

**Effect of bovine spongiform encephalopathy on consumption  
and beef meat market in Croatia**

**Mijic, P., Tolusic, Z., Rimac, D.**  
**University of Josip Juraj Strossmayer in Osijek**  
**Faculty of Agriculture in Osijek; Trg sv. Trojstva 3;**  
**31000 Osijek; Croatia; e-mail:pmijic@pfos.hr**



*Paper prepared for presentation at the 99<sup>th</sup> seminar of the EAAE  
(European Association of Agricultural Economists),  
'title', place, country, date as in: August 24-27, 2005*

*Copyright 2005 by [mijic et al.]. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.*

# **EFFECT OF BOVINE SPONGIFORM ENCEPHALOPATHY ON CONSUMPTION AND BEEF MEAT MARKET IN CROATIA**

## **Abstract**

Occurrence of cattle disease known as Bovine spongiform encephalopathy (BSE) has caused great fluctuations in production and consumption of beef meat in the European Union. Croatia does not have enough cattle to meet demands of domestic market. However, there is not one case of BSE in cattle reported in Croatia to date. This fact can be used as an advantage on the beef meat market, presupposing that Croatia has implemented quality programs to increase number of cattle. Research results show that 70% of examinees consume beef at least once a week up to several times a month, and 70.5% have not reduced beef consumption after the disease occurred.

Keywords: market, consumption, beef meat, BSE, Croatia

## **Introduction**

Bovine spongiform encephalopathy (BSE) is a disease of adult cows, most likely caused by a type of prions, i.e. very small particles built up of resistant proteins (Cullen et al., 1996). Consumption of milk and milk products is generally considered to be safe even if it originates from cattle with diagnosed BSE. The disease cannot be transferred by muscles (meat) alone, but the risk of infection becomes greater if meat is exposed to other contaminated animal tissues, such as brain and parts of a neural system (Prince et al., 2003).

In 2005, Croatia expects to start a negotiation process to access the European Union, which would also enable its joining the Central European Free Trade Zone (Tolušić et al., 2004). In that sense, Croatian beef meat and products can be a commodity to offer on this large and demanding market (Tolušić et al., 2005), especially if knowing that Croatia has not reported cases of BSE (Šoštarić et al., 2004). Current problems Croatian production industry is confronted with are limited domestic market and insufficient number of cattle. Almost 90% of all cattle in Croatia is reared on family farms, the rest is reared by agricultural companies or cooperatives. About 100.000 family farms rear cows, thus being potential suppliers of calves and baby beef. Number of fattening cattle is being decreasing over years. The most intensive decrease is marked by agricultural-food companies, which were known as good cattle breeders, although those companies even now (1999) participate in a total number with two thirds or more, if considering production processes. In 1999, there were 36.000 heads of fattening cattle in all, 12.000 of which were reared on family farms, and 24.000 by agricultural companies and cooperatives.

Production of beef meat is decreasing since 1997. Most of family farms (about 80%) rear Simmental breed, primarily for milk production, as well as for fattening. Such farms provide calves and baby beef for feedlots, but because of decreased number of reproductive cattle, prices of calves are constantly increasing. The objective of this research was to study the effect that the BSE occurrence has on the frequency of beef consumption and consequently, on the beef meat market in Croatia.

## **Material and Methods**

The research was carried out by questioning a total of 619 people, male and female, between 18 and 70 years of age. Survey was done in Croatia, in the following three Slavonian counties: Osijek-Baranja County (1), Vukovar-Syrmia County (2) and Brod-Posavina County (3). Questionnaire was based on 15 questions. In order to avoid fatigue of examinees, the time available for answering the questions was set in advance, being 15 minutes. As a part of the preparation phase, questionnaire content and procedure were explained to people involved in the survey.

Table 1. Gender structure of examinees in each county

County	Male (n = 244)		Female (n = 375)	
	n	%	n	%
1	53	8,6	148	23,9
2	105	17,0	114	18,4
3	86	13,9	113	18,3

Standard methods of descriptive statistics were used to interpret obtained results. Statistical data analysis was performed on STATISTICA 6.0. Conclusions based upon analyzed data reflect the current condition of the beef meat market and elaborate the parameters which affect the purchasing power of consumers.

### Results and discussion

Cattle market in Croatia is not well developed. Investments in that market are also not well used, which reflects on intensive production. There is not enough supplies of beef on Croatian market (75%). Domestic production was decreased for about 10.000 t in the period 1995-1999. Reasons for such a decrease are to be found in the lack of domestic, as well as imported fattening animals. In 1995, about 28.000 t of beef meat was produced. Until 1999, the production was decreased to 18.700 t. Croatian government secured financial means to support fattening of bulls and heifers, and even increased subventions in underdeveloped strategic areas.

Results obtained in researches point out that 96.8% of all examinees consume beef meat regularly. ANOVA and Tukey HSD test proved that there is a justified difference among counties in question, being  $F = 7.27^{**}$ , i.e. the most beef meat is consumed in County 2, if compared to other two counties. Of all beef meat sorts, more than 50% of examinees consume baby beef (52.5%). Over 66% consume beef meat once a week up to once a month. Examinees usually pay attention to whether meat was controlled by a veterinary inspection (83.5%) and of what origin that meat was (73%). The majority of examinees (98.5%) have heard of mad cow disease, but 55.4% of them does not fear that disease because they consider Croatia as a BSE safe country. The most of examinees (58%) buy beef meat in registered slaughter houses, 72% pay attention to meat quality and only 23.7% to price.

