Available online at www.sciencedirect.com
ScienceDirect
Procedia Economics and Finance 23 (2015) 697 – 703
Procedia
Economics and Finance
www.elsevier.com/locate/procedia

2nd GLOBAL CONFERENCE on BUSINESS, ECONOMICS, MANAGEMENT and TOURISM, 30-31 October 2014, Prague, Czech Republic

Horse Meat Consumption - Between Scandal and Reality

Silvius Stanciu [a]*

[a]*The Bucharest University of Economic Studies, Romania 180, Brailei Street, Galati, Romania, 800236*

Abstract

The meat adulteration scandal has led to numerous controversies in the press and among consumers concerning the effects of horse meat consumption, its nutritional characteristics, the confidence in foodstuffs, and the frauds and ethics issues in food production. The present article proposes a scientific evaluation of the physical, chemical and nutritional characteristics of the horse meat with a comparison between the meat coming from other species of domestic animals focusing also on its production for human consumption, the traditional consumption in different areas of the world, arguments for consumption, the reaction of the European Commission and the measures taken in order to avoid critical situations of such kind. The materials and methods used for research consisted in treaties and scientific articles regarding the characteristics and nutritional facts of the horse meat, statistical databases, data about its production and consumption, studies among consumers and media items on the horse meat scandal, and official documents concerning the food fraud. Although the horse meat scandal has affected the European consumer behavior, the main problems are not nutritional or food safety. This type of meat is a valuable new foodstuff, with physical, chemical and nutritional characteristics higher or closer to those of other domestic animals, being a part of the traditional diet in many communities. Yet, the main problems are those related to ethics, such as the attempts of fraud of some producers or traders. The European Union reacted promptly to the scandal of beef substitution with horse meat, proposing measures for strengthening the system of control and food fraud prevention.

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Keywords: horse meat, production, consumption, nutrition facts, food fraud, risk

1. Introduction

The food crisis, triggered in 2013 by beef substitution with horse meat in the lasagna produced by Comigel and marketed by Findus, led to the checking of other meat products marketed on the European market. The complex analysis methods applied allowed the identification of horse meat in products which initially were declared to have

* Silvius Stanciu . Tel.: +40722244407
E-mail address: Silvius.Stanciu@ugal.ro

Selection and/ peer-review under responsibility of Academic World Research and Education Center
doi:10.1016/S2212-5671(15)00392-5

only meat from other species of animals (Humphrey, 2011). According to the European Commission (EC) (2014), the horse meat incident involved a fraudulent labeling and didn't affect food safety or public health. The fraudsters speculated the deficiencies from the supply chain, affecting both the image of the companies that obeyed the law and consumer interests (Van Vark et al, 2013). The European food sector faced a consumer trust crisis, red meat consumption reduction, beef product boycotting and led to choosing some other meat types or vegetarian diets (Stanciu et al, 2013). The horse meat scandal, a viral social subject for the media, led to different opinions in point of technical approach and scientific information access. The consumer confronted with uncertainties regarding the horse meat nutritional characteristics and innocuity as well as potential effects on health. The legality, morality and ethics in food business also played a very important part in the scandal (Stanciu et al, 2013). The European Commission (2014) has launched a five-step program designed to prevent food sector fraud, to implement a product authenticity testing community system, to locate and identify horses, to carry out official checking and sanctions, to expand compulsory labeling for food products. In 2014, the program was materialized in the creation of a food fraud prevention network, of a system specialized in border fraud, of trainings for the food sector community officers. The legal framework, which was applicable to official checking, was also revised.

2. Material and methods

In order to write the paper, different sources were consulted: treatises and scientific articles regarding horse breeding, horse meat composition and quality, potential effects on consumption, official information provided by European authorities, producer associations, press releases and TV statements. The statistical data regarding horse meat production, consumption and marketing were taken from FAO, The European Commission or The National Institute of Statistics databases. The collected information was processed, graphically represented, comparatively analyzed and we tried to make some correlations in order to understand the studied phenomena.

