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RIASSUNTO – Qualità sensoriale della carne di agnelli alimentati con diete differenti. *Sono state sottoposte ad analisi sensoriale le carni di agnelli di razza Gentile di Puglia alimentati per sei settimane, dall'età di circa 50 giorni, con tre mangimi completi bilanciati: il primo contenente farina di estrazione di soia (Soia), il secondo farina integrale di lupino al 25% (Lupino), il terzo buccetta d'uva al 25% (Buccetta). E' stato eseguito un panel test su campioni di l. dorsi cucinati in un forno a 120°C sino al raggiungimento di una temperatura di 68-70°C all'interno del campione. Il profilo sensoriale ha considerato nove descrittori della tessitura e del flavour. La tesi Lupino rispetto a quella Soia non ha mostrato differenze significative rispetto all'odore di "Pecora" e di "Fegato", alla "Grassezza ed alla "Succosità" anche se un giudizio globale richiede ulteriori indagini. Validi nel loro insieme i risultati sulla tesi Buccetta.*

**Key words:** lamb meat, lupin, grape skin, sensory analysis.

INTRODUCTION – The whole seed of sweet lupin var. Multitalia with a protein content higher than 35% and a low content in alkaloids constitutes a good protein source alternative to soybean meal, today deriving for more than 60% from OGM (Genetically Modified Organisms) cultivation. Moreover, the poor national production and the cost of feeds for animals forces the livestock compartment to utilize alternative biomasses the availability of which highly depends on from the environment and the season. In Apulia grape skin is a largely available feed source for livestock (Apulia is the Italian region with the largest wine-growing surface), that can be easily stored since it presents a moisture content between 3 and 5% after the alcohol extraction cycle and a protein content betweeen 13 and 15% (Vicenti *et al.*, 1996; Ragni *et al.*, 1998), similar to cereal grain one. Former trials tested its value in ruminant feeding (Vicenti *et al.*, 1996; Ragni *et al.*, 1997; Vicenti *et al.*, 1997; Ragni *et al.*, 1998; Marsico *et al.*, 2003) with a supplementation up to 30% and positive effects both on productive performances and some quality traits of the meat (Ragni *et al.*, 1998). Up today no trial has been carried out to assess the influence of these feeding sources on the organoleptic qualities of the meat. The present research aims at evaluating the influence of lupin and grape skin on the sensory parameters of meat lamb.

MATERIALS AND METHODS – Twenty-four samples from 24 male lambs of Gentile di Puglia breed were subjected to sensory analysis of meat. The animals were kept in pen from the age of 50 d approx. for six weeks receiving three isoproteic, isolipidic and isocaloric balanced feeds containing as common foods maize, oat and barley: the first two containing as protein source soybean meal (Soya) and whole lupin flour at 25% (Lupin) on as it is basis; the third grape skin at 25% (Grape) on as it is basis. Slaughtering was carried out at the age of 92 days and samples of *longissimus dorsi* were taken after 24 h. The samples were refrigerated (+5°C) for seven days before freezing at the temperature of –40°C. These samples were sensory analysed using the technique of QDA, Quantitative Descriptive Analysis for establishing a sensory profile (Stone, 1992; ISO 13299,

2003). Test was performed in a ISO standard laboratory (Uni-ISO 8589, 1988). In each treatment, samples from eight lambs were tested in four sessions (replicates). A panel of ten trained assessors experienced in meat evaluation was employed, the performance of the panel was monitored according to ISO 8586-1 and –2 (1993; 1994). Descriptors were identified and chosen according to ISO 11035 (1984). After a preliminary phase of selection, twelve descriptors were selected and after a short specific training period on spare samples 9 were validated and kept to represent texture and flavour characteristics: total odour (od.), sheep od., liver od., broth od., fattiness, initial juiciness, hardness (evaluated between molars), chewiness, fibrousness. Assessors responses were recorded on score cards with 100 mm linear anchored scales (Lawless and Heymann, 1999).