During Homeland War 1991-1995, all cattle capacities in Croatia were heavily damaged. Statistical analysis claimed 130,000 cattle killed or stolen, which had a direct impact on the beef meat market. A total of cows and in-calf heifers was reduced to only 65% of the pre-war cattle capacity. Unfortunately, such negative trends continued in 2000, with a total of 428,000 cattle, out of which 301,000 were cows and heifers (Statistical yearbook, 2004). Because of these negative trends, it is necessary to establish a balanced connection between programs of cattle breeding for meat production and real demands of the beef meat market (Weiher, 1994). As Croatia disposes of numerous pasture areas, it is advisable to adopt a semi-intensive breeding model focused on cow-calf production.

Table 2: Consumption of beef within the investigated area (in %)

Frequency of beef consumption	County		
	(1)	(2)	(3)
Every day	3.0	9.5	8.5
Once a week	28.0	26.5	32.0
Once a month	23.0	20.5	20.5
Several times a week	30.0	31.0	5.5
Once in three months	9.0	9.0	9.5
Once a year	7.0	3.5	24.0
Total	100.0	100.0	100.0

Research results, as presented in Table 2, point out low daily consumption of beef, ranging from 3.0% to 9.5%, while the weekly consumption is considerably higher. In general, over 70% of examinees consume beef at least once a week up to several times a month.

Questionnaire results also show that 91.5% of examinees, when buying beef, pay attention to whether meat was controlled by a veterinary inspection. Awareness of BSE is very high, amounting to 98%, out of which 70.5% have not reduced beef meat consumption mainly because they believe that Croatia does not have any risk associated with BSE. There is no shortage of beef on Croatian market, as substantial amounts of beef are being imported from the European Union (Statistical yearbook, 2004). As consumers are aware of this fact, they want to be informed on the origin of beef they intend to buy.

In the Republic of Croatia there has not been cases of BSE diagnosed by postmortem histopathological brain examination or by applied quick tests either on animals that exhibited clinical symptoms of central nervous system disorders, or on healthy cattle older than 24 months being in a regular slaughter process. Up to date, that statement refers to cattle and their offspring originating from Croatia (Šoštarić et al., 2004). In the period 2001 to September 3, 2004, there were 47.438 samples of cattle brain tested to BSE (Mihaljević et al., 2004).

For many years, Croatia imports reproductive heifers (mostly from Germany and the Netherlands) with the aim to improve domestic herd needed for milk production. Moreover, because of already mentioned losses, Croatia imports young cattle for fattening purposes, mostly from Middle and Eastern European countries. Referring to the obligations set by WTO, protective import fees on live cattle and beef halves will be gradually reduced. The level of market protection in the cattle breeding is significantly lower than in the EU, according to the WTO regulations. Therefore, access to the EU in that respect should not be a problem in the future, if the EU does not decrease the level of market protection in meantime.

Moreover, future integration of Croatia into the European Union will open the boundaries and thus increase the risk of importing live cattle and meat infected with BSE. We witness recent trend of opening foreign large shopping centers, which offer, among others, also beef meat produced abroad. Croatian cattle breeders need to recognize these times as favorable not for importing cattle from abroad, but for marketing Croatian beef meat in the EU. Quality beef meat should be specially labeled, and its production should be stimulated through higher prices. If considering its geographical position, it can be concluded that Croatia succeeded in remaining a resource of ecological production and consumption of beef meat.

## **Conclusion**

Speaking in terms of public health, BSE is a very serious cattle disease. To date, there is not one case of BSE in cattle reported in Croatia, which is of great importance for the beef industry, as well as for the market. In order to prevent BSE occurrence, and ensure the safety of humans and animals, efforts need to be undertaken at all levels. Responsible state institutions should implement effective measures to maintain consumer's trust and avoid possible economic losses caused by the occurrence of that disease abroad.

## **References**

- Cullen, M., Bellis, M., Tocque, K. (1996). Bovine spongiform encephalopathy: Public health officials are confused over whether to eat beef. *British Medical Journal* 313 (7065): 1146.
- Mihaljević Ž., Šoštarić B., Bilandžić N., Vicković I. (2004): Presentation of the number of cattle analysed to BSE by counties in the period from 2001 to 2004. Third veterinary congress, Opatija, Croatia 17-19 November, 2004, pp. 209-212.
- Prince, M. J., Bailey, J. A., Barrowman, P. R., Bishop, K. J., Campbell, G. R., Wood, J. M. (2003). Bovine spongiform encephalopathy. *Revue Scientifique et Technique*. 22 (1): 37-60.
- StatSoft, Inc. 2003. STATISTICA (data analysis software system), version 6.
- Statistical yearbook (2004). Republic of Croatia – Central Bureau of Statistics, Zagreb.

- Šoštarić B., Šeparović S., Mihaljević Ž., Bilandžić N., Vicković I., Lojkić M., Brstilo M. (2004). Bovine spongiform encephalopathy – Situation in Croatia and new trends in world. Third veterinary congress, Opatija, Croatia 17-19 November, 2004, pp. 203-208.
- Tolušić Z., Mijić P., Rimac D. (2004). Bovine spongiform encephalopathy and beef market in Eastern Croatia. Second conference energy efficiency and agricultural engineering. Association of Agricultural Engineering in Southeastern Europe. Rousse, Bulgaria 3-5 June, 2004, pp. 185-189.
- Tolušić, Z., Rimac, D., Mijić, P. (2005). Impact of ecological production on quality of beef market in the Republic of Croatia. 40th Croatian Symposium on Agriculture with International Participation. Opatija, Croatia, 15–18 February 2005, pp. 127-128.
- Weiher, O. (1994). Breeding aims and marketing in beef cattle breeding. *Zuchtungskunde*. 66 (6) 471-483.