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Quality of donkey bresaola

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ABSTRACT - Nutritional and organoleptic properties were evaluated in bresaola of cow and donkey meat and, moreover, was made a comparison between these two products. The cured products were made from *semitendinosus* muscle taken from 8 female donkeys and 8 cows. Donkey bresaola showed lower SFA percentage ($P<0.05$) and higher PUFA content ($P<0.01$) with higher fatty acids ω 3 ($P<0.01$) than beef bresaola. Donkey bresaola showed higher content of protein ($P<0.01$) and essential amminoacids ($P<0.05$) than beef bresaola. No differences were found for sensorial properties. Our investigation demonstrates the possibility of trasforming donkey meat into a product similar to that of beef with a high nutritional value.

Key words: Donkey, Beef, Bresaola, Nutritional properties.

Introduction - In the last years food demands have been transformed and modified. Indeed, increasing consumer interest is being shown in the energetic and nutritional values of food, consumers prefer meat that is authentic, thasty, rich in protein and low in lipid and cholesterol content (Mastrosimone et al., 1998). Donkey (Equus asinus) is one of the most important domestic animals widespride in urban and rural areas of Africa, Central America and Asia, because the donkey can survive, reproduce and produce meat and milk in hard environmental condition. Recently, in many countries of the Mediterranean area, interest in donkey rearing is increased, due to interest in the nutritional properties of donkey meat for infant nutrition (Salimei *et al.*, 2004). On the contrary, the consumption of donkey meat is relatively unknown, even if donkey meat has low fat and cholesterol content and high protein content (Polidori *et al*. 2008)

The aim of this investigation was to give greater value to donkey meat by using it to produce typical, processed meat product.

Material and methods - The bresaola of donkey meat was prepared in a sausage industry (Carni SUS, Foggia, Italy) under traditional conditions and compared with bovine bresaola.

The samples of meat investigated were collected from *semitendinosus* taken from 8 female donkeys and 8 cows, slaughtered after reaching the end of their milk-producing life. The meat was trimmed by fat and additioned with a mixture of salt, pepper, juniper, nutmeg, laurel and garlic. The cuts were tumbled with mixture at 0-4°C for 6-7 days. At the end of this period the bresaola were washed and dried at 25°C and R.H. 65%, after 4-5 days started the curing step: 13°C for 40-50 days with R.H. 80%. The cured products were analyzed at the end of this period; nutritional and organoleptic properties of donkey and cow bresaola were compared.

Lipids were extracted according to Bligh and Dyer (1959), duplicate samples of chloroform extract, were methylated according to ISO-IDF (2002). Gas-chromatograph analysis for fatty acids methil esteres determination was performed using an Agilent 6890N instrument equipped with a HP-88 fused-silica capillary column (length 100 m, internal diameter 0.25 mm, film thickness 0.25 μm). Individual FAMEs peaks were identified by comparing their retention times with those of standards (Matreya). Atherogenic and thrombogenic indices were calculated according to Ulbricht and Southgate (1991).

Analysis of amino acids were performed combining both the derivatization reaction and HPLC chromatographic separations, using an HPLC system Agilent Technologies 1100. Individual amino acids peaks were identified by comparing their retention times with those of standards. Results are expressed as mg amino acids/g total amino acids.

WBSF was measured on five parallelepipeds (1cm^2 in cross-section) cutted from each sample and sheared by an Instron Universal Testing machine (Model 3343), equipped with a Warner-Bratzler shear device. For each muscle a mean value was calculated and used for statistical analysis. A consumer test was carried out with a panel composed of students and staff of the University of Foggia (80 persons) for sensorial analysis. The consumers were asked to evaluate colour, odour, flavour and taste of bresaola. The samples were evaluated for acceptability using a 9-point hedonic scale (1=extremely dislike; 9=like extremely).

Data were subjected to an analysis of variance, using the GLM procedure of the SAS statistical software (1999). Least squares means were evaluated using the PDIFF and STDERR options of SAS. Sensory values were normalised standardising each assessor by his standard deviation in order to reduce the effect of the different use of the scale.

Results and conclusions - Table 1 shows fatty acids profile of donkey bresaola compared with beef bresaola. Donkey bresaola showed lower SFA percentage (P<0.05) and higher PUFA content (P<0.01) with higher fatty acids ω-3 (P<0.01) than beef bresaola. No literature references were found for fatty acids of donkey bresaola, even if Paleari *et al.(*2003) in horsemeat bresaola found the highest content compared to other animals. This result could be due to outdoor rearing system for donkeys with a greater availability of fresh grass to the diet; indeed, it is known a predominance of C18:3 ω-3 (precursor of the ω-3 series) in grass lipids. In particular, bresaola from donkey had a higher content of very long chain (VLC) fatty acids, such as eicosapentenoic (2.08 *vs* 0.64, P<0.01), and docosahexenoic (0.32 *vs* 0.09, P<0.05) acids (data not shown).Recent research (Givens *et al.*, 2006) underlined the role of the consumption of very long chain (carbon chain length ≥20) ω-3 PUFAs in relation to chronic disease, their beneficial effects include anti-atherogenic, anti-thrombotic, and anti-inflammatory effects. In addition bresaola of donkey meat showed better nutritional indexes than beef bresaola showing lower AI and TI (P<0.01) and higher P/S ratio than beef bresaola.

