

GAME MEAT MARKET IN EASTERN CROATIA

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SUMMARY

In the Republic of Croatia, game meat is consumed far less than meat of domestic animals. Yearly game meat consumption amounts to only 0.55 kg per household member. Consumers prefer meat of domestic animals, because it is cheaper, not paying attention to specific nutritive advantages of game meat. A research on the game meat market and consumers' preferences was carried out on 101 examinees, chosen among inhabitants of Slavonia and Baranja. The majority of questioned inhabitants did consume game meat (92%), of whom 66% consider game meat to be of better quality than meat of domestic animals. Significant number of examinees considers game meat as healthy food, being also convinced that game was healthier to consume if hunted in their natural environment, than if reared on specialized farms (90%). Irrespective of quality, only 22% of examinees buy game meat, and 51% think such meat is too expensive. This is the main reason why consumers have game meat only once a month (51%). Taking into consideration monthly income of their respective household, 58% of examinees can afford game meat only once a month, and, if having an opportunity, they would opt for meat of roe deer (55%) and rabbit (25%). When asked what would stimulate the game meat market in Croatia, 56% of examinees believe this could be achieved by lowering of prices, 27% think the issue could be addressed by opening of specialty stores, and only 17% opted for more aggressive marketing activities.

Key-words: market, game meat, consumers, consumption

INTRODUCTION

Game meat originates from hunted small or large game animals and is intended for consumption. It can also be obtained by slaughtering of intensively reared game animals (Živković, 2001). For many ancient tribes such meat represents, even today, a primary source of protein, and its consumption depends on unsustainable hunting of large game animals (Apaza et al., 2002). In developed countries, however, game animals are raised extensively, but also intensively on hunting enclosures, or farms. Recently, farmers show more interest in production of game meat, as there is awareness raised among consumers of health risks imposed by consumption of conventional red meat, which is high in saturated fat (Fletcher, 1997). On the other hand, because of its chemical composition, game meat has certain nutritive advantage over domesticated meats, and is perceived by consumers as a culinary specialty (Souci et al., 1979). Nutritive advantages of such meat refer to higher content of protein and less fats, which are though of more favorable fatty acid composition (Kulier, 1996). Bandik and Ring (1996) stated that game meat, especially meat of wild ruminant animals, rabbits and hares, was not only intensely flavored, but also low in fat and with favorable content of essential amino acids, unsaturated fatty acids and vitamins, thus being accepted as an important foodstuff. Comparing meat of domestic and wild animals, Paleari et al. (2003) claimed that meat of wild boar was similar to horse meat, as it was low in saturated fatty acids. Moreover, meats of wild boars, goats and cattle were similar with respect to their quantitative composition of monounsaturated fatty acids (MUFA), while horse meat was significantly higher in polyunsaturated fatty acids (PUFA), which were contained in deer meat only averagely and reduced in beef meat final products to the lowest

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level. The content of free amino acids is considerably higher in meat of deer, wild boar and goats, if compared to beef and horse meat.

Uherova et al. (1992) investigated contents of particular substances in game meat aiming to determine its nutritive values. They determined high content of essential amino acids in game meat. Especially high content of leucine and lysine (1.83 g/100 g) was in meat of deer and rabbit, pointing out an interesting difference in comparison to domesticated meat. Content of essential fatty acids in meat of rabbits (25.92 g/100 g) and pheasants (18.19 g/100 g) is considerably higher than in beef and pig meat (14.26 g and 8.68 g/100 g, respectively). Content of those acids in muscular tissue depends mostly on fat content. Compared to cattle, surprisingly high content of thiamine was found in deers (+450%) and in muflons (+191%). Content of riboflavin (+77%) and pantothenic acid (+191%) in deer meat is also considerably higher than in beef.

As these facts point out high nutritive value of game meat, it can be recommended in human nutrition, especially because consumers prefer meat that is tasty and good for their health.

