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Comparison between carcasses of artificially suckled I.H.D.H. (Italian Heavy Draught Horse) foals slaughtered at 6 months and traditional carcasses obtained by foals slaughtered at 11 and 18 months

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ABSTRACT - Aim of the study was the evaluation of a innovative I.H.D.H. carcass production system in order to improve the conditions for mare's milk production. In the trial were used 18 foals, subdivided in three randomized groups of 6 animals each. Every group was slaughtered at a different age: 6 months (artificially suckled), 11 months and 18 months (naturally suckled, following traditional rearing systems). Six months old foals carcasses were characterized by 75.59 % of lean, 12.79 % of fat and 11.64 % of bone. Six months foals carcasses showed the lean end the fact respectively higher ($P < 0.001$) and lower ($P < 0.001$) than 18 months ones ($P < 0.001$), and the bone higher than 11 months foals ($P < 0.001$). Six months hind quarter incidence was 65.00 %, more than found for 18 months carcasses ($P < 0.001$). Moreover, 6 months carcasses showed an first quality cuts incidence higher than 11 months foals ($P < 0.01$).

Key words: Horse meat, Age at slaughter, Carcass quality, Carcass dissection.

Introduction - In the last several years, mare's milk attracted a growing interest in human nutrition, especially in France, Germany and Italy, particularly in the dietotherapy of patients affected by cow's milk protein allergy (Criscione *et al.*, 2008). In fact, milk from non-bovine mammals as equids has been investigated as a natural substitute for human milk (Businco *et al.*, 2000). Interesting results were obtained by Pinto *et al.* (2001) about I.H.D.H. breed milk production aptitude. Moreover, I.H.D.H. foals are actually reared for horsemeat production, so it is fundamental to investigate alternative suckling systems, necessary to do not get worse their meat production performances. Artificial suckling represents a valid alternative for foals, considering milk yield by mares for human consumption, and the typical horse meat production. The aim of this study was to evaluate the quality of carcasses obtained from artificially suckled foals, slaughtered at 6 months, compared to carcasses produced by foals slaughtered at the traditional age (11 months and 18 months old) and reared applying the traditional techniques typical in the South of Italy (natural suckling, conduction on pasture with mares until 8 months and subsequent indoor intensive fattening).

Material and methods - Eighteen I.H.D.H. breed foals, born in the spring of 2006 in the same farm, were used for the trial. They were equally subdivided in three randomized groups of six animals each. Each group was slaughtered at a different age: 6 months, 11 months and 18 months old. Foals slaughtered at the age of six months were artificially suckled and weaned at the 4th month, then they were raised with intensive indoor system until the slaughtering age. Foals slaughtered both at eleven months

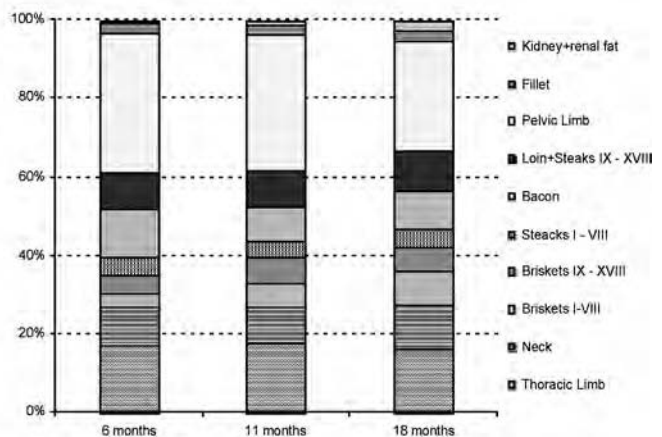
and eighteen months were naturally suckled and weaned at the 6th month from birth. They were raised on pasture during the day and indoor stabling during the night until the 8th month. Subsequently, they were stabled only with intensive indoor system until slaughtering. The foals were slaughtered at an EEC approved slaughterhouse and then transported in a butchery after 24 hours from slaughtering. After a period of refrigeration at 4°C (2-7 d after slaughtering, as necessary before the sale of the meat, the right half carcass was then divided in cuts that were removed and separated into lean, fat and bones according to the ASPA indications (1996) in the same butchery for all the carcasses considered in the trial. The classification of the lean meat in 1st, 2nd quality cuts was performed according to the butchers' customs.

