Valuation of autochthonous bovine genotypes: Assessment of the meat quality of the Italian Podolian and the Greek Katerini cattle.

Karatosidi, D.[1], Marsico, G.[1], Ligda, C.[2] and Tarricone, S.[1], [1]University of Bari, Animal Production, via Amendola 165/a, 70126 Bari, Italy, [2]National Agricultural Research Foundation, P.O. Box , 60 458, Thessaloniki , Greece; despinakaratosidi@yahoo.com

INTRODUCTION

The socio- economical changed requirements of the modern consumer, always more attended on the relationship between nutrition and health, made him prefer genuine food, of high quality, poor in fat but rich in polyunsaturated fatty acids for the beneficial effects on the human's health (Hegsted et al., 1965; Grundy, 1986;Bonamone et Grundy, 1988; Borsottelli et Berra, 1994, Kinsella et al., 1990; Vonghia et al., 1999). In order to satisfy these requirements, farmers both from the inside regions of Italy and from Greece are becoming to orient through the rearing of autochthonous genotype animals like the bovine of the breed Podolian (Italy) and Katerinis (Greece). Recent assessments evaluate 23.000 heads of Podolian bovine in south Italy, registered in the Herdbook (ANABIC, 2010) and only 217 of Katerinis in Greece (M.R. D. F., 2008).
While on the Italian Podolian there is a certain literature (Ragni M. et al., 2006; Marsico G. et al., 2007; Vicenti A. et al., 2007; Marsico G. et al., 2007; Braghieri A. et al., 2007; Ragni M. et al., 2008; Marsico G. et al., 2008; Braghieri A. et al., 2009; Tarricone S. et al., 2009; Braghieri A. et al., 2009; Tarricone S. et al., 2009), on this greek (Katerinis) the bibliography we have results very limited and it refers on the origins and the genetic characterization of animals (Georgoudis A. et al., 2000; Ligda Ch. et al., 2002; Ligda Ch. et al., 2003;Ministry of Rural Development and Food, 2008; Ligda Ch. et al., 2009). For this reason we have thought interesting to compare some meat's qualitative parameters of the two breeds: Podolian (Italy) and Katerinis (Greece) for a possible future plan of rescuing this last breed, that necessarily pass through the chemico- nutritional characterization of their meat.

KEY WORDS: Katerinis, Podolian, Meat quality, Acid composition

MATERIALS AND METHODS

In order to compare the meat quality of italian Podolians and greek Katerinis, there have been used 8 subjects of which 4 Podolians and 4 Katerinis slaughtered at 18 months of age. From every half-carcass there has been taken a sample of *Longissimus lumborum* (Ll) on which there have been executed both physical analysis like pH, the colorimetric indexes (L, a*, b*, Hunter Lab system), the shear force (WBS) and the cooking losses and those chemical (ASPA, 1980). On the extracted fat (Folch, 1957) have been measured the gas chromatography-silica analysis in glass with the stationary phase of bis-cyanopropyl-siloxane polisililfenilen 70% (60m x 0,25 mm ID x 0,25 µm).
All data collected were subjected to analysis of variance and differences between the estimated average evaluated with the "t" Student.

RESULTS AND DISCUSSION

Raw meats of Podolians in comparison with those of the greek Katerinis (tab. 1) are significantly ($P < 0.01$) more red (16,61 *vs* 12,88) and the cooked once certainly ($P < 0.05$) more resistant (2,04 *vs* 1.65) while, as far as regards the other qualitative parameters, in spite of the differences just mentioned and therefore without statistic significant, the genotype seems to make no impact.

The raw meat of Podolian bulls (tab.2), results significantly (P<0.01 and/or P< 0.05) less watery (73,69 % *vs* 76.36 %), more fatty (3.11 % *vs* 0,71%) and poorer in indeterminate (0.57 % *vs* 1.24 %), same trend that is confirmed after cooking (tab. 3) where always the Podolians demonstrate a meat more fatty (3.27 % *vs* 1,15 %) and less rich in indeterminate.
Moreover, the fat of raw meat from Katerinis bulls (tab. 4), in comparison with this of Podolians, seems to be characterized by a superior and significant (P<0.01 and/or P < 0.05) percentage of C15:0 (0.84 % *vs* 0.32%), of C18:0 (20.57% *vs* 15.71%), of C15:1 (0.31% *vs* 0.17 %), of C17:1 (1,04 *vs* 0.74%), of CLA (9Z,11E) (0.21% *vs* 0.09%), of C18:3ω3 (2,23 % *vs* 0.35%), of EPA (0.50 % *vs* 0.09 %), of C22:5ω3 (1.23 % *vs* 0.34 %) and of a low concentration of C16:1ω7 (1.38% *vs* 2.18%), of C18:1ω9c (22.32% *vs* 34.13%), of MUFA (28,32% *vs* 40,96%), of UFA (44,49% *vs* 53,23%) and of a higher fat ratio UFA/SFA (0,99 *vs* 1,36).
Indeed, the concentration of some fatty acids of the extracted fat from cooked meat (Tab. 4) shows significant (P< 0.01 and/or P< 0.05) traces of the animal genotype. As a matter of fact, this of greek animals is characterized by superior percentage of C15:0 (0.80% *vs* 0.33%), of C18:0 (18.57 % *vs* 15,66 %), of C17:1 (1.07 % vs 0.79 %), of CLA(9Z,11E) (0.21% vs 0.09%), of EPA (0.70 % vs 0.05%) and of a lower concentration of C18:1ω7 (1.79% *vs* 3.41 %)

CONCLUSIONS

From the derived results and our trial conditions, comes out that the raw meat of Katerinis bulls, in comparison with those Podolians, are less red, more watery, less fatty, the same trend that is confirmed after cooking, where shows also a shorter resistance. Moreover, the fat of this meat is richer in fatty acids ω3 and C18:0, the same trend confirmed after cooking. These data seem to indicate that this meat can satisfy the dietetic demands of the modern consumer.