In the European Union, market of game meat, as well as veterinary public health referring to hunting of game are regulated by the Council Directive 92/45/EEC. The EU candidate countries have to conform their legislation on game and game market with the stated directive. Over the past years, the Republic of Croatia has been reforming its legislation according to the European norms. However, issues on raising, protection and exploration of game are regulated by the out-of-date Law on hunting (Official Journal of Croatia 10/94) whereas hygiene requirements, technology and trade of game meat are further regulated by the Law on veterinary medicine (Official Journal of Croatia 70/97), and partially by the Law on food (Official Journal of Croatia 117/03). Law on hunting, being presently in force, should be substituted by a new law, currently debated on in the Parliament. The Law on veterinary medicine and the Law on food are satisfactorily harmonized with strict European regulatory rules, some articles of which are being often amended by legal acts (rulebooks, decrees, etc.). Similar procedure was carried out in neighboring Hungary, which is now a full member of the EU (Szekely, 1997).

Only the game meat or game organs that meet the strict veterinary and hygienic requirements can be traded with on the market. Such meat must be examined by official veterinary inspection and must be proved as appropriate for consumption (Njari et al., 2004). Inspection facilities and examination procedures are defined by the above mentioned legal acts and by-law directives (Official Journal of Croatia 20/92). It is important to put an emphasis on required veterinary procedures, as maturation and spoilage processes in game meat occur faster than in domesticated meat, thus all handling procedures need to be reduced as much as possible (Brodowski and Beutling, 1998; Konjević, 2003).

Yearly consumption of fresh meat in Croatia per household member in 2003 was 51.24 kg. Poultry meat was the most consumed (19.30 kg), followed by pig (18.14 kg) and beef meat (8.55 kg), while consumption of game meat was ranked at bottom of scale, being only 0.55 kg.

Good nutritive values of game meat and its low consumption were a motive to carry out the survey on a representative sample in order to check out consumers' preferences. Prior to the survey, data on hunting ground management, and the number of hunted animals over the last 10 years were analyzed.

MATERIAL AND METHODS

The analysis of game meat market was based on official statistical records, as well as on previous research results of authors who dealt with the same or similar topics. For the purpose of our research, there was a survey carried out among inhabitants of Eastern Croatia on their consumption of game meat. Examinees were instructed how to answer questions and note their opinions. There were 101 people involved in the survey, of whom 55% were men, and 45% women. The survey was carried out by filling in a questionnaire. The questionnaire consisted of 21 questions, all related to purchase and consumption of game meat and consumers' preferences regarding game meat varieties.

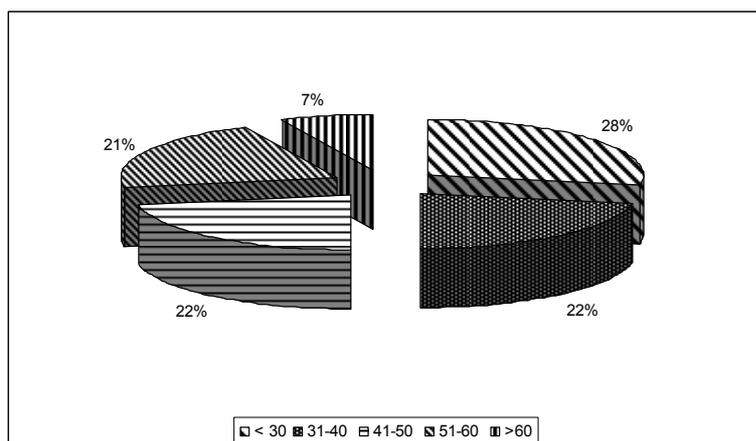


Figure. 1. Age structure of examinees
Grafikon 1. Dob ispitanika

Out of a total of examinees, more than two thirds belonged to the most active age group, between 20 and 50 years of age (Figure 1). Educational profile of examinees was as follows: 15% had a primary education or less, 65% had a high school education and 20% had obtained a college or university diploma. Results obtained in the survey were analyzed in MS Office - Excel 2003.

