

Effect of Information about Animal Feeding on Consumer Acceptability of Sausages from Turopolje Pig Breed

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Summary

The aim of this study was to examine the influence of information about pig feeding (conventional vs. acorn-fed) on consumer acceptability and probability of purchase of sausages made from local Turopolje pig breed. The study was conducted on a sample of 135 respondents using three step procedures: hedonic test in blind conditions, evaluation of expected preferences and informed hedonic test. Results showed that in the blind test sausage from conventionally-fed pigs were rated higher, but in the expectancy test the consumers had better perception of sausages made of acorn-fed pigs. A significant assimilation effect was noticed for sausage made of acorn-fed pigs; information about acorn feeding increased consumers' actual acceptance and probability of sausage purchase. However, information on conventional feeding did not influence consumers' acceptance and probability of sausage purchase in informed vs. blind test. It is concluded that information on traditional feeding with acorn can be used as an influential marketing tool for Turopolje pig breed products.

Key words

Turopolje pig breed, sausage, acorn, sensory tests, consumer expectations

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Introduction

Development and economic valorisation of specific food products of rare and endangered breeds can strengthen their conservation processes and change the way they are viewed as a pure genetic resources which need to be preserved - into a resource for a local livestock production and sustainable development (Verrier et al, 2005; Lauvie et al., 2011). This approach could be particularly suitable for local pig breeds, often characterised by small population size and the absence of specific selection programs. Local breeds are often reared in traditional production systems (typically low input extensive systems) linked to a specific environment (Bozzi and Crovetto, 2013). However, such practice is rarely self-sustainable due to the absence of typical food products with an extra added value. Hence, in order to preserve such indigenous pig breeds in a more sustainable way (i.e. with less or no external subsidies), it is necessary to offer to the market specific food product from these breeds that will be accepted and appreciated by consumers. In Croatia, an example of such poorly exploited local pig breed is Turopolje pig (TP), conservation of which is mainly maintained through state subsidies to farmers without any marketing strategy. This medium-sized, primitive-type, fatty pig breed is one of the oldest European breeds emerging during the early Middle Ages in the Turopolje region, central Croatia. Due to its modest rearing requirements, resilience and good adaptation to local marsh meadows and oak forests, the TP breed has been an important food source for the local population for centuries (Robić, 2002; Đikić et al., 2010). However, the rapid penetration of imported lean pigs in the second half of the 20th century, as well as the ban on forest grazing, significantly reduced the interest in this breed. The result was a drastic decrease in the population size. Currently, despite the governmental support, the TP breed is still endangered, with a population of only 132 sows and 30 boars kept on 16 farms (Croatian Agricultural Agency, 2016). Recently, TP breed has been included in the European Union H2020 project TREASURE (www.treasure.kis.si) which is devoted to traditional genetic resources in pig production with the aim to improve their potentials for enhanced use. One of the main challenges of TREASURE project is to enhance quality and health benefits of traditional pork products from local pig breeds and to provide information about the consumers' acceptability of these products since, as stated above, their sustainability essentially depends upon the successful marketing of their products.

Nowadays, consumers do not buy food just because of its primary function, but also for other reasons (extrinsic cues), such as naturalness, authenticity and origin, tradition or health (Fenger et al., 2015; Valkaj et al., 2013). In order to survive on the market it is very important to offer a product with additional property that will increase value of this product for a consumer. An added value that has recently been highly appreciated by consumers is traditional characteristic of a product including indigenous breeds used in its production (Albenzio et al., 2014). For the development and market success of high quality meat products from TP breed it is, therefore crucial to establish the link between the traditional production system and feeding resources with qualities of meat and products. Such intrinsic properties, when existing, can be used as a very powerful differentiation

tool in marketing of products of local breeds. In this context, the present study aimed to examine consumers' acceptance of dry fermented sausages from TP breed and to investigate the effect of information about pig feeding (conventional vs. traditional acorn feeding) on hedonic ratings and purchase probability.

