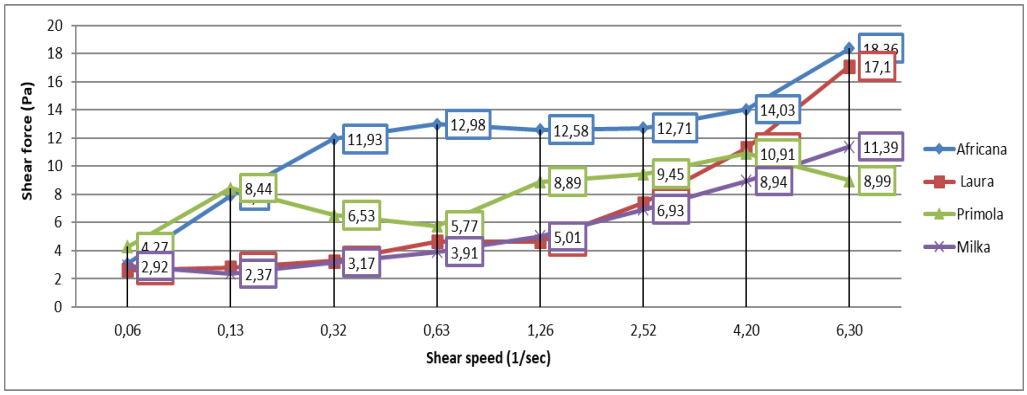

Fig. 2. Comparison of milk chocolate flow curve models at 50 °C

Raising the temperature to 50 °C leads to a decrease in shear stress in the case of milk melted chocolate samples.

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

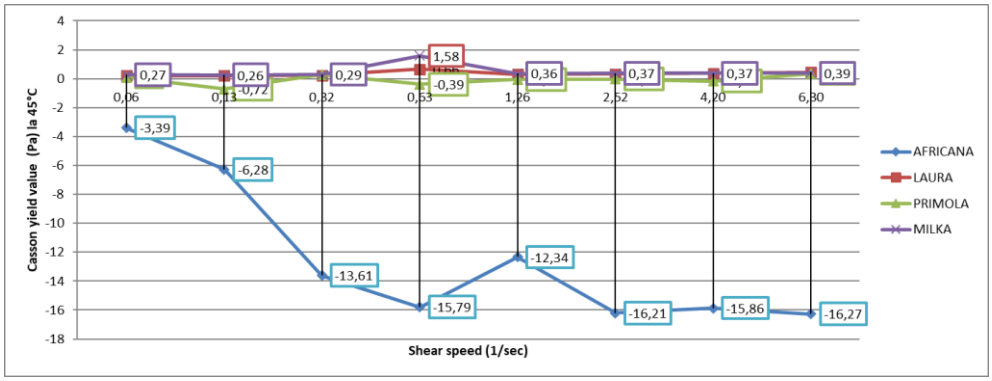

Fig.3. Casson yield value for melted chocolate samples at 45°C

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

It expresses the low properties of chocolate shear force and is influenced by specific surface area, particle fraction, emulsifiers and moisture, particle-particle interactions (Afoakwa et Al. 2009).

The highest value of the Casson yield was for Milka chocolate (1.58 Pa), followed by Laura chocolate (0.66 Pa) at the shear rate of 0.63 s^{-1} and the temperature 45 °C, showing us the direct connection between the flow and the flow rate of liquid.

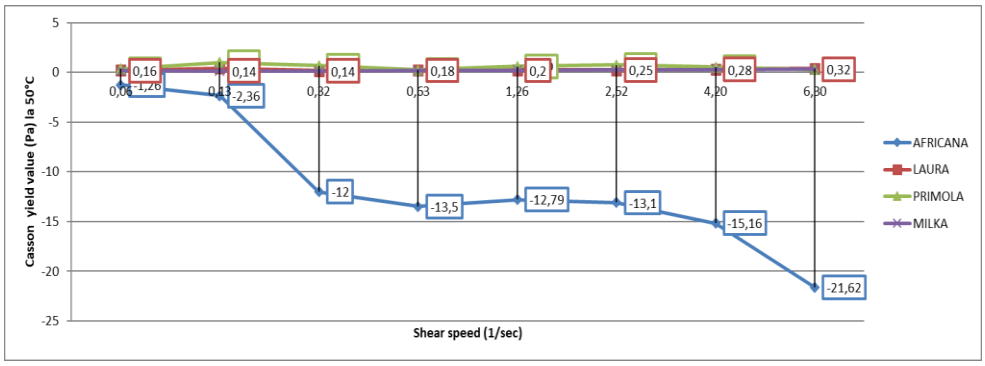

Fig.4. Casson yield value for melted chocolate samples at 50°C

Increasing the temperature to 50 °C led to a decrease in the yield value of Milka (0.16 Pa) and Laura (0.19 Pa) chocolate, both at the minimum shear rate of 0.06 s^{-1} and at the maximum shear rate of 6.30 s^{-1}: Milka 0.32 Pa and Laura 0.39 Pa, because the elastic deformation stops and the plastic deformation is installed, the viscosity of the liquid chocolate samples decreases, with the increase of the temperature.

Primola chocolate (0.77 Pa), on the other hand, recorded the highest value of Casson yield at the minimum shear rate of 0.06 s^{-1}.

African chocolate recorded negative Casson yield values as the shear rate increased, from 0.06 s^{-1} (-0.5 Pa) to 6.30 s^{-1} (-1.62 Pa).

The flow behavior of chocolate and the value of yield 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 Figure 5 and 6.

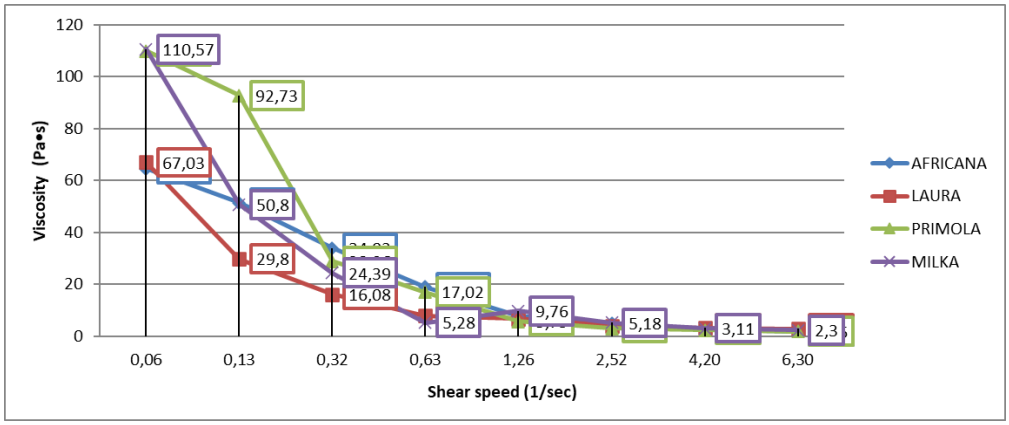

Fig. 5. Effect of temperature (45°C) on the viscosity of chocolate samples

The viscosities of Africana (51.5 Pa) and Laura (67.03 Pa) melted chocolates are lower than in Milka (110.57 Pa) and Primola (92.73) chocolates at 45 °C, at a minimum shear rate of 0.06 s^{-1}. The reason may be that Africana and Laura chocolates have a higher fat content and lower amounts of cocoa dry matter (African 8% minimum, Laura 8.3% minimum), compared to Milka and Primola which contain at least 30% cocoa dry matter , respectively minimum 28%.

Of all the samples of melted chocolate, the highest plastic viscosity was obtained in the Milka chocolate sample (110.57 Pa) at 45 °C and shear rate 0.06 s^{-1}, as it contains the highest amount of cocoa dry matter. (minimum 30%).

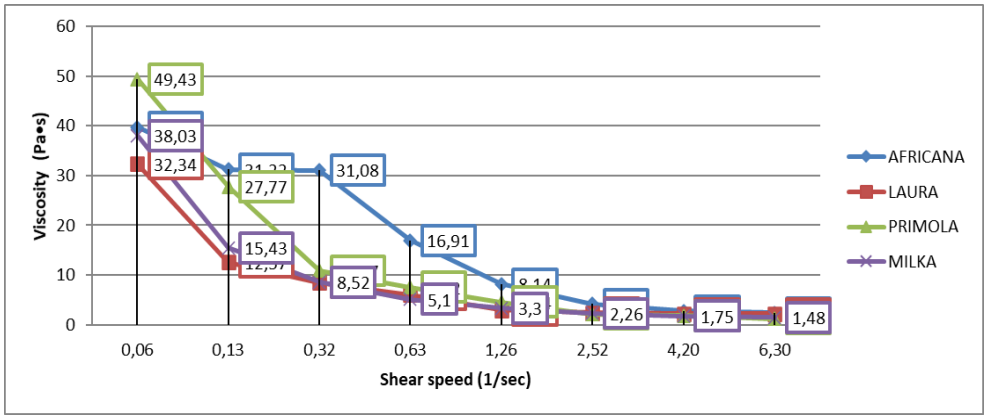

Fig.6. Effect of temperature (50°C) on the viscosity of chocolate samples

Figures 5-6 show that it has a shear and thixotropic behavior.

The hysteresis loop in the case of the Primola and Africana chocolate samples, both at 45 °C and at 50 °C shows us that the structure of the chocolate deteriorated after the shear occurred.

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.

Milka has a low viscosity because it contains the highest amount of cocoa butter.

High temperature from 45 °C to 50 °C increases the kinetic energy of chocolate molecules, decreasing the viscosity.

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 increases.

CONCLUSIONS

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

The four chocolate samples have 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.

Analyzing the viscosity curves in the four chocolate samples, Milka and Laura can be classified as plastic liquids, and Primola and Africana as pseudoplastic liquids.

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ENTEROBACTERIACEAE ON SELECTIVE MEDIA

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Abstract

The Enterobacteriaceae family represents the most extensive taxonomic unit that includes 44 types, among which 25 were involved in human pathology. They are gram-negative bacilli of average dimensions, with round heads, with non characteristic disposition generally. In Klebsiella the bacilli are disposed in diplo, in the sense of the length. The species of Yersinia are more frequently coccobacillary, bipolar colored, and the species of Proteus are sometimes extremely polymorphous. They can be mobile or immovable. They don't sporulate. The majority of the enterobacteriaceae are not capsulated. Some can have a prominent capsule, Klebsiella, and other Salmonella, E. coli, can be wrapped by a capsular material. The Enterobacteriaceae are aerobe germs, facultative anaerobe, non demanding from the nutrition point of view. They represent 80% of the total isolated gram-negative bacilli and over 50% of the total of isolated germs. Also, they are involved in the etiology of 40% of the septicemias, in over 75% of the urinary infections and in majority of the food poisoning.

Key words: bacilli, nutritive, coccobacilli

INTRODUCTION

The *Enterobacteriaceae* are catalase positive and oxidase negative. They are chemoautotroph bacteria having both types of metabolism: respiratory and fermentative. Following the fermentation of the glucose is forming an acid with or without gas. Some enterobacteriaceae use fermentation lactose.

The members of the *Enterobacteriaceae family* have a complex antigenic structure. The somatic antigen O (endotoxin) represents the polysaccharidic repetitive terminal units of the lipopolysaccharide (LPS) from the wall of the Gram-negative bacteria. LPS is also formed of a core, similar to all the Gram-negative bacteria and the lipid A, present in all the enterobacteriaceae, which is responsible for their toxic activity in the host body. The somatic antigen "O" is thermostable, resistant to alcohol. It can be detected by reactions of agglutination. It determines, in the host organism, creation of antibodies IgM type.

Enterobacteriaceae are microbodies that can be found in the environment and/or have evolved to compose the normal intestinal flora. Still, some members needed extra genetic information assured by the plasmids, transposons and bacteriophage, which lead to the appearance of some factors of pathogenicity, these strains becoming pathogen. The additional genetic information can be coded by chromosomes or extra chromosomes.

The *Escherichia* type reunites species present in the human intestine highlighted for the first time in 1885 by the German Theodor Escherich in honor of who was given the name of the type. They were considered commensal bacteria of the large intestine until 1935 when it was demonstrated the etiologic role played by a strain of *Escherichia coli* involved in an episode of diarrhea in newborn. The *Shigella* type, called after the Japanese microbiologist Shiga who discovered these bacteria 100 ago, reunites four species. The *Salmonella* type belongs to the *Enterobacteriaceae* family and includes a single species *Enteric Salmonella*. The French bacteriologist Alexandre Yersin has isolated for the first time the bacteria causing the epidemics of swine fever from Hong Kong from the end of the 19^{th} century.

MATERIAL AND METHOD

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

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

Necessary materials for the performing of the examination:

- A recipient of collection (collection recipient with collecting spoon) with transport medium
- Wooden 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 quantities larger than 10g because it will reduce the chances of isolating the pathogen bacteria.

RESULTS AND DISCUSSIONS

The weakly selective media, MC, EMB, allow the growth of all the equally lactose-positive and negative enterobacteriaceae, even of other groups of gram-negative bacilli as *Vibrio*, inclusively *V.cholerare, Pseudomonas, Aeromonas, Plesimonas, Alcaligenes.*

A special importance is represented also by the conditioned isolation of the enteric pathogens, especially *Escherichia Coli* in groups, represented by Enteropathogenic *E.Coli* (EPEC), enterohemorrhagic (CHEC), enterotoxigenic (ETEC), enteroinvasive (EIEC), enteroadherent (EAEC), enteroaggregative (EagEC).

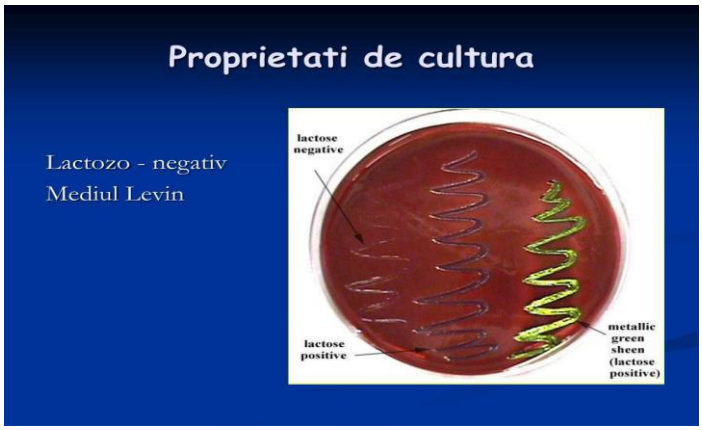

Fig1. *E. Coli,* lactase-positive colonies, metallic green**.**

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Another important role is represented by the estimation of the lactose negative flora/ lactose positive flora report, in regard to *E.Coli* or other lactase-positive, especially *Klebsiella* in children.

The moderate selective media have a higher selective capacity, considerably inhibiting the lactase-positive enterobacteriaceae. Thus, they allow the unhindered development of the lactase-negative enterobacteriaceae as would be: *Salmonella, Shigella, Providencia, Proteus, Morganella* and the late lactase-positive, *Citrobacter, Serratia, Hafinia*. Enterocolitis *Yersinia* is hardly developed, usually after the prolonging of the incubation 22-29℃ maximum 24 hours, and on some media, as ADCL, XLD, IM, SMID is strongly inhibited. These media are usually used for the isolating of the pathogens of the *Salmonella and Shigella type*. Between these, the RA and SMID media, named chromogenic media, allow the absolute differentiation of the *Salmonella* type by distinctively colored colonies. Particularly the IM medium is recommended also for the isolation of the *Pseudomonas* type.

The highly selective media are inhibiting for all the groups of enterobacteriaceae, with the exception of the salmonella. The WB medium, chosen for the development of *Typhi* serotype, is recommended especially for the investigation of the suspects of typhoid fever and the chronic bearers. The AVB medium, partially inhibitor for the *Typhi* and *parathipy A* serotypes is recommended for the control of food products.

A remark is that, from all the media of enriching you can pass on any of the moderate selective media.

In the last years, it was extended very much a category of different selective media using the antibiotics and sulfonamides as pressing factors. The advantages to dose with precision the quantities for the associated flora and the more reduced price are taken into consideration in promoting these media.

The more decreased productivity of the weakly and moderate selective media on which *Y. enterocolitica,* can be isolated after an additional incubation of 24 hours on 22-29℃, at the room temperature, has promoted for these enterobacteriaceae different media. Among these the medium proposed by Schleman, cefsulodin-irgasan-novobiocin - *Y. Enterocolitica (CIN-Ye)* is more frequently used due to its advantages, as would be the fact that it is easily to be prepared, fast reading, in 18-24 hours at 32℃, the good selective capacity and it is relatively cheap. The *Y.enterocolitica* colonies are red with the dark red center and the transparent margins. Other enterobacteriacae, as *Serratia liquefaciens, Citrobacter freundii, Enterobacter agglomerans,* can determine colonies morphologically similar to those of *Y. Enterocolitica*. The differentiation is made afterwards by biochemical tests.

From 442 samples of meat examined by Stiles, 86% have a content of enteric bacteria, all the 127 samples of beef milled being positive. The most frequent were involved *Escherichia coli* biotype I (29%) , *Serratia liquefaciens* (17%) and *Pantoea agglomerans* (12%). A total of 721 of isolates (32%) were represented by *Citrobacter freundii, Klebsiella pneumoniae, Enterobacter cloacae and E. Hafniae*. On the examination of 702 food for fecal coliforms, the most probable number of germs (MPN), representing 10 categories of food, was found in 119 samples of milled beef, the geometrical average being obtained by the AOAC procedure was of 59 /g.

CONCLUSIONS

1. Escherichia coli is a gram-negative bacillus that presents sometimes filamentous forms.
2. The majority of the species presents peritrich cillia and are not capsulated.
3. There are though strains of immovable Escherichia coli, some presenting capsule.
4. It grows on simple media where the glucose is the only organic constituent.
5. It is an aerobe germ, facultative anaerobe that can have fermentative or respiratory metabolism.
6. On solid media it grows under the form of colonies of "S" type and in the liquid media it determines uniform agitation and adherent ring on the wall of the tube.
7. The weakly selective media, MC, EMB, allow the growth of all the equally lactose-positive and negative enterobacteriaceae, even of other groups of gram-negative bacilli as *Vibrio*, inclusively *V.cholerare*, *Pseudomonas.*
8. The moderate selective media have a higher selective capacity, considerably inhibiting the lactase-positive enterobacteriaceae.
9. The highly selective media are inhibiting for all the groups of enterobactericae, with the exception of salmonella.
10. The strains of Escherichia coli that poses the "col' plasmid emit colicines, toxic substances for other bacterial strains.