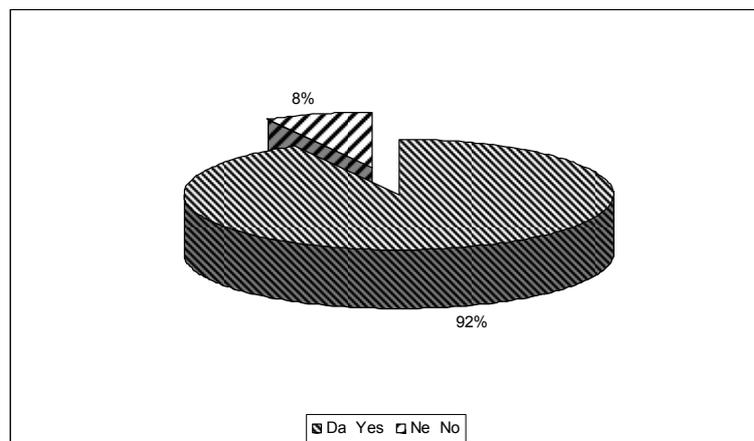
RESULTS AND DISCUSSION

According to the data on hunted game (Table 1) over 10 years, from 1993 to 2002, it is visible that after a slight stagnation of 1990s end, hunted game number increased at the beginning of a new millennium. Similar situation occurred in some European countries (Krostitz, 1996). Based on this fact, it can be assumed that there is an increase in the number of game on our hunting grounds, which can be interpreted as a proof of their sustainable management. The most game animals were killed in their natural environment, in a finishing phase of rearing on a hunting ground. Number of killed-off pheasants was increased by 5%, roe deers by 21% and deers by 57%. The highest increase of 176% was noticed in number of killed-off wild boars. Killing-off of other game was marked by either stagnation or lowering. These official statistical records are indicative and reflect a trend of killing-off game, but not the exact state, because registers of hunting organizations are more or less questionable, mostly because of lack of knowledge of responsible individuals, and because of non existence of standardized work procedure in keeping hunting records. However, this problem is not obvious only in Croatia. Lecocq (1997) claimed that trading procedure for game meat in the European Union member states was not completely transparent, because statistics is often incomplete, thus making correct evaluation of data almost impossible.

Based on the results of the survey carried out among inhabitants of Eastern Croatia, the majority of people involved in the survey (92%) did consume game meat (Figure 2). Men consumed game meat more often, thus being able to distinguish better among its varieties, which is in accordance with the research of Burger (2000). The fact that game meat is healthier and of better quality, i.e. that it has particular nutritive advantages over domesticated meat, is recognized by 66% of examinees. Mann (2000) stated that it was scientifically proven that consumption of such meat does not impose any risks for diseases occurrence of so called "western way of living", such as coronary heart diseases. Human health is endangered by overconsuming fats and domesticated meat rich in saturated fat. On the other hand, consumption of diets high in lean red meat can lower cholesterol in blood plasma, provide tissue with omega 3 fatty acids and represent a valuable source of iron, zinc and vitamin B12. Game meat fits to all of these, as it is low in total and saturated fat, but it is relatively poor in polyunsaturated fatty acids (PUFA). Such meat is a healthy component of any well-balanced nutrition.