Materials and methods

Products

Samples from two batches of dry fermented sausages produced from outdoor reared TP breed were used as test products. Both types of sausages were produced on the same day by the same manufacturer using the identical processing technology and recipe. The only difference between the batches was the finishing diet of pigs used. One batch of sausages was produced from TP fed only with standard feed mixture (conventional-fed group or CF). The second batch was produced from TP fed with the conventional mixture supplemented with acorns (originating from oak *Quercus robur* L.), which is traditionally used as a feedstuff for TP (acorn-fed group or AF). At the time of survey, sausages were 4 months old and had very similar external and cross-sectional appearance.

Consumer test

The study was conducted with 135 meat consumers interviewed at a local fair near Zagreb (84 respondents) and at the Faculty of Agriculture in Zagreb (51 respondents); 51% of the respondents were male and 49% female. The average age of respondents was 43 years \pm 15 years ranging from 18 to 89 years. More than a half of the respondent (52%) had university education and 60% of them lived in the cities. Most of them (69%) claimed to have medium family income.

Respondents were invited to answer questions regarding their frequency of sausage consumption, familiarity with the TP breed, importance of pig feeding technology and practices, attitudes on traditional way of rearing, and socio-demographics and to taste different sausages made from TP breed.

Effect of information about pig feeding (conventional vs. acorn-fed) on consumer acceptability and probability of buying the sausages was tested in a three-step procedure: evaluation of perceived/blind preference (1), expected preference (2) and actual/informed preference (3). This procedure has been often used in acceptability studies of meat products (Morales et al., 2013; Hersleth et al., 2011; Cerjak et al., 2011; Napolitano et al., 2010; Napolitano et al., 2007).

In the first stage (blind test) consumers had to taste two sausages (CF and AF) placed on white plates and coded with three-digit randomly selected numbers. They were offered water and bread between tastings to neutralise their taste buds. After each tasting session the respondents had to evaluate the acceptability and probability of buying the tasted sausage.

In the second step respondents were asked to imagine two types of sausages: one from conventionally fed (CF) and another from acorn fed (AF) TP. They were further asked to rate how much they would like or dislike each sausage and what was the probability of their purchase.

In the last step consumers were again offered to taste and rate (i.e. acceptability and probability of purchase) two sausage samples accompanied with the information about the type of feeding used in pig production.

Consumers were not informed that sausage samples in the two sensory tests were the same.

The evaluation of the acceptability and probability of purchase was the same in all three steps: acceptability was measured using 5-point hedonic scale from 1 = "I dislike it very much" to 5 = "I like it very much" and probability of purchase was measured on a 5-point scale from 1 = "I would definitely not buy it" to 5 = "I would definitely buy it".

Statistical analysis

Data analysis was performed in the SPSS statistical program version 17.0 software (SPSS Inc., Chicago, IL). A paired t-test was used to explore differences between two tasted sausages in all three steps of the consumer test. The same test was used to examine differences in blind and expected mean hedonic ratings for each sausage, as well as to test the differences between ratings of informed and blind and informed and expected tests.

Results and discussion

Consumption habits and attitudes

Most of the respondents (86%) claimed to eat meat at least 3-5 times a week. 60% of the respondents stated to eat sausages often and further 12% to eat them very often.

A great majority (96%) of the respondents have heard of TP breed. However, only 49% of respondents were sure that they ate some products made of TP breed, 22% were sure that they have never tasted such products and other respondents were not sure about it.

About two thirds of the respondents (68%) consider pig production technology and feeding an important factor when deciding to buy meat and meat products. The largest number of respondents (90%) think that natural feedstuff (grazing, acorn, etc.) in feeding pigs is better for consumer health compared to industrial feed mixtures. Additionally, 94% of the respondents agree that meat from pigs reared in traditional production systems is of higher quality compared to meat from pigs from conventional intensive production.

Acceptability test and probability of purchase

Results of blind sensory test pointed out a good quality of both sausage types. In this test, CF sausages were rated higher (4.09) compared to AF sausage (3.96) but this difference was not statistically significant (Table 1). Similarly, probability of purchase of CF sausage (3.84) was not significantly higher than probability of purchase of AF (3.67) (Table 2).