Sample preparation. Samples were defrosted at room temperature (15-18°C) 4 hours before test session. Loins were cut in slices to obtain pieces as homogeneous as possible of around 4x2.5 cm. Cooking temperature was 120°C with an average cooking time of around 25 min to reach a final cooking temperature at the heart of the sample of 68-70° C (Sañudo *et al.*, 1997). Each cooked sample was served to assessors individually wrapped in aluminium foil, univocally identified with three-number code. Samples were distributed to assessors according to a randomized and balanced scheme. Data were analysed by Senstools v. 3.1.4. General Procrustes Analysis (GPA) was performed choosing these options: translation around means, isotropic scaling, rescaling of variance=100, analysis restricted to 10 dimensions, rotation according to Gower (1975).

RESULTS AND CONCLUSIONS – In the Spider Plot (figure 1) are reported overall means of scores for each attribute/thesis, representing sensory fingerprints of the three types of lamb meat for the considered descriptors.

Figure 1.   Spiderplot objects over-attributes
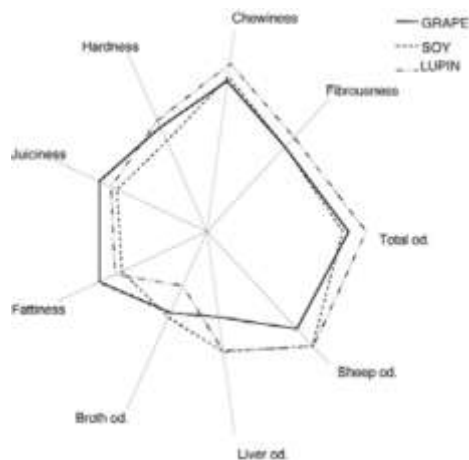
Evaluating scores by ANOVA Pairwise Significance by Attribute (table not reported) is possible to put in evidence that Lupin had a higher total od. and a lower broth od. than Test. The lambs reared with Grape had clearly lower (P<0.01) liver od. compared with other thesis. Grape, instead, got higher scores than Soya for fattiness and juiciness. The textural parameters, especially hardness, to which consumers pay particularly attention to (Piasentier *et al.*, 2003), showed no significant differences and, as in other similar researches (Valusso *et al.*, 2003), these attributes were judged of low/moderate intensity as a consequence of meat kind (lamb). General Procrustes Analysis (figure 2) showed the good treatment discrimination obtained by the taste panel with the chosen descriptors. In this case, total od. worked very well in differentiating Lupin from the other theses and liver od. and sheep od. differentiated Lupin and Soya from Grape.

Figure 2.   GPA Group Average: dimension 1 *vs.* 2.
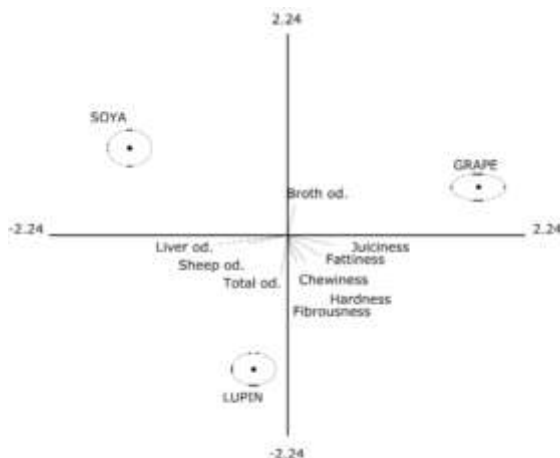
It should be pointed out that for the Lupin thesis negative off flavours were constantly reported by judges although, comparing with Soya thesis, no differences were find about sheep od., liver od., fattiness and juiciness. However, results suggest the need of a deeper investigation about lupin feed. Textural parameters were not so heavy in discriminating the different theses, even if it seems to be of lower intensity in Soya. The percentage of variation explained by the first dimension was 55.60, the second was 34.72. Regarding Grape thesis we can affirm the good performance of a by –product which offered good results about chewiness, fibrousness, total odour and broth od., with special emphasis for sheep od. and juiciness.

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