Table 1. Data on hunted game in the Republic of Croatia, 1993-2002*Tablica 1. Podaci o broju odstrijeljene divljači u Republici Hrvatskoj od 1993.-2002. godine*

Type of game <i>Vrsta divljači</i>	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Deers <i>Jeleni</i>	1147	900	522	477	581	508	761	1035	1277	1803
Roe deer <i>Srna obična</i>	5363	4656	3037	2640	2899	2968	3663	4546	6017	6501
Bear <i>Medvjed</i>	29	14	9	12	19	18	29	29	37	25
Wild boar <i>Divlja svinja</i>	3607	3700	2278	2797	3376	3435	5155	5986	8537	9971
Rabbit <i>Zec obični</i>	22000	18000	14000	10000	10000	8000	8000	9000	10000	12000
Common partridge <i>Trčka</i>	8000	10000	6000	4000	4000	5000	5000	4000	6000	7000
Rock red legged partridge <i>Kamenjarka</i>	2000	3000	1000	1000	1000	1000	1000	1000	1000	2000
Common pheasant <i>Fazani</i>	75000	75000	62000	83000	55000	54000	55000	59000	70000	79000
Waterfowls <i>Ptice močvarice</i>	21000	18000	1300	12000	10000	6000	7000	8000	11000	13000

Source: Statistical Yearbook, 2003; *Izvor: Statistički ljetopis, 2003.***Figure 2. Consumption of game meat***Grafikon 2. Konzumacija mesa od divljači*

According to the research results, 87% of examinees consider game meat as ecologically healthy food. This is supported by researches of Lusky et al. (1994), who confirmed that game meat was not polluted by environmental contaminants (heavy metals, pesticides, radioactive elements, etc.). Furthermore, Haldimann et al. (2002) found out that people (e.g. hunters) who frequently consume meat originating from game killed with lead shot, did not have any risk of blood lead increase.

The most of examinees (90%) think that game meat was healthier to consume if originating from animals hunted in their natural environment, than if intensively produced on specialized farms. As natural habitats of wild animals are constantly being reduced, especially in developing countries, raising of game animals on farms is becoming more popular particularly in Germany and Sweden, which have the biggest population of intensively produced game animals in Europe. On the other hand, on New Zealand, population of deers raised on farms exceeds one million, which takes up approximately one half of all farm produced game animals in the world. At the same time, New Zealand is the biggest world exporter of game meat, followed by Argentina, Australia, Poland and

some other countries of Middle and East Europe. The biggest import market is the European Union, especially Germany, France, Italy and Sweden (Krostitz, 1996). Inhabitants of Eastern Croatia are aware of potentials of intensive game production on specialized farms (78%), however such production is in Croatia still in its roots.

Taking into consideration the fact that in Croatia a yearly consumption of game meat amounts to only 0.55 kg per household member, being 1% of total meat consumption, there is an obvious gap between number of hunted game and amount of meat consumed. A probable explanation for such situation is that only small amount of meat reaches the market and the rest is kept by hunters. Similar situation is observed in Germany, where game meat consumption also takes up only 1% of a total meat consumption (Bandik and Ring, 1996), irrespective of the fact that Germany is one of the biggest importers of game meat in the European Union (Krostitz, 1996). There is an additional complication with marketing of game meat in Croatia, referring to the strict veterinary-hygienic regulations, and lack of facilities for processing and storage of game meat. Because of that, it is not surprising that on Croatian market there are supplies of imported frozen game meat, for example deer loin from New Zealand, rabbit from Italy, etc.

Žlender and Čepin (2003) stated that, besides climatic conditions in which game is raised, its meat quality depended on processing and production, which, if traditionally performed, have marketing advantage. Eastern Croatia is a region known by its traditional meat processing and home made meat products. When preparing cured meat products (special Slavonian meat specialty called “kulen”, sausages, etc.), people tend to add game meat to pig meat in order to improve its culinary characteristics (the most added is wild boar meat, sometimes deer and roe deer meat). Such home made meat products are usually consumed by producers themselves, while there are industrially produced goods (eg. “kulen” of game meat) offered on the market, but still in negligible amounts. Eastern Croatia needs to recognize its advantages with respect to traditional meat processing, and to promote them to a distinguished marketing brand.