3. Horse meat consumption and production at a global level

The horse (*Equus caballus*), herbivorous mammal of the *Perissodactylia* order, the *Ecvidee* family (Doliş, 2012), was domesticated 5,000 – 6,000 years ago on a territory that today corresponds to the grassy steppes from Ukraine, south-east Russia and western Kazakhstan (Pearson, 2011; Warmuth et al, 2011). At present, the use of horses for hunting, war, farming, transportation is sporadically practiced as horse breeding is mainly practiced for leisure activities and medicine. Horse meat consumption is ancestral: there is archaeological evidence regarding the use of wild horses as food source in late Paleolithic (Terrejón, 2001; Pîrlog, 2012). The reconsideration of equines as an industrial meat source is correlated with the bovine spongiform encephalitis (Deleni, 2009).

The use of horse meat was influenced by the availability of food, need, tradition and religious resources. Legally, horse meat consumption was banned in Europe only in Norway, Iceland and Sweden. In Central Asia, horse meat is part of the traditional diet, while some European or African regions consider horse meat a delicacy (Garifulovich Kurmangaliyev et al, 2013). The great majority of religious customs forbid horse meat consumption. In the Islamic religion, the horse is holy, the Catholic religion forbids horse meat consumption; the Jewish religion also forbids horse meat consumption as well as the Hindu religion, which protects life and the animals. There are only a few religious traditions, for example the anti-Christian rites, practiced by the Germanic peoples, that imply horse slaughter and horse meat consumption (Marginean, 2012).

In some European countries, horses were used as food source in critical situations (wars, poverty and famine). Although there was not a tradition of horse meat consumption, the high cost of food products during the French Revolution led the population towards horse meat consumption, which was considered a low-quality one. The year 1866 brings the legalization of horse meat consumption and the opening of the first store in Paris. The promotion of horse meat consumption, made by the French doctors and veterinarians and the existence of horse meat in butcher's shops and restaurants led to its inclusion in the diet of the population with medium incomes (Pearson, 2011).

A complex assessment of the eating habits must take into consideration cultural and economic factors, as well as institutional, intellectual and social aspects. The people from the Anglo-Saxon area do not traditionally eat horse meat. An analysis of horse meat consumption carried out by Otter (2011), suggests two hypotheses in order to explain the difference between the French and English eating habits. The hypothesis according to which the

economic situation influences cultural values and consumption justifies the lack of consumption in the Anglo-Saxon area. The access the British had to meat resources from the international market allowed them to consider horse meat disgusting. The second hypothesis suggests the influence of religion on horse meat consumption, Christianity considering the horse almost as a holy animal (but France proved that religious precepts can be overlooked in case of necessity).

Horse meat can be cooked and eaten in different ways. The culinary treatise Mac Veigh (2009) and the national and international culinary recommendations have different names, recipes and ways of cooking and marketing horse meat globally.

The processed data regarding horse meat production, trade and consumption, taken from the FAO Databases are presented in tables 1 and 2. The total number of horses in the world varied slightly around 60 million heads, from 59.8 million in 2008 to 58.3 million, with the highest number recorded in 2010, of 60.2 million heads. Approximately 10 % from horses are in Europe and almost double in Asia. The greatest number of horses is in the USA and Canada, followed by China, Mexico and Brazil.

Annually approximately 8-10% of the total number of horses is slaughtered. In 2013, the total horse meat production was of 761 thousand tons, at 4.8 million slaughtered horses, recording a slight raise as compared to 2009 (729 thousand tonnes).

Table 1. Horse meat production data (World, Europe and Romania)

Area	Element	2009	2010	2011	2012	2013
World	Producing Animals/Slaughtered (Head)	4732817	4654152	4751524	4880678	4863367
	Yield/Carcass Weight (Hg/An)	1540,77	1555,62	1552,53	1567,38	1564,78
	Production (tonnes)	729218,15	724008,37	737687,5	764989,9	761008,13
Europe	Producing Animals/Slaughtered (Head)	666034,09	694351	664096	692865	648567
	Yield/Carcass Weight (Hg/An)	2104,73	2069,47	2119,26	2117,04	2169,37
	Production (tonnes)	140182	143694	140739	146682	140698,4
Romania	Producing Animals/Slaughtered (Head)	53000	53000	51000	51000	51000
	Yield/Carcass Weight (Hg/An)	1800	1800	1800	1800	1800
	Production (tonnes)	9540	9540	9180	9180	9180