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STUDIES REGARDING THE ANTIBACTERIAL ACTIVITY, SOME PHYSICO-CHEMICAL AND BIOCHEMICAL PARAMETERS IN A FEW VARIETIES OF HONEY FROM BIHOR COUNTY

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Abstract

According to EU, Honey is the natural sweet substance, produced by Apis mellifera bees from the nectar of plants or from secretions of living parts of plants, or excretions of plant-sucking insects on the living parts of plants, which the bees collect, transform by combining with specific substances of their own, deposit, dehydrate, store and leave in honeycombs to ripen and mature. It plays an important part in our nutrition and it is well-known for its positive effects on health.

The aim of the study was to determine the antibacterial activity, physico-chemical parameters and bioactive compounds of some selelcted honey from Bihor County, such as Honeydew honey, Meadow honey, Acacia and Linden honey.

The antibacterial activity of honey was tested against Echerichia coli (ATCC 25922), Pseudomonas aeruginosa (ATCC 27853), Streptococcus pneumoniae (ATCC 49619), Staphylococcus aureus (ATCC 25923). Among the studied honey, honeydew and meadow honey had the highest antibacterial activity.

Key words: honey, antibacterial activity, physico-chemical parameters, bioactive compounds.

INTRODUCTION

Honey is an excellent food with great nutritional, biological and energetycal value, easily assimilated with real bactericidal properties, due to its content in antibiotics, enzymes and vitamins. Honey is defined as "the sweet substance produced by honeybees from the nectar of blossoms or from secretions on living plants, which the bees collect, transform and store in honeycombs" (Codex Alimentarius Commission, 2002). It is a concentrated aqueous solution of invert sugar, that contains a mixture of other carbohydrates, amino and organic acids, minerals, aromatic substances, pigments, waxes and pollen grains to make it complex (Ajlouni and Sujirapinyokul, 2010; Manzanares et al., 2011; Rashed and Soltan, 2004).

Honey produced by *Apis mellifera* is one of the oldest traditional medicines considered to be important in the treatment of several human ailments. Currently, many researchers have reported the antibacterial activity of honey and found that natural unheated honey has some broad-spectrum antibacterial activity when tested against pathogenic (Mandal M.D, Mandal S., 2011, Lusby et al, 2005, Mundo et al., 2004).

The antimicrobial activity may be different depending on the types of honey, its geographical, seasonal and botanical sources, as well as the conditions of harvesting, processing and storage (Sherlock et al, 2010). The antimicrobial activity of honey is attributed largely to osmolarity, pH, hydrogen peroxide production and the presence of other phytochemical components (Taormina et al, 2001). Honey contains antioxidants and flavonoid that may function as antibacterial agents (Bosio et al., 2000).

Phenolic compounds contribute significantly to honey color, taste and flavor and have beneficial health effects (Estevinho et al., 2008). The composition of honey, including its phenolic compounds, is variable, depending mainly on the floral source and also other external factors, including seasonal and environmental factors as well as processing (Arreaz-Roman et al., 2006). Honey inhibits the growth of dangerous bacteria such as *Escherichia coli, Staphylococcus aureus, Salmonella, Shigella*, and *Vibrio cholera* and is superior to several well-known antibiotics (Zumla and Lulat, 1989, Rahman et al 2010). The aim of this study on the one hand was to evaluate the antibacterial potential of four varieties of honey at a concentration of 75% w/V, against bacterial strains of *Echerichia coli, Pseudomonas aeruginosa, Streptococcus pneumoniae* and *Staphylococcus aureus*, and on the other hand to determine physico-chemical and biochemical parameters, in a few varieties of honey (acacia, linden, honeydew and meadow), obtained in the year 2020 and 2021 in Bihor County.

MATERIAL AND METHOD

A number of 4 honey samples (acacia-AH, linden LH, honeydew-HD and meadow honey-MH) were analyzed. All samples were obtained directly from beekeepers of Bihor county. Acaccia and linden honey were obtained in 2021, while meadow and honeydew honey in 2020.

Antibacterial activity

The sensitivity of bacterial strains to different types of honey was determined by using the disk diffusion (Kirby-Bauer test).75% aqueous honey solution was used for Kirby Bauer method.

The following bacterial strains provided by Sanimed International Impex were used: *Echerichia coli* (ATCC 25922), *Pseudomonas aeruginosa* (ATCC 27853), *Streptococcus pneumoniae* (ATCC 49619), *Staphylococcus aureus* (ATCC 25923).

Kirby Bauer method

An inoculum of each clinical isolate was prepared from subculture of bacterial suspension. Briefly, it was prepared as follows: 4–5 colonies of the isolates were emulsified in sterile distilled water and the turbidity adjusted to

1.5 × 108 CFU/mL, corresponding to 0.5 McFarland standards (Koneman et al, 1992 cited by Ndip et al 2007). A sterile cotton swab was dipped into the standardized bacterial suspension and used to uniformly inoculate sterile Petri dishes (Ø90mm) with Nutrient Broth (code: 41185). The plates were allowed to dry for 3–5 minutes. Thereafter, 8 pieces of 6mm discs (Blank discs - Oxoid Ltd) were placed on each plate and pressed gently to ensure complete contact with agar. Disks were impregnated with 10µl of all prepared honey samples. A gentamicin disk 10µg (Liofilchem SRL was used as the positive control.

The plates were incubated at 37°C for 2-5 days and examined by measuring the diameter of the inhibition zones. The experiment was repeated 3x for each strain.

Physical-chemical parameters

Physical-chemical parameters: water, pH, acidity, HMF, were analyzed according to the Romanian Standard Analysis Methods (National Standard, 2009) and Harmonized methods of the IHC (Bogdanov, 2009), or with specific methods.

Water and total sugar - of the tested samples were determined with digital refractometer KRUSS model AR 2008.

pH – HACH Sension 378 multiparameter meter was used to measure the pH of a honey solution prepared from 10 g of honey in 75 ml of distilled water.

Total acidity - by volumetric method (Bogdanov, 2009).

HMF content was determined by spectrophotometric method (White, 1979). Each of the honey samples was divided into 2 clarified aliquots; water was added to one of the aliquots and absorption was read at λ=284 and 336 nm. This was compared to a second solution in which this absorption was eliminated by the addition of sodium bisulfate. Results were expressed in milligrams of HMF per kilogram of honey.

Biochemical parameters

Extraction of antioxidant components - Antioxidant components from honey were extracted with water (10% solution).

Total polyphenols (TP) content was determined by using the Folin-Ciocâlteu (1927) colorimetric method developed by Singleton and Rossi (1965). A diluted extract (0.5 ml) or phenolic standard was mixed with 2.5 ml Folin-Ciocâlteau reagent and after 5 minutes 2.0 mL sodium carbonate (7.5%). The absorption was read after 2 h at 20°C, at 750 nm. For the preparation of calibration curve 0.5 ml aliquot of 0.2, 0.4, 0.8 and 1.2 µM/ml aqueous gallic acid solution was used as the standard and expressed as mg of gallic acid equivalent (GAE).

Antioxidant activity – FRAP assay (Benzie and Stain,1996) using the calibration curves for ascorbic acid (5 to 100 mg/L). The result is expressed

as the corresponding activity in ascorbic acid equivalent of a 10% honey solution.

RESULTS AND DISSCUSIONS

Antibacterial activity

Diameter of inhibition zones are registered in Table 1 and the graphical representation of the inhibition percentages of the honey samples taken in the study, are shown in Fig. 1. The reference value is the area of inhibition of the positive control gentamicin, considered 100%. Except *Escherichia coli* strain ATCC 25922b, which is resistant to all the studied honey samples, and *Pseudomonas aeruginosa* strain ATCC 27853 which is resistant to acacia and linden honey, all other pathogenic strains tested show different sensitivity to the concentration used, depending on the types of honey used in the experiment. Honeydew honey had the strongest antibacterial effect on the *Staphylococcus aureus* strain ATCC 25923, the diameter of the inhibition zone formed being 12.2 mm followed by Meadow honey forming a diameter of inhibition zone of 11.7 mm, being significantly and distinctly significantly smaller than the inhibition zone diameter measured in the case of gentamicin control, 13mm (Table 1). The areas of inhibition in the case of *Pseudomonas aeruginosa* strain ATCC 27853 were 6.2 mm for meadow honey and 6.8 mm for honeydew honey, the diameter of inhibition zone being very significantly lower than in the case of the control represented by gentamicin=12mm (Table 1).

Table 1.

Estimated mean values for the diameter of the inhibition zone in mm, in the studied honey solutions, compared to the same parameter in the control group (gentamicin)

Sample/CTR / Microorganism	MH	HH	AH	LH	Gentamicina
Streptococcus pneumoniae ATCC 49619	7.4±0.3 **	7.8±0.3 **	6.6±0.1 ***	6.4±0.1 ***	8.8±0.2
Pseudomonas aeruginosa ATCC 27853	6.2±0.2 ***	6.8±0.2 ***	0	0	12±0.1
Staphylococcus aureus ATCC 25923	11.7±0.2 **	12.2±0.3 *	6.5±0.1 ***	6.2±0.1 ***	13±0.2
Escherichia coli ATCC 25922	0	0	0	0	6.6±0.1

0=rezistent

p>0.05= non-significant; p<0.05 * significant; p<0.01=** distinctly significant; p<0.001=*** very significant in comparison with control lot.

In the case of *Streptococcus pneumoniae* strains ATCC 49619, honeydew honey and meadow honey generate an inhibition zone with a diameter of 7.8 mm and 7.4 mm, respectively, which represents a distinctly

significant decrease in comparison to the diameter of inhibition zone of the control (gentamicin), and acacia and linden honey have a reduced antibacterial effect, generating inhibition zones diameters between 6.6 mm and 6.4 mm respectively - representing very significant decreases compared to the control represented by gentamicin-8.8mm (Table 1).

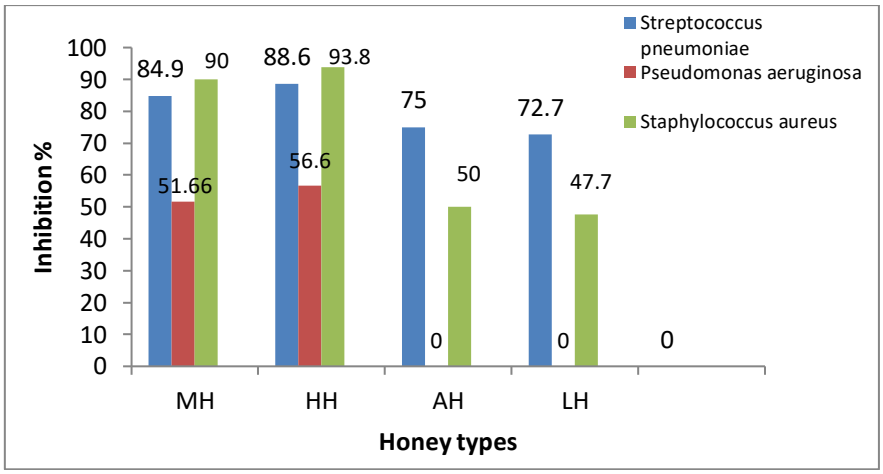

Fig. 1 – Graphical representation of the inhibition percentages of the honey samples taken in the study. The reference value is the area of inhibition of the positive control gentamicin, considered 100%

All the samples present lower antibacterial activity than the gentamicin.

Honeydew and meadow honey present the highest inhibition in case of *Staphylococcus aureus* (93.8 and 90%) and *Streptococcus pneumoniae* (88.6 and 84.9%), followed by linden and acacia honey.

The development of *Pseudomonas aeruginosa* was inhibited only by honeydew and meadow honey and only 56.6 and 51.6%.

Escherichia coli strain ATCC 25922b, was resistant to all the studied honey samples.

The results obtained in this study are consistent with the results published by several authors (Molan 1992; Manisha Deb Mandal and Shyamapada Mandal 2011; Wilkinson and Cavanagh, 2005; Sherlock et al.2010; Vică et al, 2021) regarding the effect of honey on some strains of pathogenic bacteria.

Physical-chemical parameters

The content of water, total sugar, pH, total acidity and HMF (Table 2) respect the limits established for honey in the Romanian and the International

Regulatory Standards. Table 2, also contains the values for the analyzed bioactive compounds.

Table 2.

Mean values for physical-chemical parameters determination and the limits in the Romanian Regulatory Standards

Sample	pH	Free Acidity Meq/kg	Total sugar %	Water %	HMF mg/kg	Total polyphenols mg GAE/100g honey	FRAP value for a 10% honey solution (Ascorbic acid Equiv$_4$)
AH	4.01	21.9	81.9	16.2	1.65	23.97±0.787	4.087±0.005
LH	3.97	26.1	80.0	17.6	20.66	60.83±0.337	12.42±0.001
MH	3.14	30.2	81.7	16.6	9.92	79.82±0.449	16.34±0.004
HH	3.08	33.4	80.7	17.8	2.94	159.82±1.348	52.38±0.002
STAS* 784/ 3-89/	-	Max 40	Max 83	Max 20	Max 40		

In general, honey is characteristically acidic with pH between 3.2 and 4.5, which is low enough to be inhibitory to several bacterial pathogens (Haniyeh et al, 2010).

pH values in our study ranged from 3.08 and 4.01 and total sugar between 80 and 81.9%, and as described by Sweda, 2017, high concentration of sugars and low pH are universal antibacterial factors of all honeys.

The total phenolic content of the tested honey samples, were between 23.97 (acacia) and 159.82 GAE/kg (honeydew). Similar results were obtained by Mărghitaş et al., 2009, who determined the total phenolic content in Romanian acacia honey to be in the range from 2.0 to 39.0 mg of GAE/100g of honey and by Bobiş et al, 2008 in Romanian honeydew honey (93,5 – 144,94 mgGAE/100 g honey).

Antioxidant activity has the same trend as polyphenolic compounds, growing from acacia to meadow and honeydew honey.

A very strong correlation was observed between the polyphenol content, the antioxidant activity of studied honey, and their antimicrobial activity against *Streptococcus pneumoniae* (ATCC 49619), *Staphylococcus aureus* (ATCC 25923) for all the studied honey samples, $| r | > 0,75$.

The same strong correlation was registered *Pseudomonas aeruginosa* ATCC 27853 between the polyphenol content, the antioxidant activity of honeydew and meadow honey, and their antimicrobial activity. Our are in accordance with those obtained by Alzahrani et al., 2012, Sousa et al. 2016, etc.

CONCLUSIONS

Among the studied honey, honeydew and meadow honey had the highest antibacterial activity against *Staphylococcus aureus* (ATCC 25923), *Streptococcus pneumoniae* (ATCC 49619), *Pseudomonas aeruginosa* (ATCC 27853). *Escherichia coli* strain ATCC 25922b, which is resistant to all the studied honey samples.

This potency is attributed to its physicochemical and some biochemical characteristics. Hight phenolic compounds, high antioxidant capacity and low pH, play a major role in the antimicrobial activity of honey.

In the future we intend to test the antibacterial activity of other types of honey, as well as against other strains of bacteria.

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THE MOST IMPORTANT DISEASES IN GUINEA PIGS AS ZOONOTIC RISK

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Abstract

Guinea pigs are extremely adaptable to a great range of climates, as a species, although as individuals they are highly vulnerable to variations in local temperature and humidity. They are nervous animals and may refuse to drink or eat for a period after any significant change in their location, feed, or husbandry. Environmental changes have a minimal or even nonexistent impact on guinea pigs when two animals are kept together. If a sick guinea pig must be kept in hospital, housing a cage mate with it reduces stress.

Key words: zoonosis, guinea pigs, dermatophytosis

INTRODUCTION

Guinea pigs live in family units where alpha males are predominant. Mature males, and especially strangers, will fight, still, two males who are raised together from a young age or a group of nonbreeding females do not develop such dominance problems. Social problems are diminished after castration and ovariohysterectomy. However, learned behavior in adult males after castration may still make them antisocial.

Guinea pigs require a constant source of water. It must be changed every day because they dirty their water bowls or sipper tubes with food while drinking. They only lick sipper tubes with training, defecate indiscriminately, and are prone to sit in and soil their food bowls and sleeping areas. Guinea pigs are neophobic (afraid of new things), especially when comes to food or water. They are afraid of any changes in appearance, taste, or texture, making guinea pigs refuse food or water.

Guineas pigs develop food preferences early in life, so they may not recognize new food items as food if introduced later. This is the reason why it is important to expose young guinea pigs to a variety of foods, especially a variety of vegetables, early in life.

MATERIAL AND METHOD

The study focused on 20 guinea pigs. It was done at a veterinary office in Oradea for a period of one year. All the pigs came from the pet shops in

the city, either bought or received gifts, especially for children. Samples were taken from each animal, from the skin, hairs including. Later the samples were sent to a laboratory in Oradea and then to Bucharest.

RESULTS AND DISSCUSIONS

Of the 20 pigs, 17 were positive for dermatophytes, with obvious clinical symptoms. *Dermatophytosis* is a common disease in guinea pigs and natural infection is always associated with *Trichophyton mentagrophytes* var *mentagrophytes*. Lesions usually begin as broken hairs and circular, scaly alopecia initially occur at the tip of the nose, then spreads to the periocular, forehead, and pinnal areas.

In most severe cases, the dorsal sacrolumbar area is also affected, but the limbs and ventrum are usually spared. Pruritus is either minimal or absent. More inflammatory lesions are observed in some animals, characterized by erythema, follicular papules, pustules, crusts, pruritus, and even scarring. High temperature and humidity may also contribute to a more severe infection.

Other ectoparasitic diseases are not frequent in guinea pigs. Infestation with the fur mite *Chirodiscoides caviae* may result in pruritus and alopecia along the posterior trunk of the body while underlying skin remains relatively unaffected. Subclinical cases observed may be asymptomatic.

Mange, caused by the sarcoptid mite *Trixacarus caviae*, is a common disease in guinea pigs. Its clinical signs are dramatic: intense pruritus, widespread alopecia, and hyperkeratosis. *T caviae* is transmitted through direct animal-to-animal contact from sow to weanlings during feeding and through contact with infested cage material such as bedding.

Based on the results of the post-slaughter control and following the reverse route to the farm of origin, national surveillance may be carried out.

CONCLUSIONS

We may conclude that pet guinea pigs carrying dermatophytes are a zoonotic risk for their owners, children being often the only affected members of a household.

Risk factors for human dermatophytosis are young guinea pigs and the recent acquisition of a new guinea pig. When treating ringworm in guinea pigs, owners must take into consideration the environmental treatment, with special attention given to the bedding and clothing of all people in contact with infected or carrier animals. Contagious material may persist in the owner's clothing and bedding and is the common reason for a pet's relapse after an initial response.

