

PHYSICAL CHARACTERISTICS OF THE MEAT OF “NERO SICILIANO” PIGS LIVING IN EXTENSIVE CONDITION

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Background

“Nero Siciliano” pig lives in extensive condition in mountainous and woody areas of Messina province and neighbouring zones, where it utilise entirely alimentary resources of woods, of their glades and perimetrical areas. It fed grasses, leaves, shoots, tubers, roots, wild fruits etc. Characterised by great rusticity and good adaptability to the environment, generally unfavourable, it grows with difficulty, reaching at 1-year of age 50-60 Kg, in relation to possible alimentary integration too. (Chiofalo L. et al. 1989). Because of its conformation (long muzzle, presence of strong bristles in dorsal trait), for the development of locomotor apparatus and for its way of living, this pig is often confused and compared with wild boars. In spite of life conditions, not always favourable, as already said, it is considered a good transformer of aliments in productions demanded by consumers for their good organoleptic characteristics (Chiofalo B. et al., 2001). Typicality and quality of productions, requested also for hedonistic aspects (flavour, taste, smell etc.) both of fresh and the transformed meat are due, above all to the variable pabulum of an incontaminate environment, as well as to the typical genetical inheritance of this animal population. (Chiofalo L. 2000)

Objectives

The aim of this study was to evaluate some physical characteristics of meat (pH, weight loss, colour, shear force etc.) which, as known, represent one of the most important factors for final product quality. In fact meat product quality (Faucon 1990, Matassino et al. 1985) is represented by a few parameters, which may be considered on the sanitary-health, organoleptic, nutritional, technological and economical point of view.

Methods

The trial was carried out on 30 “Nero Siciliano” pigs, (15 males and 15 females) reared in extensive condition in a woody area of about 12 hectares included in Nebrodi Park. The males were orchietomized and females were subjected to the salpingi electrocoagulation through laparoscopic technique, to maintain a normal endocrinological status. Animals fed the spontaneous fruits of undergrowth (acorns, tubers, chestnuts, and hazelnuts) variable in relation of the year periods. At the reaching of the weight of 70 Kg, in agreement to the experimental plan, pigs were slaughtered and after 24 hours of refrigeration at 4 °C from the right half carcass of each animal one sample of *m. Longissimus thoracis et Lumborum* (LTL) was taken. It was determined: 1) drip loss on raw with gravimetric method (ASPA 1996); 2) cooking loss, determined on meat samples held under vacuum in plastic bags and cooked in water bath at 75 °C for 50 minutes and after cooling in flow water at 15 °C for half an hour, the samples were taken off bags, patted dry and reweighed (ASPA 1996); 3) cooked loss in airy oven at 180 °C until the internal temperature of the meat reached 75 °C, monitored with a probe (ASPA 1996); 4) CIE colour (L*,a*,b*) was measured with a spectrometer of imagine Spectral Scanner (DV s.r.l. Tecnologie d'avanguardia-Italia) using light source D 65; 5) shear force determination on samples of raw meat, an meat cooked in water bath and in oven (1,25 cm diameter removed parallel to the muscle fibers axis and sheared perpendicularly to the same axis), using an INSTRON 5542 equipped with a Warner-Braztler shearing device (speed blade 100mm/min⁻¹). On the same muscle samples pH₁, (measured at 45 min from slaughtering) and the pH_u (measured after 24 hours from slaughtering, previous refrigeration at 4°C) were determined with a pH-meter WTN 597-S equipped with penetrating probe.

Results and discussion

Data obtained, concerning pH₁ results lightly lower (6.16 vs. 6.40) then those obtained by Fortina (2001) on Mora Romagnola x Large White cross breeds, but far from those considered at risk for the possible manifestation of PSE meat (Bosi, 1986). As regards pH_u, as known, it is used to confirm the presence of DFD meat; the values we have registered are in the range of the normal values and are comparable (5.50 vs. 5.57) with those obtained by Pugliese et al (1999) on Large White x Cinta Senese cross breeds reared outdoor, and to those of Corino et al (1996) on pigs fed with traditional diet (5.50 vs. 5.70). Enfält et al. (1997), in Yorkshire x Landrace cross breeds and Duroc x Landrace cross breeds found pH_u (5.44) lower values in pigs reared outdoor than indoor, giving the reason of this difference, probably, to the better capacity of the reared outdoor pigs to utilise substrates other than glycogen during transport to the slaughterhouse, this providing more glycogen available when the post mortem glycolysis take place. Drip loss on raw meat and cooking losses on meat cooked in water bath and in the oven (Tab. 1) resulted lower than those obtained by Pugliese et al (1999) on Large White x Cinta Senese cross breeds, above all for water bath cooked samples (20.74 vs. 34.07). Raw meat and meat cooked in water bath and in the oven (Tab. 1) put in evidence a tenderness, as measured by Warner–Braztler shear force, significantly higher than that obtained by Pugliese et al. (1999), as it may be notices comparing raw meat (6.98 vs. 4.09), meat cooked in water bath (10.91 vs. 3.63) and meat cooked in oven (12.17 vs. 3.63) values. As regards raw meat, our data are near to those registered by Enfält et al. (1997) in reared outdoor pigs (4.09 vs. 4.3) but they are higher (4.09 vs. 2.58) than those reported by Marsico et al (1998) in wild boars. Colour (Tab. 2) put in evidence a lightness, expressed by L index, higher (38.14 vs. 32.9) than Mora Romagnola x Large White cross breeds (Fortina et al., 2001), while redness index (a*) resulted similar (15.37 vs. 15) and yellowness index (b*) was lightly higher (4.51 vs. 3.1). Our data appear different from with those reported by Pugliese et al. (1999) on Large White x Cinta Senese cross breeds reared outdoor; in fact their meat resulted lighter (L = 51.26 vs. 38.14), less redness (a* = 12.13 vs. 15.37), but more yellowness (b* = 5.62 vs. 4.51). Though preliminary they are, these results about the most important physical characteristics, put in evidence an excellent water holding capacity, which made the meat of these pigs particularly suitable for the transformation in sausages (salame, bacon, raw ham) of medium and long preservation, which maturation might be favoured even by the optimal final acidification process (pH_u). In relation to consume of fresh meat, tenderness and colour good values must be considered, being the colour what determines consumer's choice. Moreover, today consumers direct their demands towards products with a high organoleptic quality or derived from animals reared with breeding management different from intensive, consumers also pay attention to biological products, as well as to products respecting of animal welfare and environment. On this point of view, therefore, Nero Siciliano pig could play an important role thanks to its natural and innate tendency to give products of excellent quality.

Pertinent literature

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Table 1. Physical Characteristics of LTL muscle

Variable	mean ± SE
pH _i	6.16±0.35
pH _u	5.50±0.13
Drip loss %	1.66±2.38
Water-bath loss %	20.74±2.41
Oven loss %	31.77±5.47
WB shear force (kgF cm ⁻²) on meat:	
▪ raw	4.09±1.34
▪ water-bath cooked	3.63 ± 0.99
▪ oven cooked	3.63 ± 0.94

Table 2. Colour of LTL muscle

Variable	mean ± SE
Lightness (L*)	38.14±5.52
Redness (a*)	15.37±2.36
Yellowness (b*)	4.51±2.44