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Table 1: Physical parameters of Podolians and Katerinis meat

	Katerinis	Podolian	DSE
pH 24	5,56	5,51	0,215
L	39,35	36,52	1,77
a	12,88 B	16,61 A	0,942
b	11,54	12,61	0,649
Raw WBS			
Shear force	2,48	2,17	0,571
Resistance	2,65	2,58	0,698
Cooked WBS			
Shear force	5,55	7,36	2,373
resistance	1,65 b	2,04 a	0,15
Cooking loss (%)	22,4	22,06	7,848

Table 2: Chemical composition % of raw meat

	Katerinis	Podolian	DSE
Moisture	76,36 a	73,69 b	1,06
Proteins	20,42	21,47	0,805
Fats	0,71 B	3,11 A	0,411
Ashes	1,25	1,16	0,094
Indeterm.	1,24 A	0,57 B	0,241

Table 3: Chemical composition % of cooked meat

	Katerinis	Podolian	DSE
Moisture	73,98	69,26	3,4
Proteins	22,1	25,7	3.087
Fats	1,15 B	3,27 A	0,757
Ashes	1,35	1,27	0,205
Indeterm.	1,40 A	0,50 B	0,341

Table 4: Fatty acid composition of fat extracted from meat

RAW	Katerinis	Podolian	DSE
C14:0	2,89	1,86	0,880
C15:0	0,84 A	0,32 B	0,170
C16:0	20,61	20,17	2,070
C17:0	0,60	0,55	0,080
C18:0	20,57 a	15,71 b	2,330
C20:0	0,59	0,49	0,080
C14:1	0,20 a	0,12 b	0,040
C15:1	0,31 A	0,17 B	0,040
C16:1w7	1,38 B	2,18 A	0,280
C17:1	1,04 A	0,74 B	0,090
C18:1w7	2,31	3,17	1,410
C18:1w9t	0,38	0,45	0,080
C18:1w9c	22,32 B	34,13 A	2,440
C18:2w6t	0,34	0,14	0,240
C18:2w6c	7,50	8,47	2,930
CLA(9Z,11E)	0,21a	0,09 b	0,050
CLA(10E,12Z)	0,08	0,18	0,070
C18:3w3	2,23 A	0,35 B	0,470
C18:3w6	0,16	0,02	0,120
C20:2w6	0,07	0,06	0,060
C20:3w3	3,73	1,78	1,450
C20:3w6	0,69	0,43	0,320
C20:4w3	0,12	0,11	0,070
C20:4w6	0,02	0,00	0,030
EPA	0,50 A	0,09 B	0,040
C22:5w3	1,23 a	0,34 b	0,440
C22:5w6	0,19	0,20	0,080
Altri acidi	9,36	7,68	2.945
SFA	46,24	39,09	5,035
MUFA	28,32 B	40,96 A	3,241
PUFA	16,16	12,26	5,569
W3	6,92 a	2,68 b	2,232
W6	9,25	9,59	3,316
UFA	44,49 b	53,23 a	4,930
w6/w3	1,35 B	3,66 A	0,286
SFA/PUFA	3,24	3,40	1,133
UFA/SFA	0,99 b	1,36 a	0,208
I.A.	0,75	0,52	0,194
I.T.	1,97	1,40	0,390

COOKED	Katerinis	Podolian	DSE
C14:0	2,77	1,78	0,670
C15:0	0,80 A	0,33 B	0,100
C16:0	22,00	20,07	1,620
C17:0	0,64	0,57	0,050
C18:0	18,57 b	15,66 a	1,370
C20:0	0,61	0,44	0,120
C14:1	0,18 A	0,12 B	0,010
C15:1	o,28 a	0,20 b	0,040
C16:1w7	1,72	2,06	0,310
C17:1	1,07 A	0,79 B	0,060
C18:1w7	1,79 b	3,41 a	0,760
C18:1w9t	0,38 B	0,50 A	0,040
C18:1w9c	24,81 B	34,50 A	2,190
C18:2w6t	0,35	0,14	0,180
C18:2w6c	7,50	8,47	2,710
CLA(9Z,11E)	0,21a	0,09 b	0,050
CLA(10E,12Z)	0,08	0,18	0,070
C18:3w3	2,23 A	0,35 B	0,200
C18:3w6	0,18	0,04	0,100
C20:2w6	0,07	0,04	0,070
C20:3w3	2,46	1,35	0,730
C20:3w6	0,45	0,37	0,260
C20:4w3	0,18	0,07	0,070
C20:4w6	0,03	0,00	0,040
EPA	0,70 A	0,05 B	0,190
C22:5w3	0,87 A	0,20 B	0,110
C22:5w6	0,16	0,11	0,080
Altri acidi	8,67	8,33	1,005
SFA	45,37 A	38,85 B	2,403
MUFA	30,22 B	41,59 A	2,352
PUFA	15,81	11,22	3,946
W3	6,33 A	2,02 B	1,094
W6	9,47	9,21	2,874
UFA	46,02 b	52,82 a	2,65
w6/w3	1,45 B	4,61 A	0,315
SFA/PUFA	3,18	3,54	0,974
UFA/SFA	1,02 B	1,36 A	0,112
I.A.	0,73	0,52	0,129
I.T.	1,84 a	1,41 b	0,185