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THE STUDY OF THE INDICATORS OF FRESHNESS OF THE BREAD SUPPLEMENTED WITH THE BREWERY MASH FLOUR

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Abstract

The supplementing of the bakery products with the bioactive principles coming from bio wastes of the food industry represents a major preoccupation in the last period of time. Also, the innovation of some products supplemented with bioactive substances coming from one or more sources represent also a major interest. In this direction is going also this paper where we followed the effect of the supplementing of the flour with percentages between 5-25% brewery mash flour on the technological properties of the dough, finished product and on the term of their conservation. Based on the scores and data obtained regarding the main parameters of freshness was found that a supplementing of 10% of bakery products influences the technological parameters by the high content of fibers that replace the gluten proteins determining the decrease of the capacity of the dough to retain the fermentation gases by the quality of the finished products in the way of obtaining some products with decreased volume, dense aspect of the core, high humidity that favors the early ageing of the finished products.

Key words: beer, bio-wastes, brewery mash, brewery mash flour

INTRODUCTION

The bakery, a science in the field of food industry in continuous evolution, uses more and more different food supplements in order to obtain innovating products designated for the human consumption with higher nutritive properties compared to the classical products [1].

Bio wastes represent one of the resources from which you can isolate active biological compounds.

The intense preoccupation from the last years for the reutilization of the agro-industrial wastes was and is higher and higher, thus obtaining, different products or services.

In this context is placed also this paper, in which we used flour obtained from brewery malt, byproduct resulted from the industry of beer, the latter being one of the industries that produce the higher quantity of bio wastes annually. The fresh brewery mash obtained is difficult to store due to the high content of water, approximately 75%, of the high potential of antioxidants and due to a strong enzymatic activity, thus, is imposed its fast exploitation. [8].

Mussatto, Dragone and Roberto, 2006 in their paper specified that the brewery malt represents the main byproduct of the industry of beer, being accumulated in quantities of approximately 85% of the total of waste generated. Also in this regard, in Eurostat data 2005, quoted by Farcas A, 2014 are presented data regarding the industry of beer that generate annually a quantity of approximately 3.4×10^6t of brewery malt in the European Union. Mussatto and Solange, 2013 in their paper specified that on the global level the production was estimated to 38.6×10^6 t. The brewery mash is valuable also by its content in substances with anti-oxidant nature like polyphenols and flavonoids.

The polyphenol substances are located in the layer of the barley grain which is rich in lignin and less rich in endosperm [6].

Thus, the brewery malt, being in a large part made of cellular walls that remain after the extraction of the fermentable substances from endosperm in the process of obtaining the beer wort, is by default richer in phenolic compounds [4].

Goupy and the collaborators in the paper published in 1999, specifies that approximately 80% of the phenolic compounds present in the beer come from malt and the rest come from hop. These compounds represent a real source of natural antioxidants, capable to prevent and treat different inflammatory affections, cardiovascular, neurodegenerative diseases, even cancer, presenting an antitumor activity characterized by the inhibiting of the proliferation of a variety of cancer cells.

MATERIAL AND METHOD

Due to the high content of water and due to the strong enzymatic activity, the brewery mash is preserved very hard, thus being necessary its fast exploitation.

In this regard in order for it to be able to be introduced easily in the composition of the premixes, the brewery malt was dried in the oven for 6 hours, at the temperature of 78°C, up to a content of 10%, was milled, and then were made the 5 premixes, made of white flour and different quantities of brewery mash flour, between 5-25%.

The experimental versions were with insertion of brewery mash of 5%, 10%, 15%, 20% and 25% plus the witness sample obtained only of white flour. From them was prepared then bread from traditional recipes, being applied the same technological conditions, which then were submitted to the determinations of freshness.

RESULTS AND DISCUSSIONS

Regarding the indicators of freshness/ageing analyzed in the bread made from premixes including white flour and different quantities of brewery mash flour (5%, 10%, 15%, 20% and 25%), 5 repetitions from each version, analyzed according to the method of the points but also from the point of view of the form and external aspect, by a number of 40 tasters. The fortification of the bread with brewery mash flour produces modifications of the technological parameters, which implicitly will be found in the characteristics of quality of the finished products.

Analyzing the results obtained for taste and flavor was remarked that the supplementing with brewery mash flour is placing a significant stamp on the taste, the versions with 5% and 10% being better tolerated and accepted compared to the other versions.

About the smell we can say that the insertion of mash flour in the bakery products brings also a significant change of the smell of the analyzed versions. If the versions with insertion of 5-15% are accepted for the other there is reluctance for tasting, due to the strong smell unleashed. The flavor identified by the tasters was present as being that of mash, thus confirming the fact that, the differences in relation to the witness sample are associated to the supplementing of the bread.

The flavor identified by the tasters once the time was passing was more and more pronounced, after 36 h of preservation at the room temperature it appeared also a bitter smell which was identified once the time was passing especially in the versions supplemented with the larger quantity of brewery mash flour.

Regarding the aspect and elasticity of the core you can say that an insertion of 5% of brewery mash flour doesn't bring modification regarding these indicators but once the percentage added increases gradually appear also structural modification but also of their aspect.

Thus, once the percentage of brewery mash flour increases you can observe a gradual change of color of the core to brown-ruddy, aspect that didn't bother the tasters, but once the content of brewery mash flour increases the elasticity of core decreases gradually, becoming denser.

This aspect can be assigned to the large quantity of fibers from it, which, by the repeated mechanical actions exercised during the obtaining, determined the deterioration of the gluten membranes. It can also be explained by the studies of microscopicity accomplished by Bordei in 2003 that showed the fact that, in the bread with fibers, the fine structure of the core, made of thin filaments and membranes characteristic for the bread without fibers, is absent.

Beside the indicators present were considered also other indicators: form, volume, color and aspect of the crust. About the volume of the bread from experimental version we can say that once the percentage of supplemented brewery mash flour increases its volume decreases leading the sample with 25% insertion of brewery mash flour to be of 265.62 cm^3/100g compared to 331.46 of the witness sample.

The decrease in volume is due to the increase of the fiber percentage from premix and the decrease of the content of gluten from the premix, aspect reflected in the incapacity of the dough to retain the fermentation gases. Laurikainen 1998, citat Farcaș, 2014 in their studies reaffirmed that an addition larger than 7% of brewery mash flour in the products of bakery determined the decrease of the volume of the products due to the decrease of the content in gluten proteins.

Another hypothesis suggests the fact that, in the presence of fibers, due to the competition for water from the dough, the gluten proteins don't hydrate enough, so that the gluten network is created in a smaller percentage [4]. The aspect of the crust of the bread in which was introduced quantities of over 15% of brewery mash flour presented the defect of cracking of the crust even from the phase of fermenting, being maintained afterwards also in the finished product.

The larger the percentage of brewery mash flour in the composition of the premix the more pronounced was this defect. Also here you can mention the fact that the color of the crust of the bakery products is different varying a lot between the versions depending on the quantity of brewery mash flour introduced in the premix, this becoming darker once the supplemented percentage increases.

CONCLUSIONS

Supporting the scores and data obtained you can say that the tasters have given data that position the first two version with 5% and 10% insertion of brewery mash flour among their preferences. Also, from the point of view of the freshness, considered by the determination of the ageing parameters of the products in 28h you can say that the supplementing of the bakery products with different quantities of brewery mash flour produces also benefits by increasing the content of fibers in the products but produces also secondary effects on the quality of the products but also on the period of their preservation.

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INFLUENCE OF RESTING TIME AFTER WETTING THE DURUM WHEAT BEFORE GRINDING ON THE FLOUR BAKING PROPERTY

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Abstract

The penetration of water into the core of the wheat grain during the rest after wetting leads to a decrease in the mechanical damage of the components in its core, thus reducing overheating during grinding that protects gluten proteins and also obtaining a lower percentage of damaged starch. By determining the fall index and rheological properties with Chopin Alveograph in samples taken at different rest time intervals after wetting, it was found that for a durum wheat the optimal rest time is 20 hours because after exceeding this time the rheological properties and the fall index has not changed significantly.

Key words: time, properties

INTRODUCTION

Wheat wetting is one of the stages of the technological flow of baking wheat milling. In the past, this stage consisted even in the effective washing of the wheat, followed by centrifugation and introduction into the rest bunker. This method was abandoned due to the residues resulting from the washing process because they were a factor of biological pollution. After wetting, rest before grinding. During the rest of the wheat grains, the water penetrates the grain and improves the yield at the mill and reduces the amount of damaged starch resulting from the mechanical work by which the wheat grains and by-products are crushed between the rollers. The rest time varies greatly depending on the hardness or glassiness of the wheat grains to be ground. If we are dealing with a durum wheat, the rest time is indicated to be much longer, even double that of a soft wheat used in obtaining baking flour.

Following the determinations made, it was highlighted that by prolonging the rest time for durum wheat, very good results were obtained on the rheological properties of the dough. The enzymatic attackability of starch characterizes the ease with which the starch granule is hydrolyzed by enzymes. It is influenced by the degree of damage to the starch granules. Of the two amylolytic enzymes alpha amylase and beta amylase, only the enzyme beta amylase hydrolyzes the mechanically damaged starch granules.

Beta amylase hydrolyzes only damaged starch granules, the rest of the starch being deteriorable only for amylase.

Therefore, the ability of flour to form fermentable carbohydrates depends mainly on the degree of damage to the starch granules. Flour obtained from glassy durum wheat consists mostly of whole cells and fragments of endosperm cells, along with small amounts of starch and free protein particles. The strong bond between starch and the proteins inside the endosperm cell causes it to remain largely intact. Deterioration of the starch granule during grinding is accidental and inevitable. Due to the high degree of damage of starch granules in flours from hard grains with high glassiness, they have a high capacity to form fragile carbohydrates.

MATERIAL AND METHOD

The study was conducted at the mill in Bicaci, Bihor County in Romania in its own laboratory. A batch of durum wheat with a high glassiness was introduced into the mill. The respective lot had 22 tons, which meant grinding in 6 hours, given the mill's grinding capacity. After introduction into the grinding process, the wheat batch was left to rest for 16 hours after wetting. Samples of flour were collected at the entrance to the flour hopper at an interval of 30 minutes, obtaining 12 samples: at 16 and a half hours, 17 hours, etc. up to 22 hours of wheat rest before grinding.

The analysis methods were those from the Romanian Standard for the following determinations: determination of the fall index SR ISO 3093/1997, the fall index method uses as substrate the starch contained in the sample.

It is based on the rapid gelatinization of the flour suspension in a hot water bath, and the measurement of gel liquefaction under the action of amylolytic enzymes. Wet gluten according to SR ISO 7495-2001. For the determination of wet gluten, the protein substances in the form of gluten are separated, by washing with sodium chloride solution of the dough prepared from the sample to be analyzed and the gluten obtained. Determination of the rheological characteristics of the dough using the chopin alveograph according to the SR ISO 5530-4: 2002 Standard.

The alveographic method is based on the tensile strength of a sheet of dough subjected to air pressure, which swells in the form of a bubble growing to rupture. The Chopin alveograph is used to determine certain rheological properties, especially the maximum overpressure P, the swelling index G, the average abscissa at rupture I and the deformation energy W.

Baking test according to SR 90-1998. The baking properties of the flour are assessed based on the characteristics of the dough and of the bread resulting from the baking test performed under established conditions, applying the single-phase process. For this test, larger quantities of flour (200

kg) were taken in order to be able to test the properties in our own bakery in working conditions within a mechanized flow for obtaining bread.

RESULTS AND DISSCUSIONS

Following the laboratory determinations, the following results were obtained as can be seen in the tables below:

Table 1

The value of the fall index according to SR ISO 3093/1997

Fall index value (sec)	276	282	288	290	294	296	299	302	304	306	308	306	308
Rest time (hours)	16.5	17	17.5	18	18.5	19	19.5	20	20.5	21	21.5	22	22.5

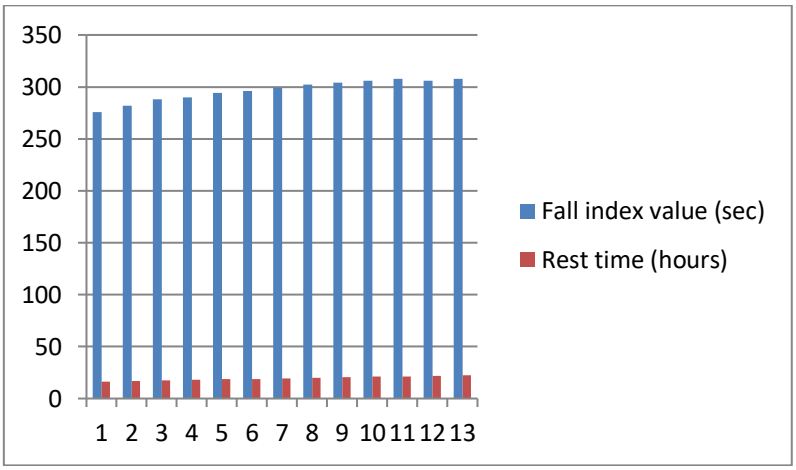

Fig 1. The value of the fall index according to SR ISO 3093/1997

Table 2

Wet gluten value according to SR ISO 7495-2001

Amount of wet gluten (%)	32.6	32.4	32.4	3.5	32.2	32.3	32.5	32.4	32.2	32.6	32.4	32.8	32.2
Rest time (hours)	16.5	17	17.5	18	18.5	19	19.5	20	20.5	21	21.5	22	22.5

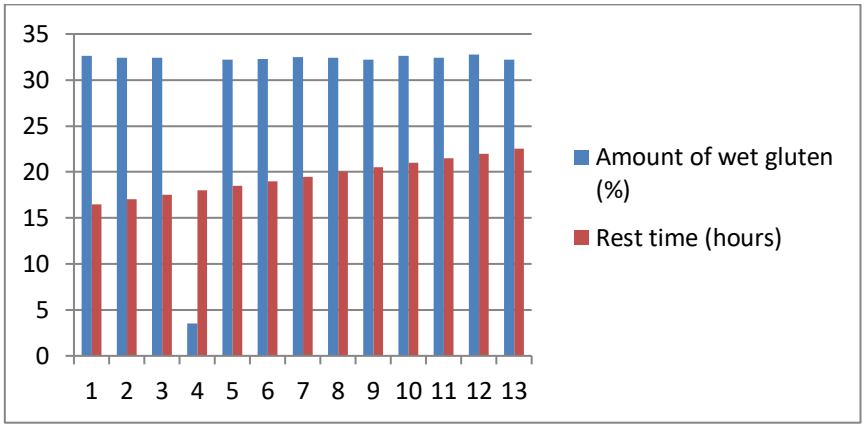

Fig 2. Wet gluten value according to SR ISO 7495-2001

Table 3

Value Maximum pressure Chopin alveograph according to SR ISO 5530-4: 2002

Maximum pressure (mm)	110	110	114	118	122	122	128	130	130	134	134	134	132
Rest time (hours)	16.5	17	17.5	18	18.5	19	19.5	20	20.5	21	21.5	22	22.5

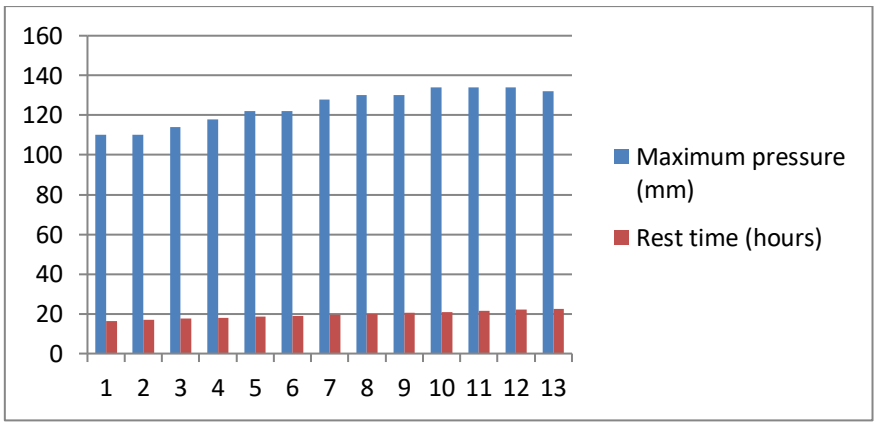

Fig 3. Value Maximum pressure Chopin alveograph according to SR ISO 5530-4: 2002

Table 4

Elasticity value Chopin alveograph according to SR ISO 5530-4: 2002 Standard

Elasticity (mm)	126	126	124	120	118	118	114	114	110	110	108	108	108
Rest time (hours)	16.5	17	17.5	18	18.5	19	19.5	20	20.5	21	21.5	22	22.5

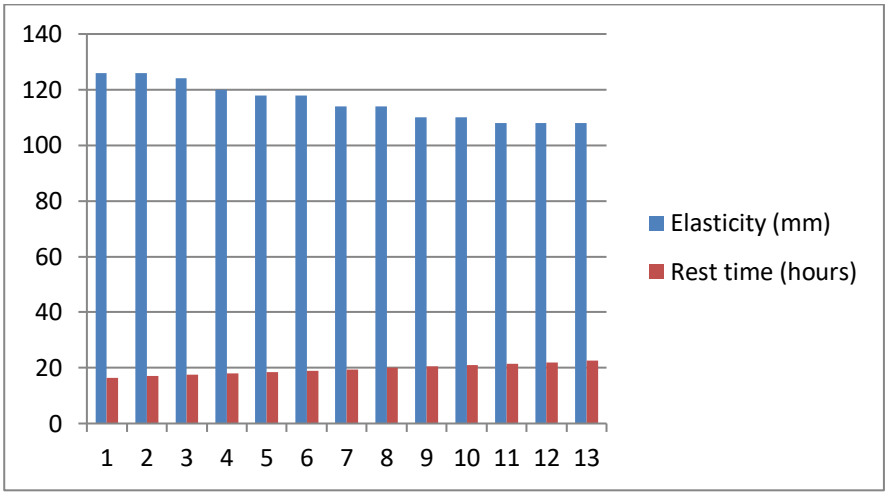

Fig 4. Elasticity value Chopin alveograph according to SR ISO 5530-4: 2002 Standard

Table 5

P / L ratio Chopin alveograph according to SR Standard ISO 5530-4: 2002

P/L ratio	0.87	0.87	0.92	0.98	1.03	1.08	1.14	1.14	1.22	1.22	1.24	1.24	1.22
Rest time (hours)	16.5	17	17.5	18	18.5	19	19.5	20	20.5	21	21.5	22	22.5

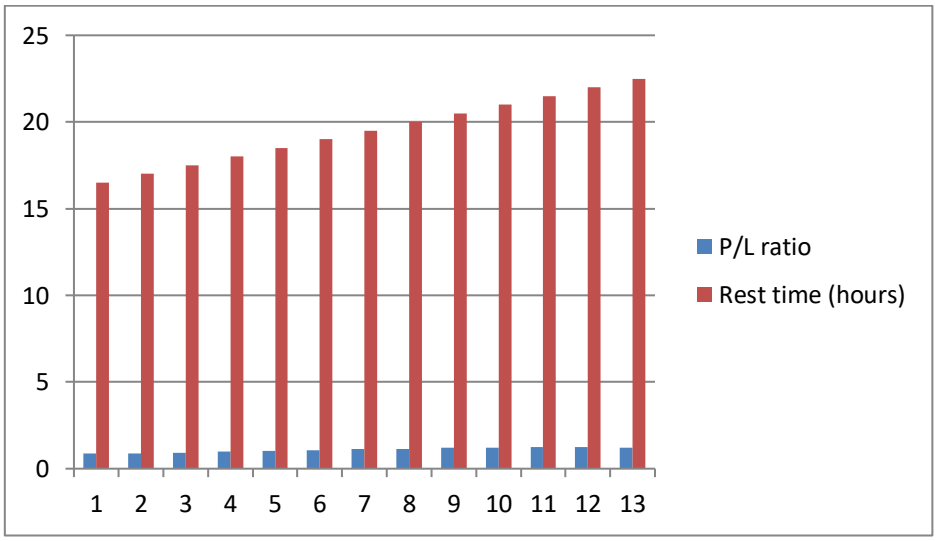

Fig 5. P / L ratio Chopin alveograph according to SR Standard ISO 5530-4: 2002

After processing the flour in our own bakery, the following were observed: for the flour batches that were taken at a rest time of 16-18 hours, the dough soon (10-12 minutes) after division began to become sticky and

presented as if "sweating". The mechanized processing was quite difficult due to the stickiness of the dough requiring more interventions on the modeling flow.