Product pricing plays an important role in marketing policies. In Croatia, price of game meat exceeds price of domesticated meat. The same happens in the EU countries (Krostitz, 1996). Although the majority of questioned people considers game meat as healthy food. Results show that game meat is being bought by only 22%, and 51% think such meat was too expensive. Expensiveness is the main reason why consumers have such meat only once a month (51%). Taking into consideration monthly income of their respective household, 58% of examinees can afford to buy game meat only once a month, and, if having an opportunity, they would opt for roe deer (55%) and rabbit (25%). Most of examinees (56%) is convinced that it would be possible to improve market of game meat by lowering of prices. About 27% think this could be achieved by opening of specialty stores, however, if considering previously presented data on game meat consumption and prices, this would not be a wise recommendation for the time being. The least number of examinees (17%) believes that game meat market can be stimulated through more aggressive marketing activities (*Figure 3*).

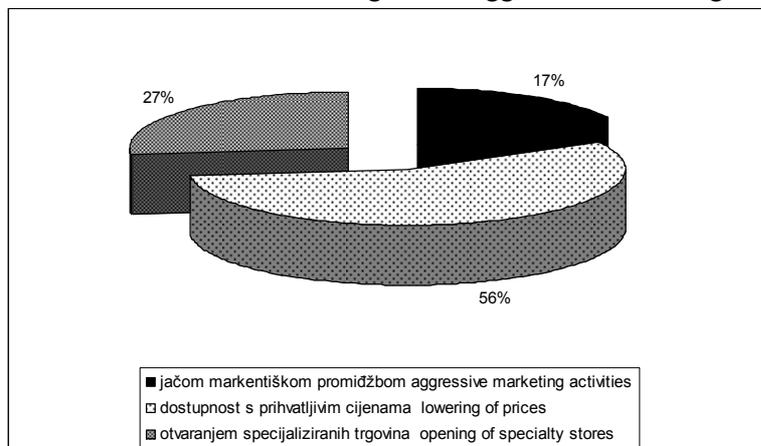


Figure 3. Possibilities of game meat market improvement

Grafikon 3. Mogućnosti poboljšanja tržišta mesa divljači

A significant public health issue in Eastern Croatia is a parasitic disease called trichinelosis, the consequences of which fear some 78% of examinees. A cause of this dangerous zoonosis is a parasitic nematode *Trichinella* sp., attacking domestic pigs, but can be also found in game meat, especially in meat of wild boar, badger, bear, and other omnivores. 73% of examinees are aware of these facts. The Republic of Croatia requires obligatory veterinary inspection of meats from risk groups, so their consumption is safe, which is also proven by 78% of those who trust the results of veterinary tests. It can be said that this disease does not have any negative impact on the game meat market in Eastern Croatia.

Table 2. Overview of survey questions and answers according to gender of examinees

Tablica 2. Prikaz anketnih pitanja i odgovora prema spolu ispitanika

Questions <i>Anketna pitanja</i>	Male <i>Muški</i>	Female <i>Ženski</i>	Male <i>Muški</i>	Female <i>Ženski</i>	Total - <i>Ukupno</i>	
	Yes (%) <i>Da (%)</i>	Yes (%) <i>Da (%)</i>	No (%) <i>Ne (%)</i>	No (%) <i>Ne (%)</i>	Yes (%) <i>Da (%)</i>	No (%) <i>Ne (%)</i>
Do you distinguish among varieties of game meat? <i>Razlikuju li potrošači pojedine vrste mesa divljači?</i>	80 ^{n.s.}	69 ^{n.s.}	20 ^{n.s.}	31 ^{n.s.}	75	25
Do you know which animals can be infected by trichinelosis? <i>Znate li koja divljač može oboljeti od trihineloze?</i>	85 ^{***}	58 ^{***}	15 ^{***}	42 ^{***}	73	27
Are you afraid of becoming infected by trichinelosis? <i>Bojite li se trihineloze?</i>	75 ^{n.s.}	82 ^{n.s.}	25 ^{n.s.}	18 ^{n.s.}	78	22
Do you trust veterinary tests run on game meat prior to being sold? <i>Vjerujete li rezultatima veterinarskog pregleda mesa divljači koje je u prodaji?</i>	85 ^{n.s.}	82 ^{n.s.}	15 ^{n.s.}	18 ^{n.s.}	83	17
Do you consider game meat as ecologically healthy food? <i>Smatrate li da meso divljači spada u ekološki zdravu hranu?</i>	91 ^{n.s.}	82 ^{n.s.}	9 ^{n.s.}	18 ^{n.s.}	87	13
Do you know that game animals can be raised on specialized farms? <i>Znate li da se divljač može uzgajati na specijaliziranim farmama?</i>	80 ^{n.s.}	78 ^{n.s.}	20 ^{n.s.}	22 ^{n.s.}	78	22