(Source FAOSTAT Database, 2014)

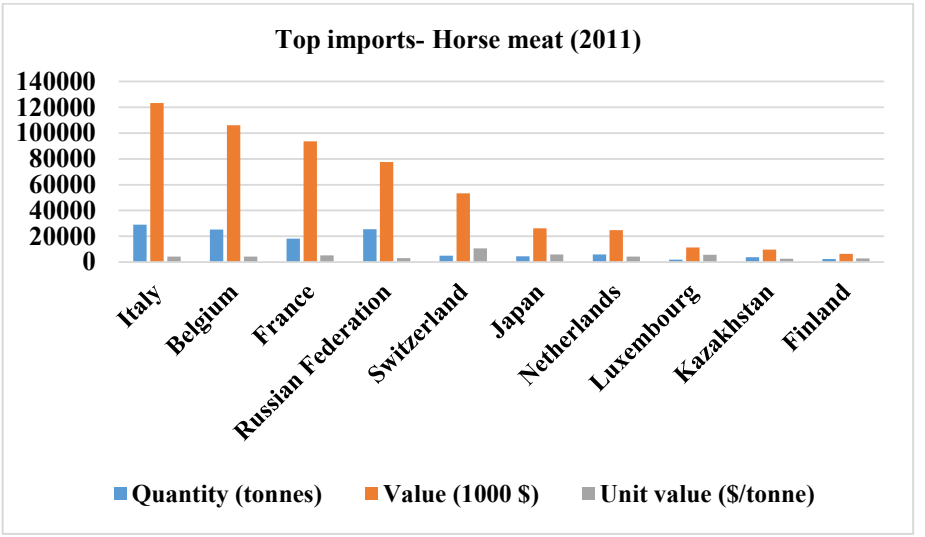
The value of the total horse meat imports was of approximately 557 million dollars, at a traded amount of 133.6 thousand tonnes. Global exports were of approximately 568 million dollars, at a quantity of 140.6 thousand tonnes of meat (table 2).

Table 2. Horse meat trade data (World, Europe and Romania)

Area	Element	2009	2010	2011
	Horsemeat exports (tonnes)	144708.0	139762.0	140659
World	Horsemeat imports (tonnes)	148337.0	137259.0	133615
	Horsemeat exports (tonnes)	64645.0	63802.0	69766.0
Europe	Horsemeat imports (tonnes)	138029.0	123684.0	119020.0
	Horsemeat exports (tonnes)	3372.0	5320.0	6151.0
Romania	Horsemeat imports (tonnes)	120.0	19.0	3.0

(Source FAOSTAT Database, 2014)

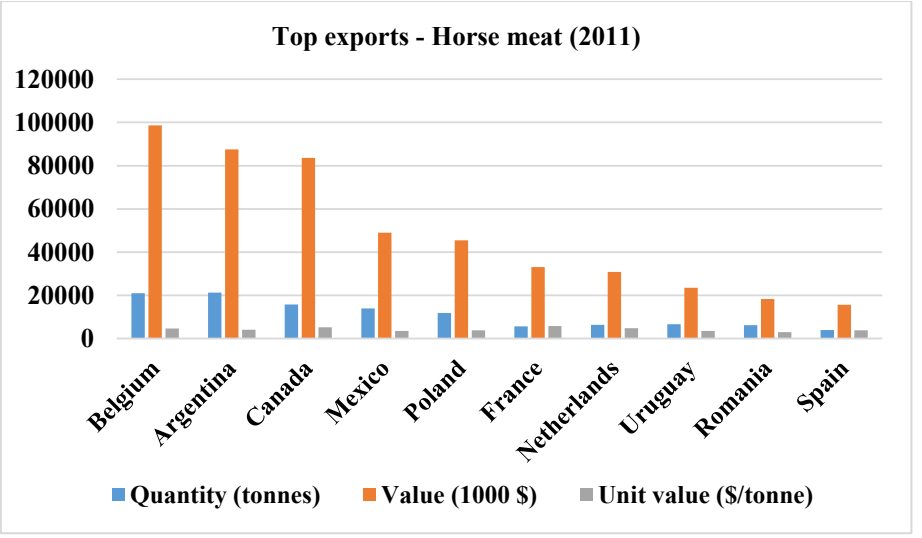
Italy remains the world's biggest horse meat importer, with almost 29 thousand tonnes, purchased from the foreign market in 2011 (Figure 1) and one of the main European consumers (Figure 2).