As the rest time progressed, this phenomenon was diluted and at a rest time of 20 hours it did not manifest itself, behaving like a normal dough. On the other hand, after baking, the volume of products obtained from flours with less rest was visibly higher compared to those obtained from flours with higher rest. In the latter, there were no processing difficulties during the technological flow.

CONCLUSIONS

Following the determinations made on the dough as well as on the products obtained from them, it was found that the rest time before grinding has a significant influence on durum wheat. Thus, as the rest time increases, the rheological properties of the dough improve. This is due to the higher amount of damaged starch in flours obtained from ground grains with less rest.

According to the determinations, it turned out that the optimal time for a durum wheat with a high glassiness is at least 20 hours, exceeding this time no longer having an influence on the rheological properties. On the other hand, the opposite was found for the volume of products. The products obtained from grain flours whose rest was lower, was visibly higher than those with a longer rest. This is due to the ease with which starch damaged by amylolytic enzymes is hydrolyzed, thus obtaining a much higher amount of mono and diglucide, which intensifies the activity of baking yeast and increases the amount of fermentation gases obtained.

As a recommendation we can say that in the units where the dough processing is mechanized, the rest time in case of grinding durum wheat must be extended by at least 20-30%, otherwise the interventions during the technological flow of obtaining of the products will be difficult, there will be many rejections. In the case of bakery units that have a technological flow of processing the dough mainly manula, there the flours resulting from the grains that have a shorter rest time even lead to obtaining products with a higher volume.

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STUDY ON WHITE POTATO DEHYDRATION AND SWEET POTATOES

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Abstract

Dehydration is the technological process by which the natural water content is reduced to a level that prevents the activity of microorganisms, without destroying tissues or depreciating the nutritional value of products that are dehydrated.

Dehydrated potatoes are obtained from fresh potatoes, in different forms, dehydrated by natural or artificial processes, or by combining them, in order to eliminate most of the water content from their composition.

The potato is considered to be 'man's second bread', it is a nutritious, tasty and cheap vegetable product, which is the staple food of many people and holds an important share in the economic balance of many countries.

Sweet potatoes are rich in complex carbohydrates, dietary fiber, beta-carotene, vitamin C and vitamin B6. Vitamin A (in the form of beta-carotene) is an important component of the composition of sweet potatoes: 100 grams provide three times the daily requirement of the body for this vitamin despite its sweet taste.

The study that looks at the drying process of white potatoes and sweet potatoes was carried out in laboratory conditions using two types of appliances: the electric oven and the domestic dehydrator.

Key words: dehydration, organoleptic characteristics, sweet potatoes, beta-carotene

INTRODUCTION

Drying or dehydration as a method of preserving horticultural products is based on removing a certain amount of water from vegetables and fruits with the help of heat, until reaching the physico-chemical state that blocks the vital activities of microorganisms, but which maintains nutritional and organoleptic qualities. (Lazăr V., 2006).

The most common method of drying is by convection at atmospheric pressure (hot air drying). During hot air drying, it is the vector that supplies the surface of the product with energy and also the vector for removing water vapor (Banu C., 2008).

The method used for dehydrating fruits and vegetables is drying with hot air, with different types of dryer machines (tunnel, tape, with zones). Depending on the characteristics of the raw material and the finished product, certain technical conditions are required to achieve dehydration with hot air, which in the case of potatoes drying temperature is 85-70^{o}C, product humidity 7%, yield 12-16%. C., 2009).

At the beginning of the dehydration process, when the humidity is still high, water evaporates from the surface of the product through external diffusion - its intensity is determined by several factors such as the evaporation surface, the temperature and the speed of air circulation. Simultaneously, the process of internal diffusion begins, a movement of water from inside to outside, as a direct consequence of the difference in osmotic pressure caused by the different concentration in soluble substances of cellular juice inside and on the surface of the product. Thus, the moisture is equalized in all the layers subjected to dehydration (Beceanu D., A.Chira, 2003).

The speed of dehydration is faster if: the temperature is higher, the diffusion resistance and the thickness of the product are lower, the ratio between the surface of the product and its water content is higher and the speed of movement of hot air is higher.(Potec I.et all, 1983).

If the optimal technological conditions are not observed during the drying process, transformations of sugars, nitrogenous substances, aroma, vitamins and color can take place. Sugar losses are caused by two main factors: caramelization, when drying is done at high temperatures, for a prolonged period of time; melanoid formation following Maillard-type reactions between sugars and amino acids. As a result of these two processes, the products darken in color and take on an unpleasant appearance. The oxidation reactions of tanning substances to quinones and the oxidations of anthocyanins also contribute to the darkening of color (Nour Violeta, 2014).

Dehydrated potatoes are the most widespread variety of vegetables preserved in this way. Dehydration is done in the form of rounds, flakes, granules, and certain amounts of dehydrated potatoes are processed in the form of flour. Not all varieties are suitable for dehydration, some darken and others are prone to crushing during operations in the technological flow (Marca Gh., 2004).

In readiness for dehydration, the potatoes must be ripe, with a juicy and hard pulp, whole, unpeeled, uncultivated and without traces of rot. The raw material destined for dehydration is successively subjected to the following operations: washing, cleaning, checking before cutting, bleaching, sulfitation, drying, packaging (Mănescu S., I Juduc, 1970).

The main physical transformations suffered by vegetables during processing are: decrease in volume, weight loss, migration of soluble components and peeling. Weight loss is the natural consequence of eliminating water from a content of 85-90% of fresh vegetables to 4-6% in the case of root vegetables (Gherghi A.).

At the end of the dehydration period, after cooling for 2-3 minutes, check the degree of dehydration, when the slices or cubes of dehydrated

potatoes must be hard, break when bent, in a glassy and transparent section and moisture 8 %. (Mănescu S., 1973).

MATERIAL AND METHOD

For the study, two varieties of potatoes were used: white potatoes and sweet potatoes. They were subjected to the dehydration process in: the electric oven and in the household dehydrator, an operation that took place in the laboratory of the Faculty of Environmental Protection - Food preservation methods.

The products intended for the study were washed, cleaned and cut into 3-4 mm thick slices using a grater, and then blanched (scalded) at a temperature of 90-95^{o}C for 4-5 minutes.

The samples taken for the study were weighed, the weight of each sample being 100g, and they were placed on baking paper and in the dehydration spaces: the electric oven and the household dehydrator.

The end weight of the samples used during dehydration was determined by weighing them every 15 minutes.

RESULTS AND DISCUSSIONS

In the study of the dehydration process of white potatoes and sweet potatoes we observed the following: the losses resulting from the non-essential parts in the cleaning process; the weight of the products used, and the time required to remove water from the products, starting from the initial weight of 100 g for each sample, and reaching their final weight; the organoleptic properties of dehydrated potatoes in the electric oven and household dehydrator, and the total and percentage weight loss during the dehydration process.

1. Determination of losses in the cleaning operation

To determine the losses resulting from the cleaning operation, the two varieties of potatoes were weighed before and after cleaning. The results were recorded in table 1.

Table 1

Determining the losses of the cleaning operation

Potato Variety	Initial quantity (g)	Weight after cleaning (g)	Losses	
			g	%
White potato	338	318	20	5.91
Sweet potatoes	368	289	79	21.46

The results obtained, presented in the table above show that for white potatoes the amount of the inedible part is 20 g, and for sweet potatoes the inedible part is much higher, 79 g. In percentages, for white potatoes the losses are 5.91% , and for sweet potatoes of 21.46%.

The percentages of inedible parts are quite small for white potatoes, because the potatoes used are early potatoes and have a thin skin, and for sweet potatoes the inedible part is quite large, 21.46%, because their skin is quite thick and hard.

2. Determining the weight of dehydrated potatoes in the electric oven, as a measure of time

To determine the weight of dehydrated potatoes, they were weighed every 15 minutes for both white and sweet potatoes. The data obtained when determining the initial and final weight of the two varieties of potatoes used in the electric oven as a measure of time, are presented in Table 2.

Table 2

The weight of dehydrated potatoes in an electric oven

Potato Variety	Weight										
	Initial	15 min	30 min	45 min	60 min	75 min	90 min	105 min	120 min	135 min	150 min
White potato	100	90	81	70	61	52	43	35	28	24	22
Sweet potatoes	100	90	79	70	55	47	40	34	27	25	23

The graphical representation of the weight of dehydrated potatoes in the electric oven as measure of time is presented in Fig.1.

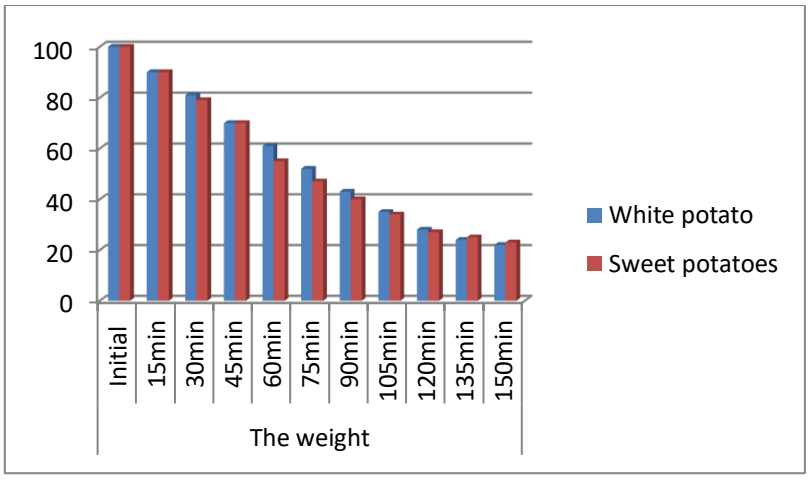

Figure 1 - Graphical representation of potato dehydration in the electric oven

As a result of the data derived from the study of dehydrating the potatoes in the electric oven, it is observed that their weight decreases progressively, depending on the drying time, which is 150 minutes. The initial weight of the two samples used: white potatoes and sweet potatoes was 100

g, and after 150 minutes the weight reached 22 g for white potatoes and 23 g for sweet potatoes.

During the dehydration of potatoes, the weight is variable: in the first half of the time, total lost water is of a greater quantity, so after 75 minutes of dehydration, the weight of white potatoes reaches from 52 g from 100 g, and that of sweet potatoes, 47 g.

The intensity of the dehydration process is reduced in the interval of 75-150 minutes, when the weight of the two samples used reaches 22 grams in the case of white potatoes, and 23 grams in the case of sweet potatoes respectively.

For the organoleptic properties, the dehydrated potatoes in the electric oven have the following characteristics:

- potato slices took the form of chips by losing water in the composition, uniform in size, yellowish, translucent, some with brown areas, browned, no foreign odor, strong consistency;
- slices of sweet potatoes are shaped like uneven chips in size, orange in color, with whiter areas, no foreign smell, characteristic taste and aroma, good texture, no browned portions.

3. Determining the weight of dried vegetables in the dehydrator as a measure of time

The data obtained for the determining the initial and final weight of the two varieties of potatoes used in the dehydrator as a measure of time are presented in Table 3.

Table 3

Weight of dried potatoes in the dehydrator

Potato Variety	Weight											
	Initial	15 min	30 min	45 min	60 min	75 min	90 min	105 min	120 min	135 min	150 min	165 min
White potato	100	89	80	72	64	55	50	40	35	29	24	21
Sweet potatoes	100	90	80	73	64	57	46	44	38	35	29	25

The graphical representation of the weight of dehydrated potatoes in the domestic dehydrator as a measure of time is presented in Fig.2.

In the case of the dehydration of potatoes in the dehydrator, the dehydration time was 15 minutes longer than in the electric oven, so that from the initial weight of 100g of the two samples used, after 165 minutes, the final weight reached was: 21 g for white potatoes and 25 g for sweet potatoes.

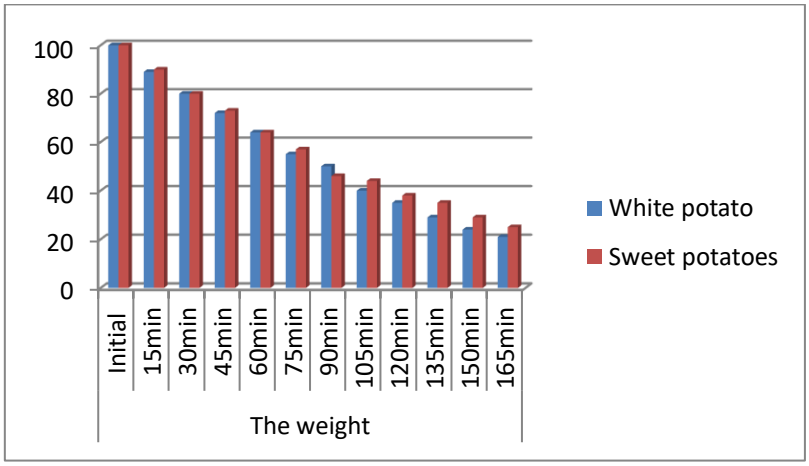

Figure 2 - Graphic representation of potato dehydration in the dehydrator

In the case of the dehydrator method ,there is a smaller decrease in the weight of the samples used in comparison with the electric oven, in the first part of the interval 0-75 minutes, when the weight reaches 55 g from 100 g for white potatoes and 57 g from 100 g for sweet potatoes.

During the interval of 75-165 minutes, the weight loss is moderate, so for white potatoes the weight reaches 21 g after 165 minutes, and for sweet potatoes, 25 g.

In terms of organoleptic properties, dehydrated potatoes in the dehydrator have the following characteristics:

- the potato slices are uniform in size and color, with a smooth surface, have a yellowish-whitish color, matte, no foreign smell, good texture, no brownish portions;
- the sweet potato slices are uneven in size, the surface is rough, orange - whitish, without foreign smell, characteristic taste and smell, similar to pumpkin, good texture, no brownish portions.

4. Determining the total weight loss and percentage weight loss

Based on the data obtained from weighing the samples, the total and percentage weight losses of potato mass and the amount of water evaporated in the dehydration process in the electric oven and dehydrator, are presented in Table 4.

Table 4

Total and percentage weight loss of potatoes

Potato Variety	Total weight loss in the electric oven		Total weight loss in the dehydrator	
	g	%	g	%
White potato	78	78	79	79
Sweet potatoes	77	77	75	75

The graphical representation of the total and percentage weight losses of the potato samples used is presented in Fig.3.

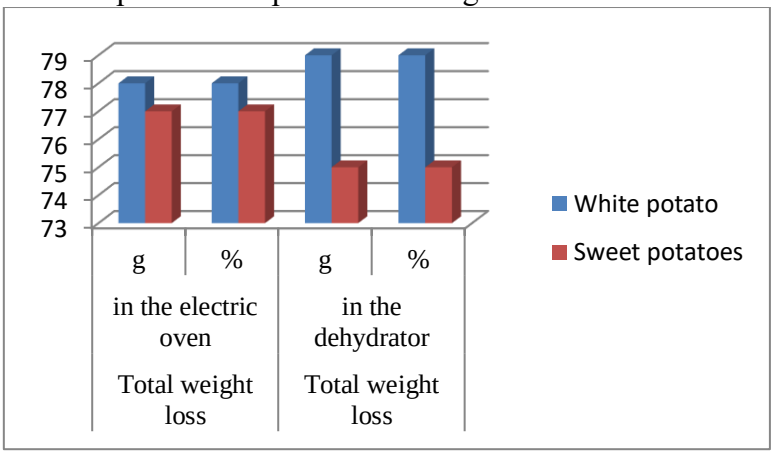

Figure 3 - Graphical representation of weight loss

The weight losses recorded during the process of dehydration in the electric oven are close for the two samples of potatoes used, compared to the dehydration in the dehydrator, where the differences are relatively larger.

The weight of the potatoes in the electric oven is quite uniform in the unit of time, the weight loss being 78% in the case of white potatoes and 77% in the case of sweet potatoes, compared to dehydration in the dehydrator, where the dehydration time is longer and the losses they are 79% in the case of white potatoes and 75% in the case of sweet potatoes.

CONCLUSIONS

Potatoes are a staple in food, in various forms, easily accessible and handy throughout the day.

Along with white or red potatoes, sweet potatoes are an alternative in the diet, due to the beta-carotene content it contains.

An advantage of foods preserved by dehydration is that they maintain their nutritional value, taste, smell, flavor, and their volume, while their weight decreases by up to 10 times, so they occupy a small storage space.

Another advantage of dehydrated products is easy handling, and storage costs are lower than the storage costs of fresh vegetables or even those preserved using other methods.

In the case of dehydration of potatoes in the dehydrator, the dehydration time was 15 minutes longer than in the electric oven, so that from the initial weight of 100g of the two samples used, after 165 minutes, it reached 21 g for white potatoes and 25 g for sweet potatoes, compared to the electric oven where from the initial weight of 100 g, it reached 22g for white potatoes and 23g for sweet potatoes.

The organoleptic characteristics of the two samples of dehydrated potatoes in the dehydrator are better than those dried in the electric oven, this being due to the ventilation of the air circulating over the products during dehydration.

