



Effect of breed on sheep milk fat quality: comparison between Altamurana and Leccese

Simonetti Amalia, Grassi Giulia, Gambacorta Emilio, Perna Annamaria

School of Agricultural, Forestry, Food and Environmental Sciences, University of Basilicata



Altamurana (A) and **Leccese (L)** sheep, autochthonous breeds of bioterritories of southern Italy, now in danger of extinction, have a low milk production characterized however by high protein and fat content. The aim of this study was to investigate the effect of breed on morphometric characteristics of fat globules, fatty acid composition, and cholesterol content of Altamurana and Leccese milk.

MATERIALS AND METHODS

The sheep, belonging to the same mounting groups within the considered breed, were reared under an extensive system on the same farm in the province of Potenza (southern Italy).



On individual milk were measured:

- ❖ Milk fat globules (MFGs) size by fluorescence microscope
- ❖ Fatty acid profile by GC
- ❖ Cholesterol content by HPLC-UV.

After determination of diameter,

MFGs were divided into 3 classes:

- small globules (diameter <2 µm);
- medium-sized globules (2÷5 µm);
- large globules (>5 µm).



The percentage incidence of each globule class on total measured milk fat globules was calculated:

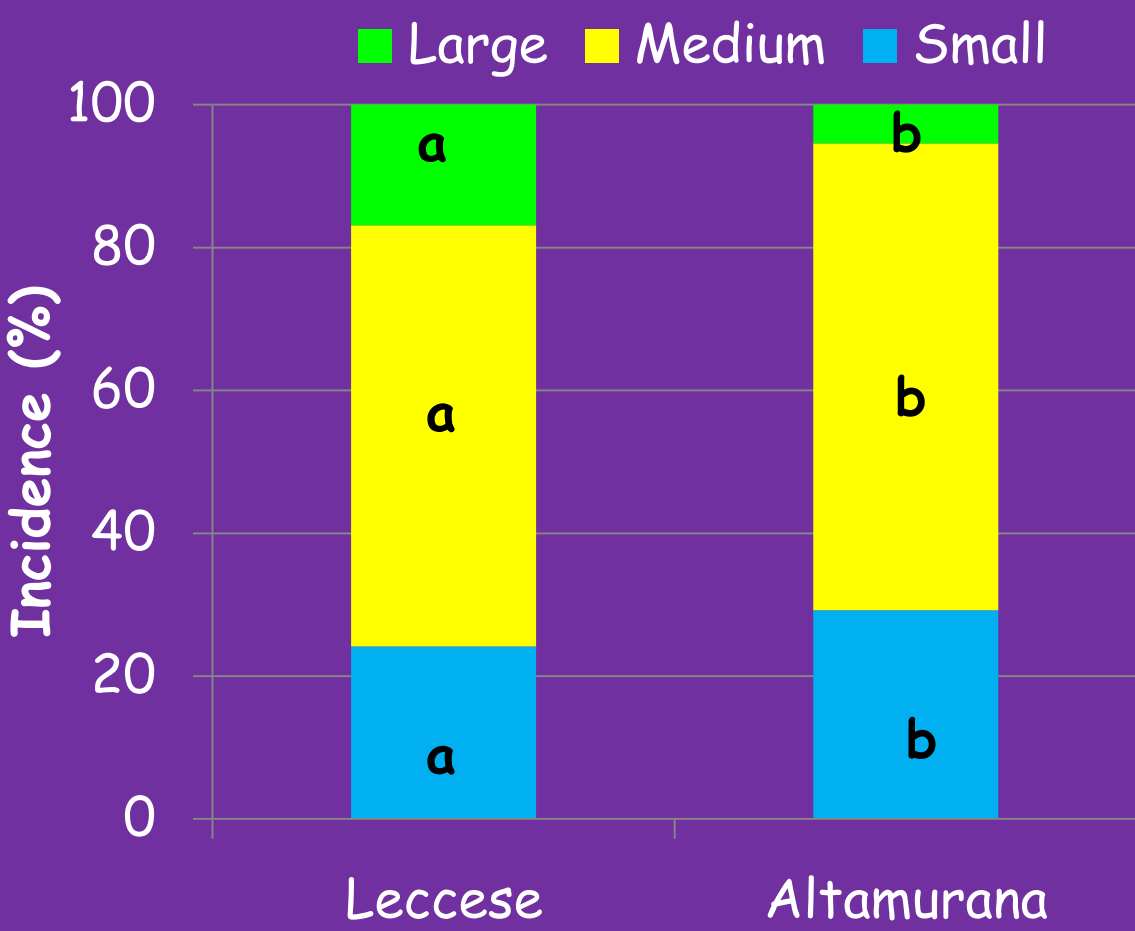
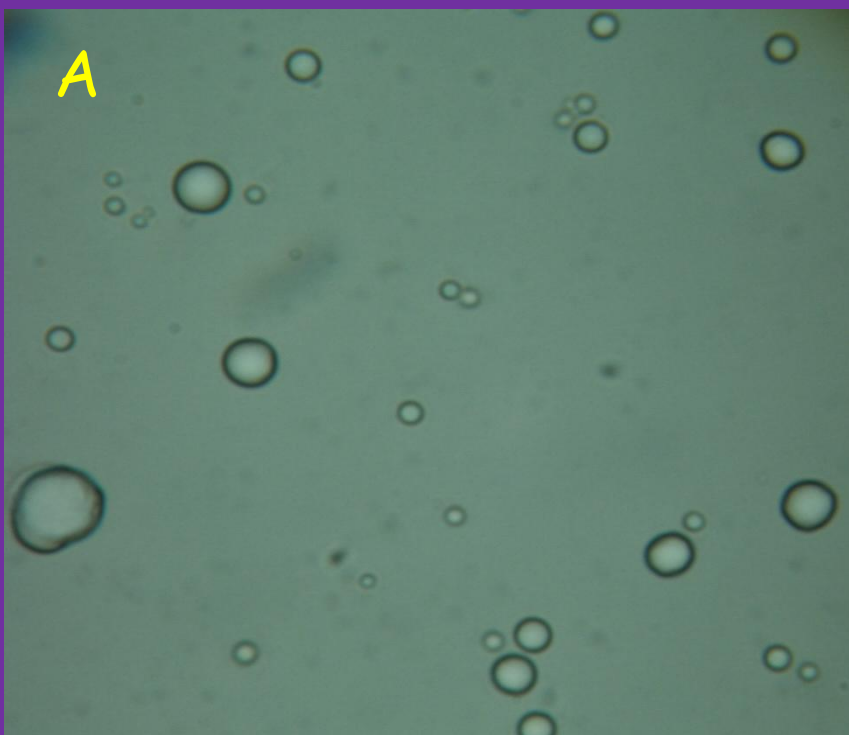
$$\frac{\sum n_{\text{globules (each class)}}}{\sum n_{\text{total globules}}} \times 100.$$

(Martini et al., 2004)

The statistical analysis was performed by **ANOVA** using a monofactorial model

RESULTS

Based on the ANOVA results, breed affected studied parameters ($P < 0.01$)



A higher incidence of smaller and medium MFGs was associated with the A milk (29.21 and 65.37%, respectively) compared to L milk (24.17 and 58.93%, respectively); whereas, L milk showed a higher incidence of large MFGs (16.90%) than A milk (5.42%).