Table 1. Fatty acids composition (%) of donkey and beef bresaola (means ± SE).

	Donkey	Beef	SEM	Effect, P
SFA	35.22	38.69	1.01	*
MUFA	41.87	41.18	1.50	NS
PUFA	22.53	19.30	0.80	**
n3	3.36	1.18	0.50	**
n6	18.93	17.48	0.62	NS
P/S	0.64	0.50	0.05	*
AI	0.40	0.69	0.06	**
TI	0.83	1.14	0.08	**

NS=not significant,=P<0.05, **=P<0.001.*

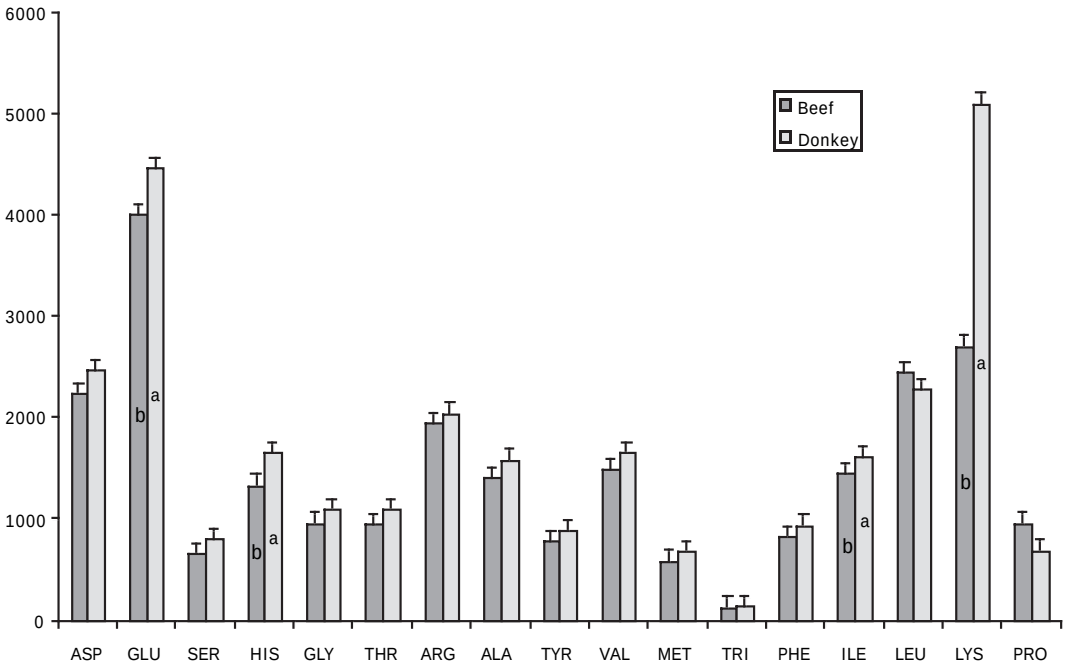
Donkey bresaola showed higher content of protein than beef bresaola (29.25% *vs* 25.35%, P<0.01, data not shown), in figure 1 is showed amminoacids content of both cured products. Donkey bresaola showed higher content of glutamic acid (0.05), histidine (P<0.05), isoleucine (P<0.01) and leucine

(P<0.001) than beef, that led to higher content of essential amminoacids (13534 *vs* 10617 mg/g, P<0.05, data not shown). This result underline the high nutritional value of donkey bresaola.

There were non significant differences in the score of colour, flavour, taste and tenderness evaluated by consumer test, both cured products were acceptable, on the contrary, bresaola from donkey meat showed lower WBS than beef (4.5 *vs* 6.8 kg/cm^2, data not shown) resulting more tender.

Our investigation demonstrates the possibility of trasforming cuts of donkey (e.g. eye round) into a product similar to that of beef with a high nutritional value (higher content of polyunsaturated fatty acids, higher content in protein and essential amino acids). Thus donkey meat can give an additional resource to local farmers in addition to milk production and typical products with their own niche in the marketplace could be created.

Figure 1. Amino acids composition (mg/100 g)of donkey and beef bresaola (means ± SE).



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