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THE INFLUENCE OF CHEMICAL AND ORGANIC FERTILIZERS ON THE CONCENTRATION OF CADMIUM IN WHEAT AND MAIZE GRAINS

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Abstract

This paper presents research results on the effects of applying different doses of nitrogen, phosphorus and manure fertilizers on the concentration of cadmium in wheat and maize grains harvested from a long experiment established in 1980.

In the three years studied, it was observed that by the combined application of chemical fertilizers and manure, the increases in the concentration of cadmium in wheat and maize grains were between 0.003 and 0.011 mg / kg, respectively 0.003 and 0.009 mg / kg.

Research has shown that wheat seeds have a higher capacity to accumulate cadmium compared to corn grains.

Key words: cadmium, wheat, maize, seeds, chemical, organic, fertilizers.

INTRODUCTION

Vegetables, grains and meat are essential in human nutrition. They can be contaminated with different levels of heavy metals (Ross S.M., 1994).

The nutritional value of plants intended for human and animal consumption is obviously improved when mineral fertilizers are used rationally (Nicholas D.J., Egan A.R., 1975).

An important source of heavy metal pollution is agriculture through the inputs used (chemical fertilizers, organic fertilizers, pesticides, irrigation water). The systematic and prolonged application of phosphorus and zinc fertilizers leads to an increase in the accumulation of cadmium in soils and implicitly in plants (Adams M.L. et al., 2004).

Heavy metals are being given special attention around the world due to their toxic effect even at very low concentrations. A number of cases of disorders, diseases, malformations of the organs caused by the toxicity of heavy metals have been reported. Some heavy metals can be stored in soil, plants and animals, reaching the human body through the food chain.

There are data on the increase in the accumulation of arsenic, cadmium and uranium in the fields treated with phosphate fertilizers. The concentration of cadmium higher than 100 mg/kg in phosphate rocks

increases the contamination of the soil with cadmium. Uranium is another example of a contaminant often found in phosphorus fertilizers. Phosphate rocks contain different amounts of these elements and if no specific cleaning technologies are applied, after mining, the systematic application of phosphorus fertilizers leads to the accumulation of these elements in the soil, which can reach high levels for agricultural crops, human and animal health (Barisic D., et al. 1992).

According to A. Singh and M. Agrawal (2001), the application of manure can reduce by 32%, 47%, 42%, 21%, 24%, 47% and 38% the concentrations of Cd, Cu, Pb, Zn , Mn, Ni, and Cr respectively from soils fertilized for long periods with NPK chemical fertilizers (Vuşcan A., 2014, 2017, 2019, 2020).

MATERIAL AND METHOD

The wheat and maize were harvested in 2014 – 2016 period from the long term trials with chemical and organic fertilizers to the Agricultural Research and Development Station Oradea, Romania.

The crop rotation was: bean – winter wheat – sunflower – maize – winter wheat.

The elements of technologies utilized was respected the most recent recommendations in this area.

In experiment with phosphorus, nitrogen and farmyard manure fertilizers, the experimental factors were:

a. nitrogen and phosphorus rates: N_0P_0, $N_{50}P_0$, $N_{50}P_{50}$, $N_{100}P_{100}$.
b. farmyard manure rates: 0 t/ha, 20 t/ha, 40 t/ha, 60 t/ha.

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 cadmium 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 cadmium.

The links between different doses of chemical and organic fertilizers and cadmium concentration in wheat and maize grains 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 R^2.

RESULTS AND DISCUSSIONS

Average concentrations of cadmium in wheat grains in experiment with chemical fertilizers with nitrogen, phosphorus and farmyard manure were 0.056 mg/kg in control variant, 0.059 mg/kg (higher with 6.2% compared to the control) in variant $N_{50}P_0$ + 20 t/ha farmyard manure, 0.063 mg/kg (higher with 13.4% compared to the control) in the fertilized variant with $N_{50}P_{50}$ + 40 t/ha farmyard manure, the differences in the two variants are statistically insignificant, 0.067 mg/kg respectively (higher with 20.5% compared to the unfertilized variant) in variant $N_{100}P_{100}$ + 60 t/ha farmyard manure, the difference being statistically significant (Table 1).

Table 1

The influence of NP fertilizers and farmyard manure on cadmium concentration in winter wheat grains, average data

Variant	Cd concentration		Difference		Statistical significance
	mg/kg	%	mg/kg	%	
N_0P_0 + 0 t/ha FYM	0.056	100	-	-	Control
$N_{50}P_0$ + 20 t/ha FYM	0.059	106.2	0.003	6.2	-
$N_{50}P_{50}$ + 40 t/ha FYM	0.063	113.4	0.007	13.4	-
$N_{100}P_{100}$ + 60 t/ha FYM	0.067	120.5	0.011	20.5	*
		LSD 5%	0.009		
		LSD 1%	0.017		
		LSD 0.1%	0.029		

*FYM - farmyard manure

Regarding the mathematical modeling of the obtained data, it shows that the polynomial function, $y = 0.000x2 + 0.002x + 0.048$, $R^2 = 0.785$ best quantifies the connection between the doses of fertilizers with nitrogen, phosphorus and manure and the concentration of cadmium in wheat grains (Figure 1).

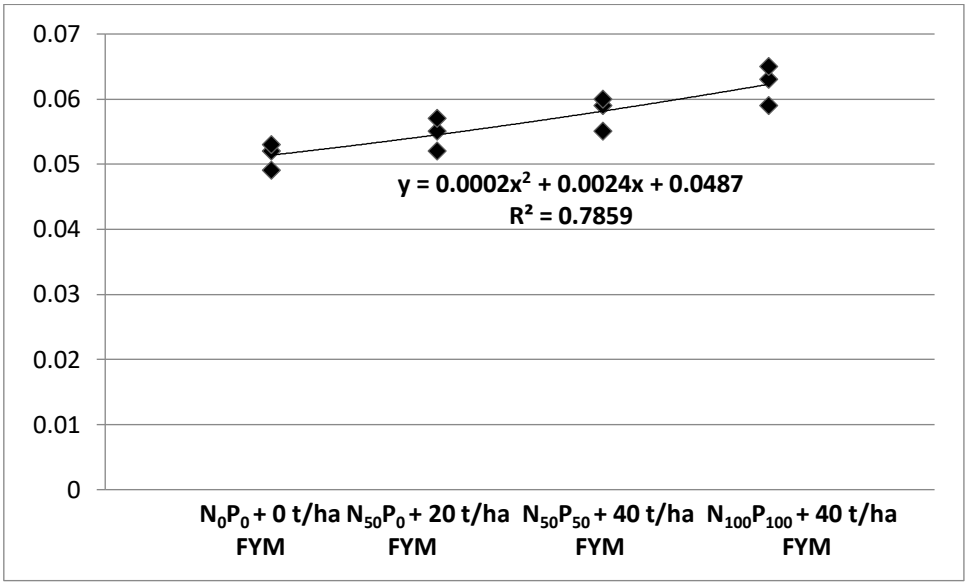

Fig. 1. Correlation between doses of NP fertilizers and farmyard manure and cadmium concentration in wheat grains

The average concentration of cadmium in maize grains in the three years studied, the experiments with chemical fertilizers with nitrogen, phosphorus and farmyard manure was 0.040 mg/kg in control variant, 0.043 mg/kg (higher than 8.4% compared to control one) in variant $N_{50}P_0$ + 20 t/ha farmyard manure, 0.046 mg/kg (16% higher compared to the control variant) in the variant fertilized with $N_{50}P_{50}$ + 40 t/ha farmyard manure, statistically insignificant differences, respectively 0.049 mg/kg (23.3% higher compared to unfertilized variant) in variant $N_{100}P_{100}$ + 60 t/ha farmyard manure, the difference being statistically significant (Table 2).

Table 2

The influence of NP fertilizers and farmyard manure on cadmium concentration in maize grains, average data

Variant	Cd concentration		Difference		Statistical significance
	mg/kg	%	mg/kg	%	
N_0P_0 + 0 t/ha FYM	0.040	100	-	-	Control
$N_{50}P_0$ + 20 t/ha FYM	0.043	108.4	0.003	8,4	-
$N_{50}P_{50}$ + 40 t/ha FYM	0.046	116.0	0.006	16,0	-
$N_{100}P_{100}$ + 60 t/ha FYM	0.049	123.3	0.009	23,3	*
		LSD 5%	0.009		
		LSD 1%	0.016		
		LSD 0.1%	0.025		

Mathematical modeling of the results of the cadmium concentration in maize grains from the NP and manure experiments studied shows that the exponential function best quantifies the relationship between nitrogen, phosphorus and manure fertilizer doses and the concentration of cadmium from maize grains (Figure 2).

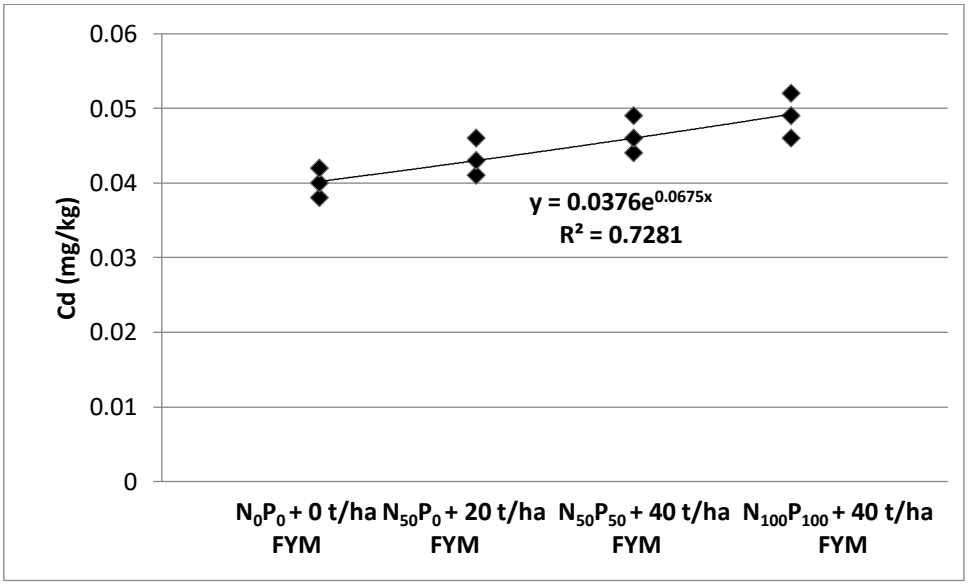

Fig. 2. Correlation between doses of NP fertilizers and manure and cadmium concentration in maize grains

CONCLUSIONS

In all chemical fertilized variants, cadmium concentration from winter wheat and maize grains is far below the permissible limits.

The farmyard manure doses applied led to increases in wheat grains from 0.056 mg/kg in control variant to 0.067 mg/kg in variant $N_{100}P_{100}$ + 60 t/ha farmyard manure, the difference being statistically insured, respectively in maize grains, the difference recorded was 23.3% higher (0.049 mg/kg).

By applying manure combined with nitrogen and phosphorus fertilizers, the accumulation of cadmium in wheat and corn seeds is reduced.

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THE IMPORTANCE OF ULTRASOUND EXAMINATION IN ESTABLISHING THE DIAGNOSIS OF PREGNANCY AT MARES - review -

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Abstract

This paper is a bibliographic study on the usefulness of the diagnosis of pregnancy in mares at an early stage through ultrasonography. Perpetually improved diagnostic methods lead to a better understanding of the process of reproduction of horses, so that the resulting products follow the purpose for which financial and human resources were used, namely, obstacle jumping competitions, training, aerobatics, carts, trekking, endurance, horseback riding (in a more widely accepted sense) or improvement, and the whole process of gestation to parturition can be followed by minimally invasive methods on mares.

Key words: equine reproduction, diagnosis of pregnancy, ultrasound.

INTRODUCTION

Few people have predicted the impact that ultrasonography has had on the equine breeding industry. The ability to examine non-invasively the mare's genital tract using ultrasonography-based technology provides the ability to diagnose gestation earlier than by the method of transrectal examination to effectively manage twin gestation and to detect early embryonic death (EED) imminent. However, ultrasonography should not be limited to these areas. Ultrasonography can be used to diagnose the pathology of the uterus, such as the presence of intrauterine fluid, air, residues of organic substances and cysts. In addition, ultrasound examination of the ovaries can help determine the stage of the estrogen cycle, the status of preovulatory follicles, the development and morphological evaluation of the luteal body (CL), but also to interpret the malfunction of the ovaries.

Ultrasonography, synonymous with the ultrasound or sonography, is an imagistic method that helps to visualize different organs of the body. It has many advantages, namely, it is not harmful, it is fast, simple, safe and easy to perform. It is informative, non-invasive, painless, has no side effects, as it uses ultrasound.

The modern ultrasound technology used to examine the genital tract of mares is the B-mode, which scans in real time. B-mode refers to brightness, in which

the ultrasound image is a two-dimensional display of dots. The brightness of the dots is directly proportional to the amplitude of the returning echoes. When repeated signals are transmitted, received and processed, a continuous visual image of the tissues is produced, which allows the observation of the structure and movement in real time (B-mode, real time).

The procedure and precautions taken for intrarectal ultrasound examinations are similar to those for rectal palpation. The transducer should be covered by the examiner's hand to prevent trauma of the rectal wall. At the same time, it must be well lubricated. It must be handled with care to avoid attaching feces to the transducer. After evacuating the fecal material from the rectum, the probe is inserted and moved on the genital tract as follows: uterine body, right uterine horn, right ovary, right uterine horn, uterine body, left uterine horn, left ovary, left uterine horn, uterine body, then cervix uterine or cervix. There must be good contact between the probe and the rectal wall. Rectal air, fluid or gas in the intestines will result in a distorted image. To minimize scanning errors, mainly omissions, practitioners recommend performing the same scanning procedure during each examination.

The two types of ultrasonographic transducers used to examine gestation in mares are linear and sectoral. A linear transducer is oriented longitudinally relative to the mare's body. Therefore, the images of the cervix and uterine body are oriented longitudinally, and those of the uterine horn are transverse. The images of the tissues closest to the probe are at the top of the screen. Sector scanners produce a triangular beam so that the sound beam generally moves transversely to the mare's body and therefore the images of the cervix and uterine body are transverse, while the images of the horns are longitudinal or oblique.

At the breeding process of mares, one of the risks that may occur is multiple gestation. Statistics indicate that only about 60% of mares with twin embryos give birth to a single alive product, 31% lose both fetuses and only 9% of mares diagnosed with multiple gestations manage to give birth in time. Literature notes that of this last category, more than half (64.5%) give birth to dead foals. Another 21 percent complete the pregnancy, but only one of the fetuses is born alive. The success rate in twin pregnancy (both fetuses are born alive) shows an unsatisfactory percentage of 14.5%. After endometritis, twin pregnancy is the second leading cause of abortions in mares. Specimens diagnosed with multiple gestations should be assisted in calving, and often the surviving foal is usually weaker, susceptible to infection, and develops more slowly. When both fetuses are born alive, most often, one is less developed and has an increased mortality rate. Most of the time, the foal dies in 3 to 4 days. Aborted mares have an increased incidence of fetal membrane retention, do not enter the estrus, and the attempts of insemination during the

same or later breeding season are doomed to failure, and this translates into low reproductive efficiency.

The method in removing one of the blisters, causing an abortion with prostaglandins or saline are some of the methods in managing twin pregnancies. Gemini in most species can occur through one of two mechanisms: a) the division of a fertilized egg or b) multiple ovulations that result in multiple eggs. The possibility of twins occurring from the release of a single fertilized egg can be eliminated in mares, because in this species, the twins are almost always dizygotic, i.e. derived from different eggs. It has been found that the mare develops a natural biological mechanism for the elimination of twins.

In a study carried out for 2 years, on a total number of 496 mares, without lactation, the fertilization rate, twin pregnancies, etc. were followed. The mares were examined on days 15, 20, 25, 30, 35, 40 and 50 after ovulation with an ultrasound device, which operated in real time at a frequency of 3 MHz. The mares belonged to the light breeds, mostly Quarter Horse. 307 of the specimens received the diagnosis of gestation, and in 15 of them, the imagistic indicated the twin gestation. One of the mares treated with prostaglandin was removed from the study. The other 14 mares diagnosed with twin gestation did not receive treatment before the 50th day of gestation. 12 of the mares (i.e. a percentage of 85.7%) eliminated one of the fetuses before the 50th day. One of the mares lost both embryos between days 15 and 20. It was found that the non-intervention led to the following result: 85.7% naturally eliminated one of the fetuses before the 50th day of gestation. This natural biological mechanism of embryo reduction appears to be just as effective and, in some cases, more effective than the treatments suggested for removing one of the fetuses. Most embryonic reductions occurred between 25-30 and 30-35 days of gestation (four in each time period). In the gestation intervals between days 15 - 20, 20 - 25, 35 - 40 or 40 - 50 there was an embryonic reduction. Unfortunately, the number of mares under study was too small to provide conclusive data in twin pregnancy statistics. In most cases, pregnancy loss can be predicted by measuring the size of the vesicle and / or embryo over time. In general, it was found that one embryo continued to grow, while the other bladder and / or embryo did not increase or decrease in size between measurement periods. The exact mechanism of elimination of one of the embryonic vesicles has not been fully elucidated, but it seems that success lies in the way the twin vesicles attach to the uterus.

Manual removal of a twin vesicle during 12 to 30 months of pregnancy led to an extremely high rate (96%) of single embryonic reduction. The frequency of the ultrasound examination is therefore necessary to identify a good separation of the vesicles. The less developed bladder should be led and removed at the tip of one of the uterine horns. After day 16, embryo

removal is more difficult. During the breeding seasons of 1987 and 1988, the elimination was successful with the help of the transducer. The ability to carefully separate embryos and lead them to the end of a uterine horn is facilitated by ultrasonographic monitoring. The uterine horn is pressed towards the side edge of the pelvis, and the pressure increases by driving the transducer down to the bladder until it is destroyed. Another method accepted by practitioners for the elimination of twin pregnancy is ultrasound monitoring and non-intervention until the 30th day of pregnancy. If the mare's biological mechanism has not eliminated one of the fetuses by that time, doctors and veterinary technicians believe that prostaglandin intervention will eliminate unwanted pregnancy. If the reintroduction of the mare is not chosen or the specialist does not consider it appropriate, the induction of abortion can be postponed until the pregnancy reaches the interval of 70-80 days, so it must be done within 40 days.