n.s. = not significant ($P > 0.005$); *** $P < 0.001$; n.s. = nije signifikantno ($P > 0,005$); *** $P < 0,001$

Analysis of answers to questions presented in Table 2., and their classification according to gender of examinees show that men consume game meat more often than women, and are thus able to distinguish better among varieties of game meat (80% to 69%, respectively). This is also in accordance with researches of Burger (2000). Moreover, it can be claimed with certainty ($P < 0.001$) that male consumers (85%) are better in knowing what meat can be potentially infected by trichinelosis than female consumers (58%). Other answers, as presented in Table 2, point at the fact that there are no statistically significant differences in consumers' preferences, as related to their gender.

Based on the stated data and consumers' preferences, it can be concluded that consumption of game meat is relatively low in Croatia, and abroad, as well. Natural resources of flora and fauna, their preservation, as well as tradition of home made domesticated and game meat products, all of which are especially cherished in Eastern Croatia, should also be recognized as advantages and used in marketing presentations of traditional meat products, putting at the same time special emphasis on game meat.

REFERENCES

1. Apaza, L., Wilkie, D., Byron, E., Huanca, T., Leonard, T., Perez, E., Reyes-Garcia, V., Vadez, V., Godoy, R. (2002): Meat prices influence the consumption of wildlife by the Tsimane Amerindians of Bolivia. *Oryx*. 36(4):382-388.
2. Bandick, N., Ring C. (1996): Game as food. *Fleischwirtschaft*, 76(9):888 ff.
3. Brodowski, G., Beutling, D. (1998): The hygienic production of met of game under hunting conditions – A Study of Fallow Deer, Roe Deer, Wild Boars and Red Deer from Saxonia-Anhalt. *Fleischwirtschaft*, 78(11):1208-1210.
4. Burger, J. (2000): Gender differences in meal patterns: Role of self-caught fish and wild game in meat and fish diets. *Environmental Research*, 83(3):140-149.
5. Fletcher, T.J. (1997): European perspectives on the Public health risks posed by farmed game mammals. *Revue Scientifique et Technique*, 16(2):571-578.
6. Haldimann, M., Baumgartner, A., Zimmerli, B. (2002): Intake of lead from game meat – a risk to consumers' health? *European food research and technology*, 215(5):375-379.
7. Konjević, D. (2003): Postupak s dlakavom divljači nakon odstrela, a u cilju poboljšanja održljivosti mesa divljači (divljačine). *Meso V(3)*, 43-45.
8. Kulier, I. (1996): Tablice kemijskog sastava namirnica. *Hrvatski farmer*, Zagreb.
9. Krostitz, W. (1996): The market for game meat. *Fleischwirtschaft*, 76(10):1029 ff.
10. Lecocq, Y. (1997): A European perspective on wild game meat and public health. *Revue Scientifique et Technique*, 16(2):579-585.
11. Lusky, K., Lippert, A., Stoyke, M., Bohm, D., Hecht, H., Luthard, M. (1994): Environmental contaminants in Roe Deer, Red Deer, Fallow Deer, Moufflon and Wild Boars. *Fleischwirtschaft*, 74(2):189-191.
12. Mann, N. (2000): Dietary lean red meat and human evolution. *European Journal of Nutrition*, 39(2):71-79.