Contrary to the blind test, respondents showed significantly better expected acceptability of AF sausage (4.45) compared to CF sausage (3.59) (Table 1). Additionally, probability of buying AF sausage was much higher (4.31) than stated probability of buying CF sausage (3.48) (Table 2).

When comparing results of blind and expected tests, a significant differences ($P < 0.001$) between blind and expected acceptability for both sausages confirm occurrence of disconfirmation. The expected acceptability for the AF sausage was higher compared to the blind test acceptability indicating negative disconfirmation (i.e., the product is worse than expected). Opposite to that, a positive disconfirmation (i.e., the blind acceptability is higher than expected) has been recorded for CF sausage.

Our results show that information on the traditional feeding of pigs used in sausage production can have a positive impact on consumer expectations regarding sausage quality, while information on conventional feeding may reduce consumer expectations regarding sausage quality and acceptability. This is in line with previous research that has shown that modern consumers choose meat products based not only on its price and taste but also on ethical features of meat, such as animal welfare, environmentally friendly farming practice or product origin and the use of traditional pig breeds (Napolitano et al., 2007; Resano et al., 2007; Cerjak et al., 2011).

Results of the informed hedonic test showed again significantly better acceptability for AF (4.29) compared to CF sausages (3.94), however the difference was much lower than in expectancy test (Table 1). As expected, the average value of the probability of buying AF sausage (4.13) was higher than for CF sausage (3.77) (Table 2).

The relationship between expected and actual product performance is critical for the success of a new product on the market (Tuorila et al., 1998) as expected quality influences consumers buying decision. The assimilation model can be used to

Table 1. Results of consumer acceptability test

Ratings ^a	CF sausage	AF sausage	Average difference	P-value ^b
Blind test (B)	4.09 ± 0.842	3.96 ± 0.877	0.13	0.152
Expectancy test (E)	3.59 ± 0.972	4.45 ± 0.740	-0.86	<0.001
Informed test (I)	3.94 ± 0.817	4.29 ± 0.921	-0.35	0.001
E-B	Average difference P-value ^b	-0.50 (Positive disconfirmation) <0.001	0.49 (Negative disconfirmation) <0.001	
I-B	Average difference P-value ^b	-0.15 0.079	0.33 (Assimilation) <0.001	
I-E	Average difference P-value ^b	0.35 <0.001	-0.16 0.044	

^a1 = "I dislike it very much" to 5 = "I like it very much"; ^b paired t-test

Table 2. Results of probability of purchase

Ratings ^a	CF sausage	AF sausage	Average difference	P-value ^b
Blind test (B)	3.84 ± 1.04	3.66 ± 1.10	0.18	0.093
Expectancy test (E)	3.47 ± 1.01	4.32 ± 0.86	-0.85	<0.001
Informed test (I)	3.76 ± 0.97	4.15 ± 0.94	-0.39	0.001
E-B	Average difference	-0.37	0.66	
	P-value ^b	<0.001	<0.001	
I-B	Average difference	-0.08	0.49	
	P-value ^b	0.332	<0.001	
I-E	Average difference	0.29	-0.17	
	P-value ^b	0.009	0.025	

^a1 = "I would definitely not buy it" to 5 = "I would definitely buy it"; ^b paired t-test

explain the effect of information on food acceptance (Deliza and MacFie, 1996; Cardello and Sawyer, 1992) and it suggests that product evaluation changes in the direction of expectation. On the contrary, a contrast model occurs when product evaluation changes in the opposite direction of expectation (Cardello and Sawyer, 1992; Morales et al., 2013). Significant assimilation effect was noticed for AF sausages; information about acorn feeding increased consumers' actual acceptance and probability of its purchase but this assimilation was incomplete as the difference between expected and informed liking is significantly different from zero. This means that the information on acorn feeding was not completely effective in reducing the difference between expectations and actual perception. On contrary, there was no assimilation effect for CF sausage meaning that information about conventional feeding did neither influence consumers' hedonic ratings nor probability of purchase.