To evaluate the effectiveness of the ultrasound examination in detecting gestation at mares, practitioners in the United States made 18 studies. The subjects were 496 mares that did not show lactation. All were examined on days 15, 20, 25, 30, 35, 40 and 50 post-ovulation, unless they were not pregnant at subsequent examinations and / or returned to the estrus phase before the next examination. By the method of transrectal examination (ETR), veterinary technicians performed 1 of 3 determinations: open, pregnant or too early for diagnosis. The transducer (3 MHz) was then used and inserted into the genital tract. If a bladder was located, the image was frozen, and electronic stirrups were used on the screen to determine the largest diameter of the bladder and embryo. The diagnosis of non-gestation was made when the technicians could not locate a blister. False negative diagnoses were also recorded, when at a single scan, the mare received an unfavorable diagnosis, but a subsequent examination established a gestational diagnosis. Mares that have been misdiagnosed as pregnant due to confusion between an embryo and a uterine cyst, follicle or other circular structure have been recorded and classified as false positives. A group of 20 unmounted mares was included for examination, without the veterinary technician knowing the condition of the animals. Two technicians with experience in both transrectal examination and ultrasound diagnosis were used. Subsequently, during the studies, two other technicians, experts in establishing the diagnosis by the method of rectal palpation, collected information from the target group. The results show that, in all stages of gestation (15 to 50 days), the ultrasound method indicated accuracy in detecting gestation from 97.4 to 100%. On the other hand, the rectal palpation method indicated accuracy in only 30% of cases (for a 15-day gestation). On day 20, the accuracy of the ultrasound examination and rectal palpation for gestation was similar (99.3% and 95%, respectively). Consequently, for the correct diagnosis it was found that

knowledge of ultrasound technology and ETR skills were required. The accuracy of 15-day gestation detection reported in this study using a 3.0 MHz real-time scanner was extremely high.

To determine whether the frequent manipulation of the transducer at the mare's rectum or sound waves at 3 MHz were harmful to the fetus, a study was performed on 90 subjects. The mares were assigned to one of the following three groups in which one of the three methods was used: a) ETR; b) ETR and ultrasound scanning, in off mode; c) ETR and ultrasound scanning, in on mode. All inseminated mares were examined on days 15, 20, 25, 30, 35, 40 and 50 post-ovulation, unless they returned to the estrus phase or received a negative diagnosis after three consecutive examinations. Manipulation with the transducer or waves produced by the equipment did not change the gestation rate compared to mares for which only the ETR method was used. None of the subjects suffered side effects from the application of the ultrasound method.

CONCLUSIONS

Ultrasound transrectal examination is a useful procedure at mares in reproductive management and gestation detection. Ultrasound transrectal examinations of the genital tract are usually performed throughout the estrous cycle and during the first 60 days of gestation. Testing at late pregnancies is done in special circumstances.

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EVOLUTION OF EGG PRODUCTION AND LAYING EGG INTENSITY IN PIGEON POPULATION - THE KING BREED IN BIHOR COUNTY

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Abstract

The research includes the partial results, regarding the numerical egg production and the laying intensity of some birds of the order Columbiformes, genus Columba, species Columba livia domesticus, from the territory of Bihor county. The study was carried out in five private farms in Oradea and in Bihor County, analyzing 100 specimens from the pigeon population, respectively 50 males and 50 females. The following parameters were studied numerical egg production and egg laying curve.

Key words: eggs yield, laying intensity, King pigeons, fertility

INTRODUCTION

Fanciers in Bihor county have in their households more or less rich effectives of specialized breeds for flight and play but also in ornament. In the study, the King breed was chosen because it is quite poorly represented in the North West of the country. There are 16 known varieties of color, of which the most common in our country are blue, gray, brown and white. Most of the producers in the studied farms presented the gray and white varieties.

MATERIALS AND METHODS

Is well known the seasonal character of egg production in the species Columba livia, the pairs laying eggs from spring to latest August, in 5-6 laying series, interrupted by hatching periods and the growth of freshly hatched chicks.

The data collected were obtained from private breeders, namely: in hatchery C1, 20 heads (10 males and 10 females), hatchery C2, 26 heads (13 males and 13 females), hatchery C3,18 heads (9 males and 9 females), hatchery C4, 24 heads (12 males and 12 females) and the C5 hatchery, 12 heads (6 males and 6 females). Birds of both sexes, of different ages, were used as biological material (hatching, in the juvenile period, when reaching sexual maturity, in the active period of reproduction).

The following work equipment and materials were used: digital technical and analytical balances, calipers, Petri dishes and flat glass plates,

small capacity incubators (50-200 eggs / series), portable ovoscope, camera, computer equipped with software table calculation, depending on the experimental method approached.

The obtained results were compared with the reference values from the literature (Sauveur B., 1988; Usturoi M.G., 1999; Vacaru-Opriş I. et al., 2002).

The experimentally obtained data were centralized and statistically processed.

RESULTS AND DISCUSSION

Although incubation was performed naturally, some statistical calculations common to the embryonic development process were performed, which included the number of hatched chicks and the hatching percentage (Table 1).

The eggs from which no chicks hatched were analyzed and those found unfertilized (clear) were used to calculate the percentage of fertility in the studied populations.

Table 1

Incubation process analysis in the King pigeons breed

Laying eggs period	Analized population	Eggs introduced (buc.)	Hatched squabs (cap.)	Hatching (%)	Fertility (%)
Layings 1-2	C1	20	13	63,7	85,3
	C2	20	12	58,8	80,4
	C3	14	9	66,2	85,3
	C4	19	12	64,2	84,7
	C5	9	5	58,8	80,2
	Total of hatcheries	82	51	62,5	83,2
Laying 3	C1	15	10	65,4	86,9
	C2	19	12	64,2	84,0
	C3	13	8	62,7	84,3
	C4	16	10	61,9	82,8
	C5	7	4	57,1	80,6
	Total of hatcheries	70	44	62,9	83,6
Laying 4	C1	13	8	62,7	84,3
	C2	17	11	64,7	82,4
	C3	12	8	67,2	91,6
	C4	14	9	64,3	86,2
	C5	6	4	66,7	88,4
	Total of hatcheries	62	40	64,9	86,6
Laying 5	C1	9	6	70,6	76,5
	C2	12	7	58,8	83,2
	C3	9	6	70,6	88,2
	C4	10	6	60,0	84,4
	C5	4	2	50,0	74,6
	Total of hatcheries	43	27	62,9	81,4
Total:		256	162	63,3	83,7

The best fertility was obtained in eggs from the C3 population and, throughout the breeding season, however, existing variations between successive layings. On average, on the 5 studied populations, were registered fertility values in the range of 81.4-86.6% (fig.1).

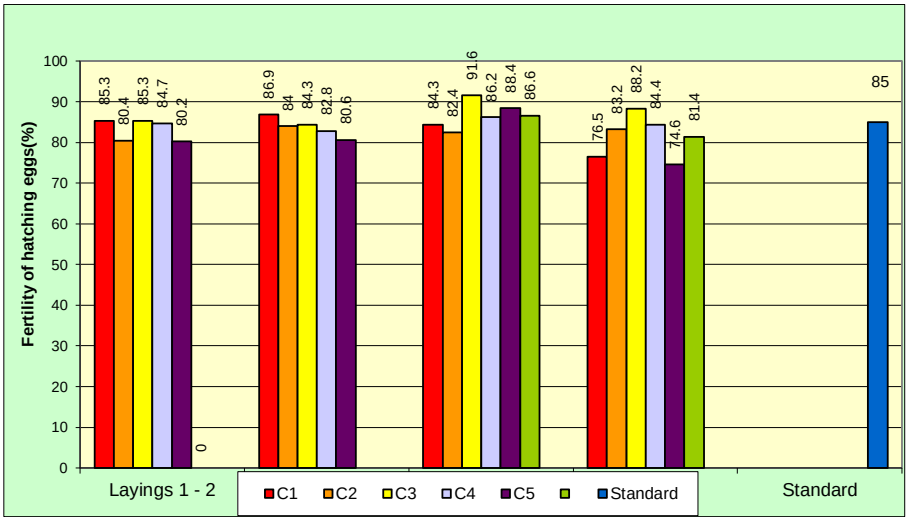

Fig.1. Fertility of the incubation eggs issued from King pigeons populations

The hatching percentage also presented acceptable values, but located in a larger range of variation, compared to the moment of appreciation of this character (50.0% -70.6) (fig.2)

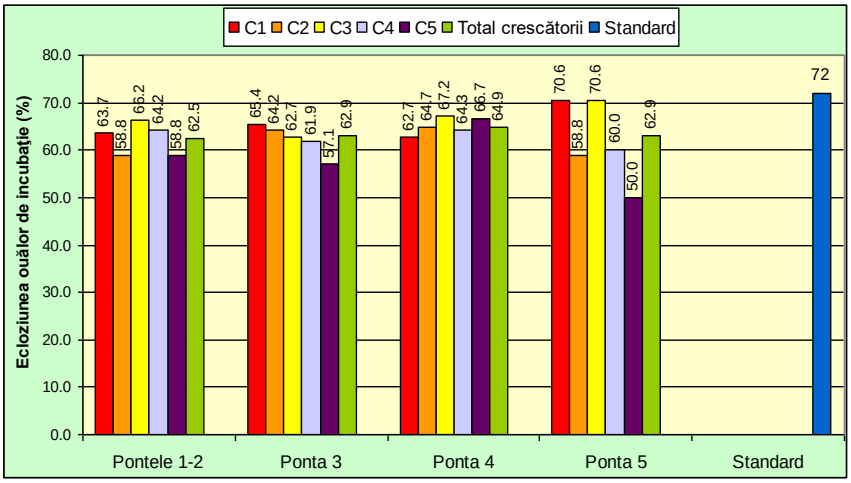

Fig.2. Hatching proportion of the incubation eggs issued from King pigeons populations

CONCLUSIONS

The specimens of King pigeons, existing in private farms in Bihor County of both sexes achieved average performances below the theoretical potential of the population of origin.

Due to the seasonal specificity of reproduction in pigeons, the average number of eggs obtained / adult pigeon was 6.5, between March and July.

Since the incubation was performed by natural hatching, the only parameters appreciated were fertility and hatching, namely fertility: between 81.4% and 86.6%, and hatching being between 62.5% and 64.9% (Dodu M.2010).

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PLUMAGE PIGMENT ABERRATIONS OF BIRDS IN ROMANIA

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Abstract

In this paper are presented types of aberrations in the colour of plumage, observed by authors in different species of birds in Romania in the period 2000 – 2021. These chromatic aberrations of the plumage were observed in 27 species: albinism, leucism, melanism, dilution. The causes of plumage aberrations are differently

Key words: plumage pigment aberrations, birds, Romania

INTRODUCTION

Data on the colour aberrations of bird feathers in Romania have appeared sporadically in various publications or books (Dombrowsky, 1946; Linția, 1954 – 1955; Ilie 2013, 2014a,b,c, 2015, 2016a,b,2017a,b,c, 2019, Ilie L.C. & Ilie A.L., 2018, Ilie & Marinescu, 2019, 2020).

Two pigments determine the coloration of the birds' feathers: carotenoids and melanins (Fox and Vevers, 1960). The causes of plumage aberrations are differently: genetic mutations, diet, age, disease, parasites and injury (Guay et al., 2012).

MATERIAL AND METHOD

Plumage pigment aberrations of birds were observed sporadically during excursions or wildlife trips in different areas of Romania in the period 2000 – 2021: Anieș – Maieru area , Bistrița – Năsăud county (the northern part of Romania); Craiova - Dolj county (the south – western part of Romania); Tinca, Cheșa, Cociuba Mare, Oradea, Girișu – Negru, Husasău de Tinca, Belfir, Gurbediu, Râpa - Bihor county (the north – western part of Romania); Lugoj, Timișoara – Timiș county (the western part of Romania); Coșești, Pitești – Argeș county (the central part of Romania). Both binoculars (20 x 50, 7 x 35) and direct observations were used. For the determination of bird species the guide S.O.R. was used.

RESULTS AND DISCUSSION

In the period 2000 – 2021, there were observed the following plumage pigment aberrations of birds:

Albinism is characterized by the complete lack of melanin pigment in the skin and plumage (Guay et al., 2012). It is caused by a genetic mutation due to the absence of the enzyme tyrosinase (Fox and Vevers, 1960).

– *Athene noctua* (Scopoli, 1769) – one completely albino specimen, Cheșa (BH), 8.2.2021; one 100 % albino specimen, Belfir (BH), 17.11.2019; one completely albino specimen, Cociuba Mare (BH), 16.11.2019. Sedentary species in Romania.

– *Troglodytes troglodytes* (Linnaeus, 1758) – one 100 % albino specimen, Cociuba Mare (BH), 2.6.2021. Summer visitor, rarely in winter in Romania.

– *Upupa epops* (Linnaeus, 1758) – one completely albino specimen, Cheșa (BH), 20.5.2021. Summer visitor in Romania.

– *Anas platyrhynchos* (Linnaeus, 1758) – one albino specimen, Oradea, the Crișul Repede river (BH), 18.8.2021. Sedentary species in Romania.

– *Phasianus colchicus* (Linnaeus, 1758) – one completely albino male specimen, with red eyes, the edge of the Tinca forest (BH), 3.11.2014; one male albino specimen, Tinca (BH), 13.12.2015. Sedentary species in Romania.

– *Perdix perdix* (Linnaeus, 1758) – one albino specimen, Râpa (BH), 1.10.2018; one completely albino specimen, Girișu – Negru (BH), 3.9.2012. Sedentary species in Romania.

Leucism occurs due to the total absence of melanin in some parts of the plumage (Guay et al., 2012). The degree of leucism is variable in the plumage and can occupy smaller or larger surfaces. The causes of leucism are diverse, often unknown: genetics, radioactivity, domestication selection, age, diet (Guay et al., 2012).

- *Corvus frugilegus* (Linnaeus, 1758) – one specimen with white spots on neck, undertail – coverts secondaries and rectrices, Oradea (BH), 18.9.2021; one specimen with white wings, Belfir (BH), 16.9.2015. Sedentary species in Romania.

– *Passer domesticus* (Linnaeus, 1758) – one female specimen with unilateral white spot on the undertail – coverts secondaries, Craiova (DJ), 3.9.2000; one female specimen with unilateral leucism: lesser coverts and secondaries entirely white but only at one wing. The other wing presented the normal colouring of the species, Tinca (BH), 7.3.2015; one female specimen with bilateral white tail and uppertail – coverts, Tinca (BH), 3.5.2015; one female specimen with unilateral white uppertail – coverts and secondaries, Tinca (BH), 4.2.2015; one male specimen having white primaries, Tinca (BH), 22.2.2013; one male specimen with the white crown and many white spots on

the body, Anieș – Maieru area (BN), September 27, 2010. Sedentary species in Romania.
– *Dendrocopos major* (Linnaeus, 1758) – one male specimen with white lesser, median and greater coverts, Tinca (BH), 1.2.2011; one specimen with the head almost white, Tinca (BH), 24.4.2013; one specimen with many white spots on the entirely body, Tinca (BH), 3.5.2013. Sedentary species in Romania.
– *Dendrocopos syriacus* (Hemprich & Ehrenberg, 1833) – one female specimen which had on each wing a large white spot that widens event o the shoulders of the wings, Tinca (BH), 2.9.2012. Sedentary species in Romania.
– *Pica pica* (Linnaeus, 1758) – one specimen having the tip of the wings white, Tinca (BH), 6.8.2017; one specimen with completely white dorsum, on wings there were observed oval white spots, abdomen to neck completely white, Tinca (BH), 16.12.2016; one specimen with white wings, the abdomen is partially black, Tinca (BH), 31.1.2017; one specimen with white wings, Tinca(BH), 9.2.2017; one specimen with white head, neck, primaries and secondaries, Tinca (BH), 28.3.2016; one specimen with white primaries, Tinca (BH). 2.6.2016. Sedentary species in Romania.
- *Buteo buteo* (Linnaeus, 1758) – one specimen with white tail, Husasău de Tinca (BH), 5.11.2015; one specimen almost white, with few black spots on the body, Anieș – Maieru area (BN), October 3, 2010. Partial migratory species in Romania. –
Perdix perdix (Linnaeus, 1758) – one specimen with many white spots on the body, Gurbediu (BH), 15.1.2017. Sedentary species in Romania.
– *Parus major* (Linnaeus, 1758) – one specimen with entirely white abdomen, having the characteristic black central stripe, Tinca (BH), 20.2.2015; one specimen having the terminal quarter of the ventral part white and not yellow as in the classic, Tinca (BH), 17.5.2013. Sedentary species in Romania.
– *Phasianus colchicus* (Linnaeus, 1758) – one male specimen with the white body, the wings with many white spots, Gurbediu (BH), 23.11.2015. Sedentary species in Romania.
– *Turdus merula* (Linnaeus, 1758) - one male specimen with many white spots on the body, the head was almost white, Anieș – Maieru (BN), September 12, 2005. Sedentary species in Romania.
– *Corvus monedula* (Linnaeus, 1758) - one specimens with many white spots on the body, Pitești (AG), November 2018. Sedentary species in Romania.
– *Turdus pilaris* (Linnaeus, 1758) – one specimen with many white spots on the body, Coșești (AG), February 3, 2019. Summer visitor or winter visitor in Romania.

Melanism is due to an abnormal amount of melanin deposited in feathers or melanin replaces carotenoids in part or all of the plumage (van

Grouw, 2006; Guay et al., 2012). The formation of melanin is a genetic process which includes the oxidation of tyrosine catalysed by tyrosinase (van Grouw, 2006; Carpenter – King et al., 2017).
– Aythya fuligula (Linnaeus, 1758) – one entirely black male specimen, Tinca (BH), the Crișul Negru river, 13.10.2015. Winter or summer visitor in Romania.
– *Buteo buteo* (Linnaeus, 1758) – one entirely blackish male specimen, Cociuba Mare (BH), 6.1.2021; one blackish female specimen, Cheșa (BH), 22.9.2021; one blackish specimen, the Miersig forest (BH), 28.2.2019; one black specimen having even the black legs and not yellow legs like the specific specimens, Cheșa (BH), 17.2.2019; one brownish – black specimens, on Oradea (BH) – Lugoj (TM) – Timișoara (TM) route, 24.12.2018. Partial migratory species in Romania.
– *Parus major* (Linnaeus, 1758) – one partially melanic specimen in which the black spot in the midlle of the abdomen was greatly extended so that the abdomen was almost entirely black, only the narrow sides were yellow, Tinca (BH), 8.1.2015; one specimen who presented one black spot localized only around of the anal orifice, Tinca (BH), 11.12.2016. Sedentary species in Romania.
– *Ciconia nigra* (Linnaeus, 1758) – one completely black specimen, Tinca (BH), 1.4.2015. Summer visitor in Romania.
– *Anser erythropus* (Linnaeus, 1758) – two specimens who presented melanism: the forehead was black, the undertail – coverts were black, Râpa (BH), the Crișul Negru river, 11.2.2015. Winter visitor or passage species in Romania.
– *Oenanthe pleschanka* (Lepechin, 1779) – one male specimen with the head completely black and the abdomen almost black , Husasău de Tinca (BH), April 30 , 2018. Summer visitor in Romania.