(Source FAOSTAT Database, 2014)

Fig.1. World's top horse meat importers in 2011

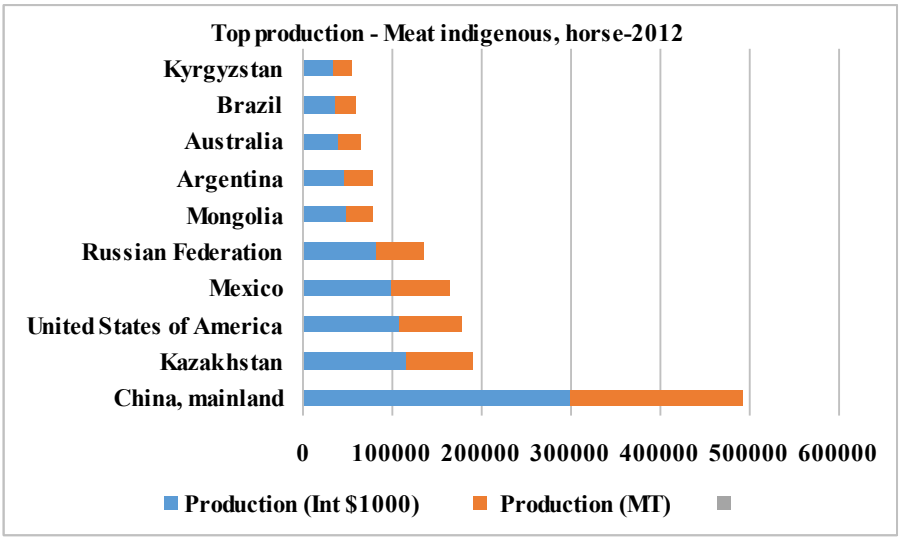
Belgium, with horse meat imports of approximately 25.3 thousand tons, at an exported quantity of 21 thousand tons represents one of the world's main consumers and merchants, as compared to the number of inhabitants (Figure 4).



(Source Eurostat Database, 2014)

Fig.2. World's top horse meat exporters in 2011

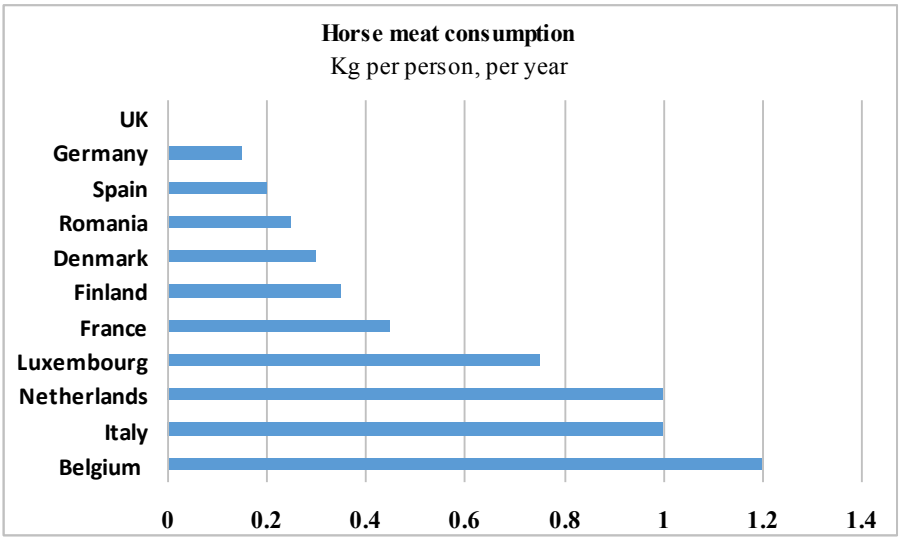
France is on the third place in the world, with imports of over 66 million dollars, being followed by the Russian Federation and Bulgaria.