13. Njari, B., Mioković, B., Sruk, V., Perić, T., Gregurić, I. (2004): Prilog veterinarsko-sanitarnom pregledu mesa divljači. *Zbornik radova Trećeg hrvatskog veterinarskog kongresa, Opatija, 17.-21. studenog 2004.*, 302-306.
14. Paleari, M.A., Moretti, V.M., Beretta, G., Mentasti, T., Bersani, C. (2003): Cured products from different animal species. *Meat science*, 63(4):485-489.
15. Souci, S.W., Fachmann, W., Kraut, H. (1979): Die Zusammensetzung der Lebensmittell. Nährwert-Tabellen. *Wissenschaftliche Verlagsgesellschaft MBH, Stuttgart*.
16. Szekely, K. (1997): Changes in the meat inspection and food control according to new legal regulton. *Magyar Allatorvosok Lapja*. 119(4):214-216.
17. Uherova, R., Buchtova, V., Tkacsova, M. (1992): Nutritional factors in game. *Fleischwirtschaft*, 72(8):1155-1156.
18. Zlender, B., Čepin, S. (2003): Traditional Slovene meat products. *Fleischwirtschaft*, 83(1): 81-85.
19. Živković, J. (2001): Higijena i tehnologija mesa I. dio. *Veterinarsko-sanitarni nadzor životinja za klanje i mesa*. Orbis, Zagreb.
20. Council Directive 92/45/EEC of 16 June 1992.
21. Regulations on requirements set for facilities used for animal slaughter and processing and storage of meat products (1992). *Official Journal of Croatia* 20.
22. *Statistical Yearbook of Croatia, 1995-2004*.
23. *Law on food (2003)*. *Official Journal of Croatia* 117.
24. *Law on hunting (1994)*. *Official Journal of Croatia* 10.
25. *Law on veterinary medicine (1997)*, *Official Journal of Croatia* 90.

TRŽIŠTE MESA DIVLJAČI U ISTOČNOJ HRVATSKOJ

SAŽETAK

Meso divljači se u Republici Hrvatskoj konzumira u znatno manjim količinama od mesa domaćih životinja. Potrošnja mesa divljači iznosi svega 0,55 kg po članu domaćinstva godišnje. Potrošači preferiraju cijenom

povoljnije meso domaćih životinja, bez obzira na pojedine nutricionističke prednosti mesa divljači. Istraživanje tržišta mesa divljači i preferencije potrošača provedeni su na 101 ispitaniku među stanovništvom Slavonije i Baranje. Većina anketiranih stanovnika konzumirala je meso divljači (92%) i misli da je ono kvalitetnije od mesa domaćih životinja (66%). Značajan broj anketiranih smatra da je meso divljači ekološki zdrava hrana i da je zdravije ukoliko se divljač odstrijeli u prirodi, nego da je podrijetlom sa specijaliziranih farmi (90%). Bez obzira na kvalitetu, tek 22% ispitanika kupuje meso divljači, a 51% anketiranih smatra da je ono preskupo. To je i glavni razlog što je meso divljači na stolu potrošača tek jednom mjesečno (51%). S obzirom na mjesečna primanja članova, 58% anketiranih u mogućnosti je konzumirati meso divljači samo jednom mjesečno, a najradije bi izabrali meso srneće divljači (55%) i zeca (25%). Na temelju provedene ankete, tržište mesa divljači moguće je poboljšati sniženjem cijena, što smatra 56% ispitanika, dok 27% misli da bi se ono poboljšalo otvaranjem specijaliziranih prodavaonica, a tek 17% ispitanika izjasnilo se za jaču marketinšku aktivnost.

Ključne riječi: tržište, meso divljači, potrošači, konzumacija

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