Dilution consists in the deposition of the amount of pigment in a very small proportion, resulting in discoloration of the plumage (Guay et al., 2012). Causes: genetic mutation or probably diet or disease.
– *Buteo buteo* (Linnaeus, 1758) – one specimen with pale colour of the plumage, Tinca (BH), 10.6.2021. Partial migratory species in Romania.
– *Phoenicurus ochruros* (Gmelin, 1774) – one female specimen with very pale colour of the plumage, beige – whitish, Anieș – Maieru (BN), October 4, 2010. Summer visitor, rarely in winter in Romania.

Xanthocroism consists in replacing a pigment with the yellow or red pigment. Causes: genetic mutation, diet.
– *Dryocopus martius* (Linnaeus, 1758) – one specimen with yellow skullcap, 3.3.2001; one specimen with orange skullcap, 2.2.2005 and 4.4.2010; two specimens with yellow – orange skullcap, 11.12006; one specimen with white

– yellowish skullcap, 27.1.2008, 10.4.2008 and 12.10.2013. All these observations were made in the Anieș – Maieru area (BN); one specimen with the yellow – orange skullcap, Tinca (BH), 16.10.2013. Sedentary species in Romania.
– *Parus palustris* (Linnaeus, 1758) - one specimen which had a yellow abdomen, down to the chin, otherwise the plumage had the classic colour, Tinca (BH), 9.2.2015. Sedentary species in Romania.
– *Parus major* (Linnaeus, 1758) – one specimen with entirely yellow abdomen (without the caracteristic black spot, being no juvenile specimen), the edge of the Tinca forest (BH), 12.10.2019.
– *Accipiter nisus* (Linnaeus, 1758) – one female specimen with red – brick legs and eyes of the same color, Tinca (BH), Januery 31, 2019. Sedentary species in Romania.

Other chromatic aberrations

-*Streptopelia decaocto* (Frivaldszky, 1838) – one specimen having a reddish – brown plumage. Generally, this species has a gray plumage. Sedentary species in Romania.
– *Corvus monedula* (Linnaeus, 1758) – one specimen with a brown spot on the neck, Râpa (BH), 31.10.2019. Generally, the plumage is 100 % black or mixed with gray. Sedentary species in Romania.
– *Motacilla alba* (Linnaeus, 1758) – one specimen which had a gray – brown tail with white sides and not black with white sides as in the classic specimens, Tinca (BH), 17.4.2015. Summer visitor in Romania.
- *Carduelis carduelis* (Linnaeus, 1758) - one specimen with a pinkish – white beak and the tip of the beak had a black stripe both above and below, Tinca (BH), 24.4.2018. Sedentary species in Romania.

CONCLUSIONS

In the period 2000 – 2021, feather aberrations were observed in 27 species of birds from different areas of Romania: albinism, leucism, xanthocroism, melanism, dilution. Among the causes of these chromatic aberrations can be mentioned: genetic mutations, diet, age, disease, parasites and injury.

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BETA-CASEIN GENETIC VARIANTS AND PROTEIN PROFILE IN DAIRY CATTLE

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Abstract

Milk and dairy products are highly recommended in humans as health-promoting foods, based on the well-known benefic effects. Beta-casein is one of the milk proteins, encoded by the CSN2 gene showing controversy related to its genetic variants impact on human health. Even if A1 and A2 milk is still debating, A1 allele shows a proved negative association with various human diseases, opposite to A2 allele. For such considerations beta-casein SNPs should be considered in planning of dairy cattle breeding programmes accordingly. This paper aims to overview the interference of beta-caseins from cow`s milk in terms of genetics advances up to the present, related to the actual recommended dairy cattle breeding strategies and to human health impact.

Key words: milk protein, beta-casein, genetic variants, dairy cattle, milk quality, human health.

INTRODUCTION

The growing trend of globalization side effects result in directing major concerns for reducing mortality and improving global life expectancy. On this line, milk and dairy products are highly recommended in dietary guidelines as health-promoting foods (Oberritter et al., 2013).

Even if milk and milk products intake is known be inverse associated with some diseases development, including cancer, milk proteins quality based on their encoding genetic variants is still under debate related various diseases occurrence and progression (Ali et al., 2019; Bermejo et al., 2019). Moreover, milk proteins genetic variants vary along cattle breed, including beta-caseins (Park et al., 2021).

The present paper aims to overview the interference of beta-caseins from cow`s milk in terms of genetics advances up to the present, related to the actual recommended dairy cattle breeding strategies and to human health impact.

BETA-CASEIN GENETICS

Beta-casein, also known as β-casein or CSN2 is one of the 4 caseins found in milk next to: alpha s1 (CSN1S1), alpha s2 (CSN1S2), kappa (CSN3), and gamma, known for influencing milk protein content and milk

composition (Threadgill and Womack, 1990), being located on chromosome 6 in cattle.

From all caseins, beta-casein is encoded by the CSN2 gene and represents 36% of milk total protein content, data related CSN2 gene positional info in *Bos taurus* being detailed in figure 1 and the encoded amino acid sequence in figure 2.

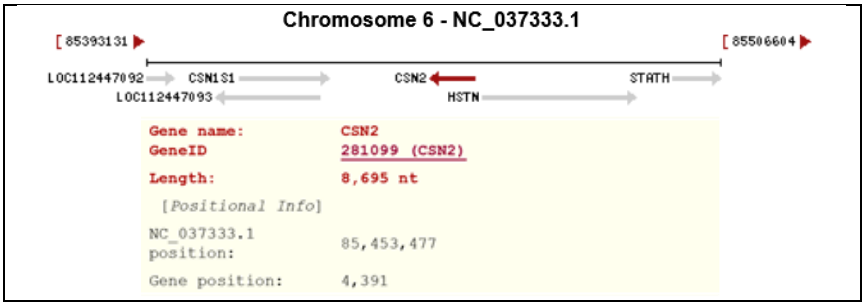

Fig. 1 CSN2 positional info in *Bos taurus* (selected data retrieved from NCBI Gene)

```
>sp|P02666|CASB_BOVIN Beta-casein OS=Bos taurus OX=9913 GN=CSN2 PE=1 224aa
linear   02-JUN-2021

MKVLILACLVALALARELEELNVPGEIVESLSSSEESITRINKKIEKFQSEEQQQTEDELQDKIHPFAQTQSLVYP
FPGPIPNSLPQNIPPLTQTPVVVPPFLQPEVMGVSKVKEA
MAPKHKEMPFPKYPVEPFTESQSLTLTDVENLHLPLPLLQSWMHQPHQPLPPTVMFPPQSVLSLSQSKVLPVPQKA
VPYPQRDMPIQAFLLYQEPVLGPVRGPFPIIV
```

Fig. 2 Protein sequence of CSN2 in *Bos taurus* (selected data retrieved from NCBI Protein)

All caseins are located in the casein gene cluster known as BTA6 (BTA position 6:87181619) in a certain order, spanning cca 250 kb and showing the highest SNP density in the upstream, intron and exon regions, missense and synonymous mutations being also referred (table 1) (Boettcher et al., 2004; Meier et al., 2019).

Table 1

CSN2 SNP density/10kb (data adapted from Meier et al., 2019)

Gene	Upstream	Intron	Exon	Missense	Synonymous
CSN2	10.0	15.6	8.7	6.1	2.6

CSN2 gene shows many different genetic variants identified in dairy cattle: A1, A2, A3, B, C, D, E, F, G, H1, H2, I, J, K, L, of which the most common are A1 and A2, B variant is less common, and A3 and C variant are rare (table 2) (Kamiński et al., 2007; Gallinat et al., 2013; Meier et al., 2019). The A2 variant is considered the oldest variant, from which the other variants originated via mutation processes (Farrel et al., 2004).

Table 2

Polymorphic profile of β-caseins (data adapted from Kamiński et al., 2007 and Meier et al., 2019)

β-casein genetic variants	**Polymorphic sites in amino acid sequence**													
	18	25	35	36	37	**67**	72	88	93	106	117	122	137	138
A2*	Ser-P	Arg	Ser-P	Glu	Glu	Pro	Glu	Leu	Gln	His	Gln	Ser	Leu	Pro
A1*						His								
A3*										Gln				
A4						change not yet recognized								
B*						His						Arg		
C*			Ser		Lys	His								
D	Lys													
E*				Lys										
F						His								Leu
G						His						Leu		
H1		Cys						Ile						
H2							Glu		Leu					Glu
I*									Leu					

** detected in European cattle breeds*

CSN2 gene has a common SNP in exon 7 which is believed to be associated with human health also known as rs43703011 or A1A2 SNP. A1 and A2 variation consists in a substitution mutation changing a cytosine (C) to adenine (A) nucleotide, substitution changing histidine (present in A1 type) with proline (present in A2) at 67th position of β-casein polypeptide (table 3) (Bonsing et al., 1988; Meier et al., 2019).

Table 3

Description of A1 and A2 SNPs of CSN2 in cattle missense variants (data adapted from Meier et al., 2019)

Casein gene variant	BTA position	Allele	Amino acid	Protein seq. Position	SNP ID
CSN2*A1	6:87181619	T/G	His/Pro	82 (67)	rs43703011
CSN2*A2	6:87181619	T/G	His/Pro	82 (67)	rs43703011

Based on the amino acid in position 67 these variants can be classified into 2 groups: A1 group (H67) including A1, B, C, F, G and A2 group (P67) harboring A2, A3, H1, H2, I, J, K, L (VGL, 2021).

A1 and A2 allele variants have a particular influence on milk's technological characteristics and also implications for human health (EFSA,

2009; Brooke-Taylor et al., 2017). The A1 variant improves curd consistency, milk coagulation, and micelle size, but results in lower milk digestibility compared with the A2 variant (Pearse et al, 1986 Ng-KwayHang, 2006).

CSN2 VARIANTS IMPACT ON HUMAN HEALTH

CSN2 variants may be involved in milk intolerance and some human diseases, due to the production of a bioactive peptide with opioid activity during digestion named β-casomorphin-7 (BCM-7) (Jianqin et al., 2016).

A1 milk lead to 4-fold higher levels of BCM-7 resulted from beta-casein metabolism during gastrointestinal digestion, than A2 milk (Jarmolowska et al., 1999).

BCM7 shows negative effects for human health, being considered the primary causative factor for health and digestive disorders associated with A1 milk, due to its strong opioid activity; BMC-7 has a role in stimulating human lymphocyte T proliferation in vitro, cytomodulatory properties, etc. (EFSA, 2009; Deth et al., 2016).

BCM-7 may be a risk factor for different human diseases (figure 3). It seems that BCM-7 presence is associated in humans with ischemic heart disease, atherosclerosis, type 1 diabetes, sudden infant death syndrome (Sun et al. 2003; Tailford et al. 2003), autism, schizophrenia (Cade et al. 2000, Priyadarshini et al., 2018).

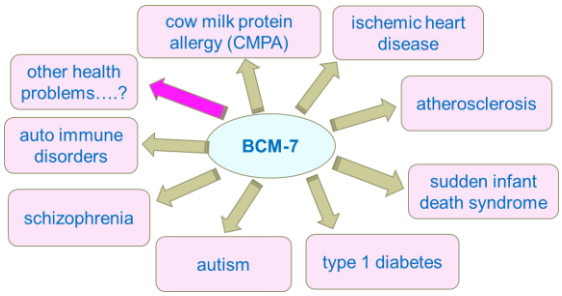

Fig. 3 BCM-7 interference in various human diseases

On the other side, A2 milk generates another peptide called BCM-9 with no such effects (Jianqin et al., 2016) and there is no relationship reported between the BCM-9 resulted from A2 milk and cow milk protein allergy (CMPA) or other health problems (Park and Haenlein, 2021), genotypes harboring A2 allele being highly recommended in dairy cattle breeding.

BETA-CASEIN ALLELES AND GENOTYPES IN VARIOUS CATTLE BREEDS

Various studies assessed the casein gene cluster in many dairy cattle breeds by means of sequence variation in coding regions, promoter region and microsatellites, proving casein haplotypes correlation with milk yield, fat, and protein percentage (Formaggioni et al., 1999; Boettcher et al., 2004; Gallinat et al., 2013 Ahmed et al., 2017).

CSN2 variants can be detected at lower or higher frequencies in various cattle breeds (figure 4) (Hohmann et al., 2018; Meier et al, 2019).

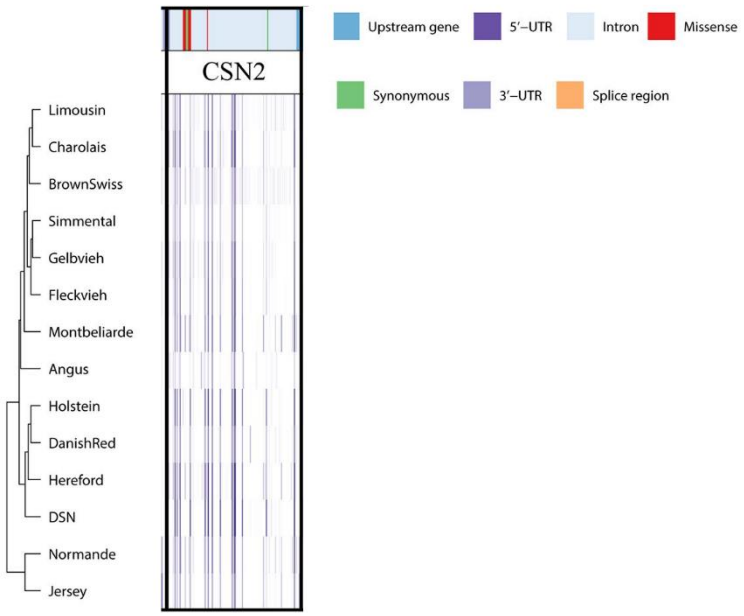

Fig. 4 Clustering of per-breed alternative allele frequency for the identified sequence variants in CSN2 gene including the 1,000-bp upstream region. The alternative allele frequencies are presented in various breeds. The clustering was mainly based on intron variants (light blue areas) as they make up 87.3% of all detected variants. (data adapted from Meier et al., 2019)

In general, the northern European cattle breeds such as: Holstein, Friesian, Ayrshire and British Shorthorn are known to produce milk showing a high A1 β-casein composition, meanwhile cattle breed as Guernsey, Jersey, Simmental, Charolais and Limousin from Channel Islands and southern France produce A2 β-casein milk (Kaminski et al., 2007).

Indigenous cattle and buffalo from India and various countries from Asia, mostly produce a milk with an A2 β-casein high content (Priyadarshini et al., 2018, Park and Haenlein, 2021).

A1 and A2 alleles of beta-casein can be assessed in milk at peptide level or in animals at DNA level, so that the homozygous or the heterozygous state of genotypes can be determined. In this way, milk produced from A2 homozygous genotype will have only the A2 variant of beta-casein in its composition, meanwhile heterozygous genotypes will generate a milk having both A1 and A2 variant of beta- casein.

Animal selection based on genotypes will ensure an adequate management of animal couplings acting to increase A2 favorable allele frequency and to decrease undesirable alleles frequency, so that, at the end will result cattle herds showing the A2A2 homozygous genotype from the initial dairy cattle population, oriented to A2 milk production.

However, ``A1 and A2 Milk`` continue to be a global debate related to milk quality and its risk for various disease occurrence and progression (Ali et al., 2019).

On the other side A2 cow's milk, or milk without the A1 variant is commercially available in countries such as: Australia, the United Kingdom, the United States, New Zealand, and the Netherlands is widely recommended for people who are milk-intolerant. Formula for newborns containing A2 variant is sold in China and Australia and is promoted commercially as being more gentle on infant's digestive system (Brooke-Taylor et al, 2017).

CONCLUSIONS

Advances technologies as microarray, systematic genotyping or sequencing can be useful molecular tools that can be used for identifying and monitoring milk alleles frequencies in cattle, and also for selection of specific genotypes, i.e. A2 genotypes, including selective commercialization of bull semen targeting the obtaining of cattle herds producing A2 milk.

Milk resulted from the homozygous A2 genotype shows a higher digestibility related to the gastrointestinal transit, compared to that obtained from other beta-casein genotypes.

A1 variant association with the etiology of various diseases requires further investigations, scientific reports related to the side effects of A1 and A2 milk on human health are still contradictory.

Dairy cattle farmers should consider the genotype based selection for producing milk with human health benefits, implementing a selection against the A1 allele of beta-casein for obtaining an A1-free milk. The potential negative impact of A1 variant of beta-casein on human health enhanced the planning of dairy cattle breeding programmes based on beta-casein SNPs. Dairy cattle breeding programmes in Romania should stand for such policies based on genetic screening of beta-casein variants and marker-assisted selection (MAS), in order to align Romanian cattle breeds with those of other

countries, which have already promoted A2 milk production and commercialized A2 milk as a product with beneficial properties.

Acknowledgments

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REVIEW- IMPACT OF CODIV-19 ON INDIVIDUALS WITH IRRITABLE BOWEL SYNDROME

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Abstract

The goal of this study was to describe the influence of the COVID-19 pandemic on ability to engage in activities and the influence on psychological distress and gastrointestinal symptoms among individuals with irritable bowel syndrome (IBS) and comorbid anxiety and/or depression.

Key words: : irritable bowel syndrome, covid-19, pandemic stress

INTRODUCTION

Irritable bowel syndrome (IBS), referred to previously as spastic or nervous colon, and spastic bowel, is a functional gastrointestinal disorder characterized by a group of symptoms accompanied together that include abdominal pain and changes in the consistency of bowel movements. These symptoms occur over a long time, often years. It has been classified into four main types depending on whether diarrhea is common, constipation is common, both are common (mixed/alternating), or neither occurs very often. (Whitehead,2012)

Coronavirus disease 2019 (COVID-19) pandemic has affected the psychological health of people, causing a higher level of stress. Stress can exaggerate the symptoms of irritable bowel syndrome (IBS). To assess the effect of the COVID-19 pandemic stress on patients with IBS in Saudi Arabia a descriptive cross-sectional approach was used, which targeted accessible subjects with IBS from different regions of Saudi Arabia. Data were collected from participants using a structured electronic questionnaire, which captured the participants' socio-demographic data, medical history, IBS clinical data, self-reported stress due to COVID-19, and its effect on IBS symptoms.(Definition and Facts for Irritable Bowel Syndrome" NIDDKD, 2015)

A total of 1255 IBS patients completed the questionnaire. About 63.4% of them reported stress due to the pandemic. The most frequently reported causes of stress were fear of infection occurring in the family,

followed by fear of self-infection (43.5%), and death due to COVID-19 infection (17.2%). Most of the stressed participants (56.6%) reported that stress usually exaggerated IBS symptoms. Almost 22% of them consulted a physician for stress aggravation of the symptoms.(Mohammed A. Alzahrani, 2020).