(Source FAOSTAT Database, 2014)

Fig. 3. Horse meat producers - countries in the world

Although, in Romania, horse meat is consumed only in some communities and it is used only for some types of salami (the Sibiu salami for example), it occupies the eight place in the European consumers top (Figure 4).



(Source Eurostat Database, 2014)

Fig.. 4. Horse meat consumers in Europe

4. Horse meat composition and nutritional features

Horse meat falls into the category of red meat, which comes from butcher animals (beef, pork, sheep meat, goat meat, horse meat). The organoleptic features make horse meat resemble beef. Carcass evaluation offers correct

information for species identification. The commercial types of meat are difficult to identify as commercial cutting of both meats is similar. In order to identify the species in processed products immunological procedures are carried out, procedures that determine the meat's normal components (glycogen) or metabolism products (creatine). Horse meat color varies from dark red in mature animals to pink – red in young animals (due to higher water content). The consistency, influenced by the fattening degree, is firm but soft when touched, lower than beef. The smell of fresh horse meat is pleasant, specific, but can be easily affected by the way the animal was bred, by medicines, by transport or storage conditions. Horse meat fat resembles that of beef. The lacks of bones and of the head, which are not marketed for the horse meat, constitute impediments in the osteological assessment. Commercial horse meat carving in order to delimitate quality and marketing classes is close to beef (Canadian Food Inspection Agency, 2014).

According to Banu (2009), horse meat represents a valuable type of food from a composition point of view. The data referring to the main nutritive elements and to the energy value of different types of meat (Table 3), highlight a high content of proteins and mineral components and a low percentage of fat for horse meat. The non-lipid caloric intake of cooked horse meat is superior to beef (120 calories/100g. vs. 110 calories/100 g).

Lee et al. (2007) specify that the percentage of useful minerals in horse meat (P, K, Ca, Mg, Na, Fe, Mn, Zn, Cu) properly covers body needs. As compared to beef, horse meat has a high content of iron and enough Zn to cover one third of an adult daily requirement (Banu, 2009).

Table 3. Main components and energy value of horse meat, beef, veal, pork, lamb and sheep (average values for status fattening average)

	Water (%)	Protein (%)	Lipids (%)	Minerals (%)	Calories (unit/100g)
Horse meat	71,0	22,6	5,5	0,9	136,4
Beef	68,3	20,0	10,7	11,1	181,5
Veal	68,0	20,0	11,0	1,0	184,3
Pork	65,1	19,0	15,0	0,9	217,4
Lamb	72,0	21,0	6,1	0,9	142,8
Sheep	64,8	17,0	17,2	1,0	229,6

(Source Banu, 2009)

The research carried out by Lombardi-Boccia, Lanzi and Aguzzi (2005) proved that horse meat has a higher vitamin content than beef, covering the daily requirement of an adult person. Horse meat has moderate cholesterol content, close to that of beef (52 mg./100 g.) and a higher quantity of omega-3 fatty acids (360 mg/100 grams vs. 21 mg/100g) (Pino, 2011). The composition rich in minerals and vitamins are solid arguments used by nutritionists to recommend horse meat consumption to people suffering from anemia.

5. Conclusions

Horse meat consumption doesn't pose any danger to the population if the animal is healthy, if it is slaughtered in specialized units and if the storage and marketing conditions are obeyed. The major problems regarding horse meat consumption can be due to consumers 'preferences and the hygienic quality of meat. The high protein value, the minerals and vitamins that are in sufficient quantities for the human body recommend horse meat as a food of the future. Although there is a certain reluctance regarding horse meat consumption, the need for proteins of an increasingly large population will lead to a reconsideration of horse meat consumption.

Acknowledgements

This paper was co-financed from the European Social Fund through Sectorial Operational Programme Human Resources Development 2007-2013, project POSDRU number /159/1.5/S/138907 "Excellence in scientific interdisciplinary research, doctoral and postdoctoral school, in the economic, social and medical fields-EXCELIS", coordinator The Bucharest University of Economic Studies

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