All data were processed first using the one way variance analysis, then using post-hoc comparisons by Dunnet's test (SAS, 1998). Six months horses were considered as control group for Dunnet's test. All processed data were normalized in percentage, to make comparable the results, independently from the absolute weight values.

Results and conclusions - Hind quarter incidence and lean incidence on carcass of foals slaughtered at 6 months were higher than on the carcasses of the animals of 18 months old ($P < 0.001$; Table 1). Moreover, fat incidence in the youngest foals carcasses was lower than in 18 months foals ($P < 0.001$). Similar results were observed in the hind quarter. In fact, in 6 months foals carcass a greater incidence of lean and a lower ratio of fat was observed than in 18 months foals ($P < 0.001$). Those results may be explained by a different use of metabolic energy by foals of 6 months old compared with 18 months old foals. In fact, while the latter tend to convert energy in adipose tissue, the first ones transfer energy in muscle (Tateo *et al.*, 2008; Sarries and Beriain, 2005). Bone incidence in 6 months old foals carcasses was higher both in the whole carcass and in hindquarter, than 11 months old foals ($P < 0.001$), moreover, in forequarter than in 11 and 18 months old foals ($P < 0.001$). These results were expected because it is known that bone growth anticipates muscular tissue hypertrophy and hyperplasia (Martin-Rosset *et al.*, 1983). First quality cuts incidence in 6 months carcasses was lower than 11 months carcasses ($P < 0.01$). This difference is more evident on hindquarter, in fact, 1st quality cuts incidence in 6 months foals carcasses was lower than those of foals slaughtered at 11 and 18 months ($P < 0.001$). Instead, on the forequarter, 1st quality cuts incidence in 6 months carcasses was higher than 11 months ($P < 0.01$) and 18 months carcasses ($P < 0.001$). Pelvic limb incidence and bacon incidence in 6 months foals were higher than in 18 months foals ($P < 0.001$), instead loin + steaks IX - XVIII incidence and briskets IX - XVIII incidence in 6 months foals was lesser than in 11 months and 18 months old foals ($P < 0.001$; Figure 1). Those results confirm the records reported by Tateo *et al.* (2005) that observed two phases of growth of I.H.D.H. foals: the first involving height and the second length and width. This aspect gives reason of a higher incidence of pelvic limb and a less incidence of briskets in foals slaughtered at 6 months than in older ones.

These results showed that artificially suckled I.H.D.H. foals slaughtered at 6 months old produced carcasses with interesting characteristics for meat production, compared with carcasses obtained by foals slaughtered according to traditional rearing techniques at 11 and 18 months old. In fact, although there is

Figure 1. Influence of slaughtering age on carcass composition (%).



a higher incidence of bone, linked to tissue development during foals' growth, the incidence of total lean and of 1st quality cuts shows that the I.H.D.H., as a tachi-auxetic and brachimorphic breed, produces carcasses with good quality also in foals slaughtered at 6 months and artificially suckled. By this way, it will be possible to associate horsemeat production to mare's milk production. Surely, for an overall evaluation of the introduction of this new suckling system, it would be appropriate to integrate these results with other parameters related to meat quality (horsemeat rheological and chemical composition at different slaughtering age) and with consumer perception of this product.

Table 1. Influence of slaughtering age on carcass parameters (%).

	6 Months	11 Months	18 Months	s.e.
Carcass				
Hind quarter incidence	65.00	62.80	58.80***	0.77
Lean incidence	75.59	76.34	69.82***	0.69
Fat incidence	12.79	14.24	18.73***	0.61
Bone incidence	11.64	9.45***	11.45	0.19
1 st quality cuts incidence	56.83	59.60**	54.91	0.77
Hind quarter				
Lean incidence	76.26	75.39	65.48***	0.82
Fat incidence	14.34	17.61	26.13***	1.03
Bone incidence	9.38	6.99***	8.33	0.32
1 st quality cuts incidence	67.44	73.48***	71.88***	0.94
Fore quarter				
Lean incidence	74.32	77.96*	75.84	0.94
Fat incidence	11.54	10.68	14.73	0.92
Bone incidence	14.15	11.35***	9.43***	0.23
1 st quality cuts incidence	58.55	53.66**	52.06***	1.10

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