MATERIAL AND METHOD

A descriptive cross-sectional approach was used to target accessible populations suffering from IBS in different regions of Saudi Arabia. Adults aged 18 years or above having IBS were the target population. The survey covered participants from the 5 regions of Saudi Arabia (central, eastern, northern, southwestern and western). The sample size was estimated by Epi Info software, version 7.2. With predicted proportion of COVID-19 related stress among IBS patients of 50%, an absolute precision of 3% and at 95% confidence, the minimal sample size required for the study was measured to be 1068 IBS subjects. To account for non-response bias, a total sample of 1255 was targeted. (Mohammed A. Alzahrani, 2020)

In the present study, a total of 1857 responses were collected of which 1255 (67.58%) respondents were eligible and completed the questionnaire: 329 (26.2%) from central region, 143 (10.3%) from eastern region, 220 (17.5%) from northern, 319 (25.4%) from southwestern region and 244 (19.4%) from western region. Participants' age ranged from 18 to 75 years and a mean age of 27.5±9.3 years. The majority of the respondents were females (74%), single (66.1%), having a university level of education (57.8%), students (43.8%), had just adequate monthly income (61.4%), and from urban areas (84.5%). Only 19.8% suffered other chronic health problems besides IBS. The onset of IBS was recent (less than 1- year) in 26.9% of subjects and more than 2 years in 38.5%. The most frequent IBS symptoms reported by participants were flatulence with abdominal distension (50.2%), abdominal pain (47.5%), and changes in bowel habits (diarrhea and constipation) (24.1%).

Table 1- describes the COVID-19 pandemic stress and its effects on IBS symptoms. About 63.4% of the participants stressed due to the pandemic. The most frequently reported causes of stress were fear of a family member contracting the infection (84.1%), followed by fear of self-infection (43.5%), and death due to COVID-19 infection (17.2%). Most of the stressed participants (56.6%) reported that stress usually exaggerates IBS symptoms, and (33.8%) that the stress sometimes exaggerates the symptoms. Almost 22% of the subjects consulted a physician for stress aggravation of the symptoms, 18.1% used sedatives due to stress, and 9.2% modified IBS medications due to the stress. Moreover, 75.5% of the participants reported impaired daily activities due to symptoms exacerbation.

Table 1

The link between COVID- 19 and its effects on IBS patients

	Stress and stress effects	No.
Stress due to COVID-19 pandemic and related procedures	Yes No	796 459
Causes of stress	Afraid of infection in family member Afraid of being infected Afraid of loss of income Afraid of dying duet o the virus	670 347 63 137
Stress exaggerated IBS symptoms	Yes Sometimes No	444 265 75
Consulted doctor duet to stress	Yes No	172 612
Exxagerated symptoms affect daily activities	Yes No	592 192

The COVID-19 pandemic is a global health crisis affecting several countries, with millions of cases and thousands of deaths reported to date.(Sohrabi C, Alsafi,2019) Such a widespread pandemic is associated with adverse effects on mental health. Our study targeted IBS patients in Saudi Arabia to assess the subjective stress they experienced due to the COVID-19 pandemic and its effect on IBS symptoms. The study revealed that two-thirds of the participants were stressed due to the COVID-19 pandemic. During a pandemic, the burden of mental health issues is greater than the proportion of people affected by the infection. (Ornell F, 2020, Reardon, 20215)

In the present study, fear of contracting the infection by self or the family were the most commonly reported sources of stress. Also, about 61% of participants knew a case of COVID-19 and 2% of participants contracted the infection. Studies revealed that fear from COVID-19 infection can create stress and deteriorate psychiatric symptoms. (Rodríguez-Rey, 2021) Fear of contracting the corona virus and becoming sick, suffering economic losses, helplessness, separation from relatives, and stigma are the most widely reported sources of negative mental health issues in the literature. (Wang C, 2020)

More than 90% of the stressed participants had usual or sometimes aggravation of IBS symptoms, especially abdominal distension and cramps, and 75% of them stated that the aggravation of symptoms affected their activities of daily life. Other participants (18%) reported taking sedatives to minimize the stress. The impact of stress on IBS patients is an important issue that should be considered by both clinicians and patients. IBS symptoms could fluctuate with daily stress, and patients having IBS report more stressful

events in their lifetime compared to healthy controls. There is significant evidence about the role of usual stressors of life besides the COVID-19 pandemic in patients of IBS. Patients with IBS frequently experience anxiety and depression, which can aggravate the symptoms. This is because the colon is partly controlled by the nervous system, which responds to environmental stress. (Park S-C, 2020, Rajkumar, 2020)

CONCLUSIONS

During the COVID-19 pandemic, which exacerbated their symptoms and impacted their everyday life. Patients unable to differentiate between COVID-19 gastrointestinal symptoms and IBS symptoms, and patients suffering from chronic morbidities are more vulnerable. COVID-19 pandemic stress exacerbated IBS patients' symptoms and impacted their activities of daily life. The impact of pandemic stress on IBS patients is an important issue that should be considered by both clinicians and patients. IBS patients should be enrolled in supportive psychological health education programs to cope with stressors, including the current pandemic. (Mohammed A. Alzahrani,, 2020)

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THE COLLABORATION AND COMMUNICATION RELATIONSHIP BETWEEN THE LOCAL PUBLIC ADMINISTRATION, THE HOSPITAL AND THE HIGHER MEDICAL EDUCATION INSTITUTION

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Abstract

Decentralization, as a process of transferring managerial authority, from governmental to local level, involves the initiation, maintenance and development of a tripartite collaboration relationship that includes: Local public administration, health unit with beds and the Faculty of Medicine and Pharmacy in the city or city respectively. Collaboration between the three parties is fundamental and essential in terms of providing and improving human resources for the health unit involved. The supply of medical staff, by the Faculty of Medicine and Pharmacy, implies the existence of a capacity of the educational institution regarding the training of medical staff in hospitals, respectively: doctors, nurses, physiokinetotherapists, pharmacists, dentists. Also, the training of medical staff is outlined through residency programs in various medical and surgical specialties.

Key words: decentralization, health services, hospitals, Faculty of Medicine and Pharmacy, Local Government.

INTRODUCTION

The inter-institutional collaboration relationship materializes through an unconditional participation, active on all professional and administrative levels between the following public institutions:

- the local public administration as the main authorizing officer, reported to the hospital institution which stands out as the main provider of hospital medical services;

- the faculty of medicine and pharmacy as a medical higher education unit, the main institution in the training and improvement of medical staff in hospitals;

- **the hospital** as a health unit with beds providing medical services in hospital and outpatient;

The collaboration involves continuous activity on two levels, respectively:

- **training** young high school graduates in various medical professions: doctors, nurses, physiotherapists, pharmacists, biologists, chemists, dentists, etc .;

-continuous improvement of the medical staff, provided in the previous paragraph, through courses, internships, residency training, congresses, etc;

The objective of this tripartite relationship, functional and activated on the two mentioned levels, is highlighted by an uninterrupted activity, with a well-established goal, namely to provide well-trained medical staff, always willing to continuous medical training.

MATERIAL AND METHOD

In conducting this study, the main working method is the "analysis method". In addition, 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, decisions of the Senate of the University of Oradea.

RESULTS AND DISCUSSIONS

1) **The local public administration** is the institution that manages and organizes the health unit with subordinate beds.

The City Hall / Local Council, an administrative body but also with a political basis due to the fact that the personalities, who occupy the top positions in this area, are represented by people involved in the active political life of the city, has every direct and indirect interest in providing resources. well-educated human from a professional point of view, immediately suitable for activity in medical units.

Quality human resources is a sine qua non condition for the provision and provision of high-quality medical services..

The indirect interest of the local administration is based on its relationship with the ordinary citizen, virtual and possibly “patient”, who, once every four years, represents the voter and decision maker of the people who will occupy the top positions in the mayor's office and within the local council.

Regarding the direct interest of the local administration, it is quantified by ensuring and maintaining a **good health of the local population**.

Any community, local or national leaders, possibly coordinators of institutions operating at the supranational level, intend to create political, administrative, social and economic circumstances conducive to maintaining and developing a fair health of the population they serve. No leader wants

dominion over a sick nation. Health insurance, as a rule, is provided in the Constitution of each democratic or totalitarian state.

2. **Facultatea The Faculty of Medicine and Pharmacy** operates on two respective levels of interest:

   The indirect objective of the higher education institution is to provide the market with providers of medical services, well-qualified medical staff eager to excel in the new medical profession.

   The direct objective of the Faculty of Medicine and Pharmacy, in a competitive society, based on the free market economy, where the one who is more competent in his field of activity wins, is to ensure enough students to follow the specialization courses in institution. A faculty without students cannot fulfill its goal of its own functioning.

3. **Hospitals,** in the local communities in Romania, represent particularly important institutions in blowing up the city, regardless of its numerical size and size. The main provider of medical activities in the interest of the health of the citizen is mainly the hospital. In the alternative, other administrative forms, legally constituted at the level of the Public Health Directorate and the Trade Register, respectively: medical office, limited liability company, joint stock company, etc.

Any hospital must be a destination for the sick, temporarily ill citizen, where he can benefit from the legal and professional framework in order to restore his health, both physically and mentally. In fact, the main role of the hospital is to bring the patient to the initial state prior to his illness.

Areas of activation of human society, both from a political and administrative point of view (town hall and local council), from the point of view of higher medical education as a trainer of medical human resources (Faculty of Medicine and Pharmacy), and from the perspective of the provider of medical documents (hospitals), must be supported for functionality, at a higher level of communication, with a well-established single objective, depending on the specificities highlighted at the level of the local population.

The objective that all local personalities who coordinate and manage public and private institutions, from a well-quantified and determined community, numerically and zonal, materializes through a “achieving and maintaining a good state of health for each individual, individual which is a well-defined component of a community of people ”.

Beyond the aspects presented above, the most important beneficiary of this collaboration is the citizen, virtual patient.

All detailed circuits, regardless of level, must function and be organized in such a way that:

1. The faculties of medicine and pharmacy to include within them, elite teachers to help train the future hospital staff;

2. The local public administrations to have at the top of their hierarchy, personalities who benefit from determination in order to create a favorable framework for the development of the medical services market;
3. The sanitary units with beds are obliged to be constituted as reference barometers in the revitalization of the health condition of any sick individual, but also of the entire local community;

CONCLUSION

The active involvement of all decision-makers, animated by the main active objective, certainly leads to the development of society, in terms of physical and mental health. Any of the institutions involved above, which does not fulfill its purpose established at the establishment, is an important obstacle in the development of the well-being of the community to which it belongs.

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OBESITY – A SIDE EFFECT OF COVID-19 PANDEMIC

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Abstract

Obesity has emerged as an important risk factor for severe disease during the COVID-19 pandemic. This pandemic strongly influenced the public health policy. The measurements approved to limit the extension of the virus, induced a national lockdown associated with important loss of physical activity. The persistence of the lack of movement (especially outside) determined the increase of obesity prevalence.

Key words: obesity, pandemic, COVID-19, lifestyle

INTRODUCTION

Obesity is a chronic disease that affects people from all over the globe; the current global prevalence of obesity is 39%. The complex pathophysiology of obesity is characterized by excessive hypertrophy and hyperplasia of adipose tissue due a chronic imbalanced energy state (Gammone M.A., D'Orazio N., 2021). Obesity is a major health-care problem, even in middle-income and low-income countries, because of its association with chronic diseases such as diabetes, cardiovascular diseases and some cancers (Santosh Kumar K.Y et al, 2021).

Obesity has emerged as an important risk factor for severe disease during the COVID-19 pandemic; several studies have shown that individuals with COVID-19 and obesity have an increased risk of severe disease, hospitalization, and death. (Mohammad S. et al., 2021)

The findings of a prospective community-based cohort study highlighted that a body-mass index greater than 23 kg/m^2 is associated with increased risks of severe COVID-19 outcomes, particularly in patients younger than 40 years. (Gao M et al., 2021)

This large population-based study corroborated evidence of obesity being a major risk factor associated with adverse outcomes in patients with COVID-19 (Mohammad S. et al., 2021)

It is obvious that obesity has a negative impact on patients infected with SARS-CoV-2, but there might be an effect the other way around.

AIM

The aim of this study is to analyze the effect of COVID-19 pandemic on the incidence of obesity.

MATERIALS AND METHOD

The cohort included a number of 182 patients: 140 women (76.9%) and 42 (23.1%) men. All of them were patients that presented themselves for an endocrinology checkup during the first nine months of 2021.

The patients were consulted, analyzed from anthropometric point of view and subjected to blood tests (including hormones determinations).

RESULTS AND DISCUSSIONS

The COVID-19 pandemic in Romania is part of the ongoing pandemic of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The virus was confirmed to have reached Romania on 26 February 2020, when the first case in Gorj County was confirmed. (M.A.I. Report). Today, there are around 1,600,000 cases, 1,400,000 recoveries and 47,700 COVID-19-related deaths.

Given the context generated by the dynamics of the evolution of the epidemiological situation determined by the spread of SARS-CoV-2 coronavirus, the general public interest called for adoption of new measures to enable public authorities to intervene efficiently and with adequate measures for the crisis management. At first, the Romanian government announced a 14-day quarantine for citizens returning from the affected regions.

On 11th of March 2020, the Government published a list of fifteen guidelines regarding the "responsible social behavior in preventing the spread of coronavirus (COVID-19)". The authorities have imposed a ban on sports, scientific, religious, cultural or entertainment events with over 100 participants in closed spaces until 31 March. Likewise, the public activities for museums were suspended until 31 March.

On 16th of March 2020, the Romanian President issued the decree establishing the state of emergency in Romania for a period of 30 days. The schools were closed during the state of emergency and, also, restaurants, hotels, cafes, clubs were closed, followed by gradual closure of borders, or limiting or prohibiting the movement of vehicles or people in/to certain areas.

At the end of March 2020, the first three deaths were reported in Romania. Following a surge in new confirmed cases, the Government instituted a national lockdown: movement outside the home or household is prohibited, with some exceptions (work, buying food or medicine etc.). People over 65 were allowed to leave their homes only between 11 a.m. and

1 p.m. These restrictions limited movement in the open, limited work or losing jobs, reduced interactions (even with the family members) for at least two months during the state of emergency. Even if later on the restrictions were gradually relaxed, the state of emergency had an important impact on society from many points of view, including health.

Each examined patient complained about gaining weight starting in the spring of 2020.

They gain between 5 and 20 kg in 12 months. Before that (at the beginning of 2020), based on their declaration, their BMI was between 24.3-29.4 kg/m^2. When measured, all of them were suffering of obesity (BMI $\geq$ 30 kg/m^2) (fig.1). All patient were adults (age between 20 and 55 years old).

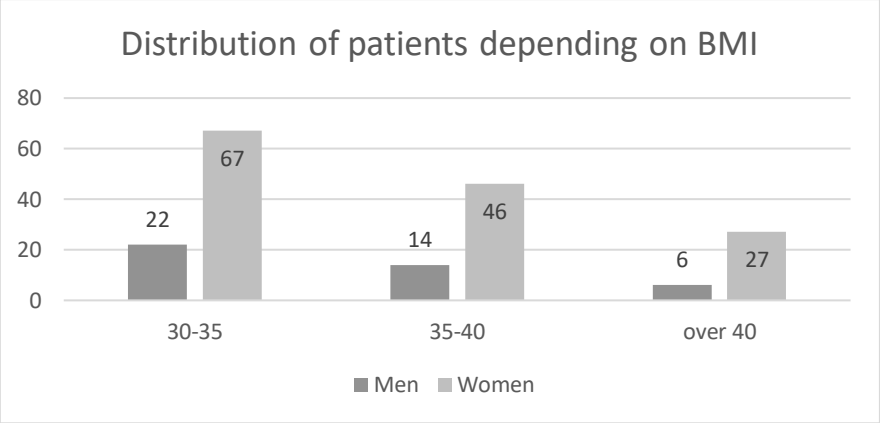

Fig.1. BMI of patients

To exclude secondary obesity causes, blood test were token. All patients integrated in the study had normal hormonal values (TSH, FT4, and Cortisol). From biochemical point of view, 103 of the patients started showing higher glucose values (116 to 138 mg/dl) or mixt dyslipidemia (total cholesterol $\geq$ 200 mg/dl, triglycerides $\geq$ 150 mg/dl).

Low glucose tolerance/ diabetes mellitus or dyslipidemia were not presented in the medical history of the patients before 2020.

Evaluating the lifestyle changes that occurred after de spring of 2020, patients admitted: less physical activity, losing their jobs, compensatory eating disorder etc. (fig.2)

The state of emergency in Romania induced a total lockdown and had a major impact on society: people became afraid, sceptic, introverted. Many of them did not get out from their apartments for two months; every activity took place inside their home.

This situation led to state of depression, less movement and searching comfort in food.

CONCLUSIONS

The COVID-19 pandemic had a great impact on public health.

If obesity is a risk factor for severe outcomes in patients with COVID-19, in the same time, the COVID-19 pandemic induced obesity as a side effect of the measures taken to limit de extension of SARS-CoV-2 infections.

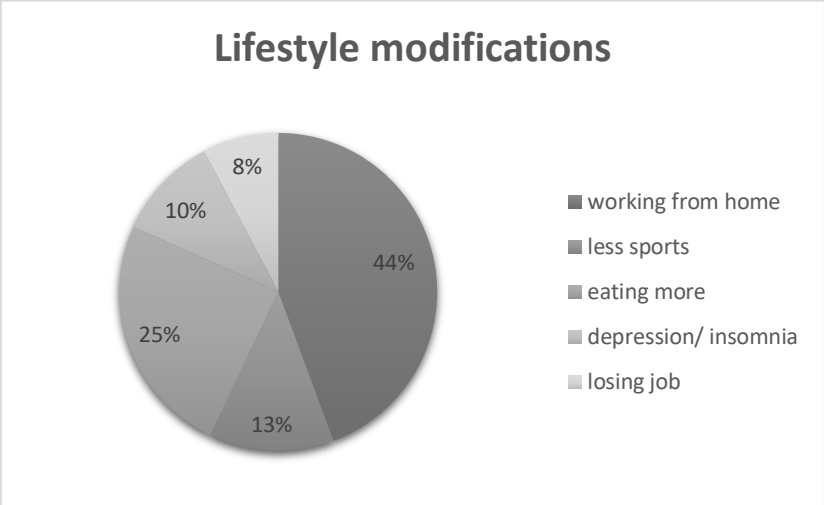

Fig.2. Modifications in lifestyle induce by pandemic measurements

Many of these side effects are now neglected, but they remain and they can influence population health in a chronic way that may persist even longer than the COVID-19 pandemic.

This phenomenon needs a larger study to allow a better evaluation of the impact of measurements induced by COVID-19 pandemic, on public health.

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