Conclusion

It can be concluded that information about traditional feedstuffs in pig diet (i.e. the use of acorn) can affect consumer perception of meat products from local breeds and increase their affinity towards them. Therefore, the information on the use of traditional feedstuff in pig diet can be used as an influential marketing tool for distinguishing meat products from local pig breeds from other meat products. More specifically, the use of traditional feeding with acorn in TP breed should be emphasized in marketing strategies as this kind of information may enhance the consumer's motives for consumption and purchase of TP products, which is a critical prerequisite for more sustainable management of this breed in the future.

References

- Albenzio M., Santillo A., Marino R., Angelo F., Caroprese M., Sevi A. (2014). Quality of Soppresata salami from Pugliese Pigs as Affected by Rearing System. *Food Nutr Sci* 5: 626-634.
- Bozzi R., Corvetti A. (2013). Conservational issues in local breeds – state of the art. *Acta Agric Slov Supp* 4: 9-14.
- Cardello A.V., Sawyer F.M. (1992). Effects of disconfirmed consumer expectations on food acceptability. *J Sens Stud* 7: 253-78.
- Cerjak M., Karolyi D., Kovačić D. (2011). Effect of information about pig breed on consumers' acceptability of dry sausage. *J Sens Stud* 26: 128-134.
- Croatian Agricultural Agency (2016). Pig breeding Annual report 2015.
- Deliza R., MacFie H.J.H. (1996). The generation of sensory expectation by external cues and its effect on sensory perception and hedonic ratings: a review. *J Sens Stud* 11: 103-128.
- Đikić M., Salajpal K., Karolyi D., Đikić D., Rupić V. (2010). Biological characteristics of turopolje pig breed as factors in renewing and preservation of population. *Stočarstvo* 64: 79-90.
- Fenger M.H., Aschemann-Witzel J., Hansen F., Grunert K.G. (2015). Delicious words – Assessing the impact of short storytelling messages on consumer preferences for variations of a new processed meat product. *Food Qual Prefer* 41:237-244.
- Hersleth M., Lengard V., Verbeke W., Guerrero L., Næs T. (2011). Consumers' acceptance of innovations in dry-cured ham: Impact of reduced salt content, prolonged aging time and new origin. *Food Qual Prefer* 22: 31-41.
- Lauvie A., Audiot A., Couix N., Casabianca F., Brives H., Verrier E. (2011). Diversity of rare breed management programs: between conservation and development. *Livest Sci* 140: 161-170.
- Morales R., Aguiar A.P.S., Subiabre I., Realini C.E. (2013). Beef acceptability and consumer expectations associated with production systems and marbling. *Food Qual Prefer* 29: 166-173.
- Napolitano F., Caporale G., Carlucci A., Monteleone E. (2007). Effect of information about animal welfare and product nutritional properties on acceptability of meat from Podolian cattle. *Food Qual Prefer* 18: 305-312.
- Napolitano F., Braghieri A., Piasentier E., Favotto S., Naspetti S. and Zanolini R. (2010). Effect of information about organic production on beef liking and consumer willingness to pay. *Food Qual Prefer* 21: 207-212.
- Resano H., Sanjuán A.I. and Albis. L.M. (2007). Consumers' acceptability of cured ham in Spain and the influence of information. *Food Qual Prefer* 18: 1064-1076.
- Tuorila H.M., Meiselman H.L., Cardello A.V., Leshner L.L. (1998). Effect expectations and the definition of product category on the acceptance of unfamiliar foods. *Food Qual Prefer* 9: 421-430.
- Robić Z. (2002). Contribution to the renewal of the Turopolje breed of pigs. *Agromoski glasnik* 5-6: 305-320.
- Valkaj K., Cerjak M., Kalit S., Rako A., Wendorff W.L. (2013). Do consumers from Međimurje region recognize their autochthonous Turoš cheese? *Mljekarstvo* 63: 211-219.
- Verrier E., Tixier-Boichard M., Bernigaud R., Naves M. (2005). Conservation and values of local livestock breeds: usefulness of niche products and/or adaptation to specific environments. *Anim Genet Resources Info* 36: 21-31.