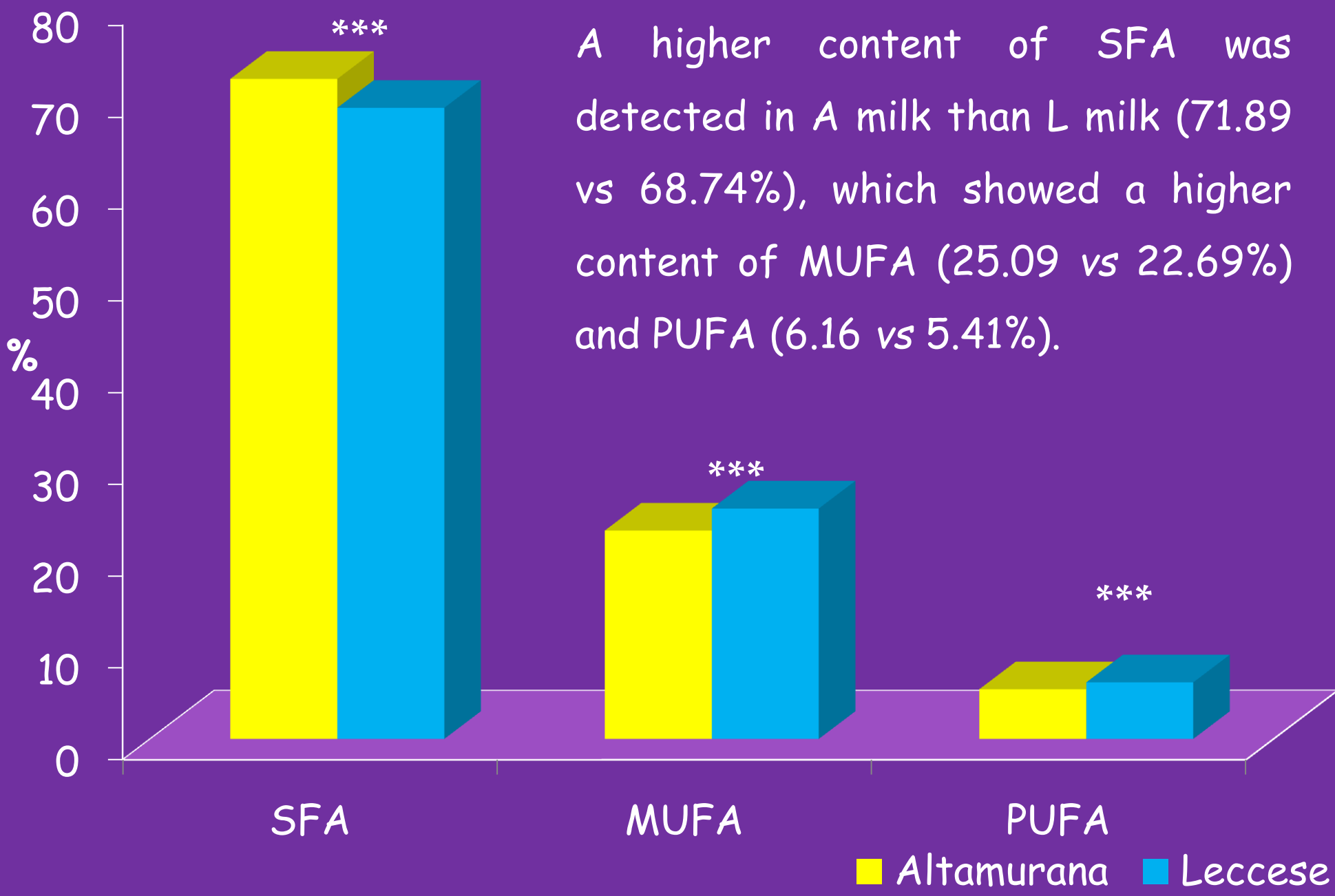
Significant differences ($P < 0.05$) within each globule class are indicated by different letters

Fatty acid	Leccese		Altamurana	
	Mean	SD	Mean	SD
C4:0	2.89 ^a	0.30	2.52 ^b	0.29
C6:0	2.92	0.31	2.71	0.49
C8:0	3.07	0.19	3.11	0.68
C10:0	8.90	0.59	9.80	1.24
C12:0	5.33	0.30	4.97	1.80
C13:0	0.16	0.03	0.21	0.09
C14:0	11.52 ^a	0.57	14.46 ^b	0.66
C14:1	0.52 ^a	0.05	0.44 ^b	0.08
C15:0	1.16	0.10	1.19	0.26
C15:1	0.26 ^a	0.02	0.59 ^b	0.23
C16:0	23.29	0.50	23.57	1.77
C16:1	1.11 ^a	0.04	0.52 ^b	0.07

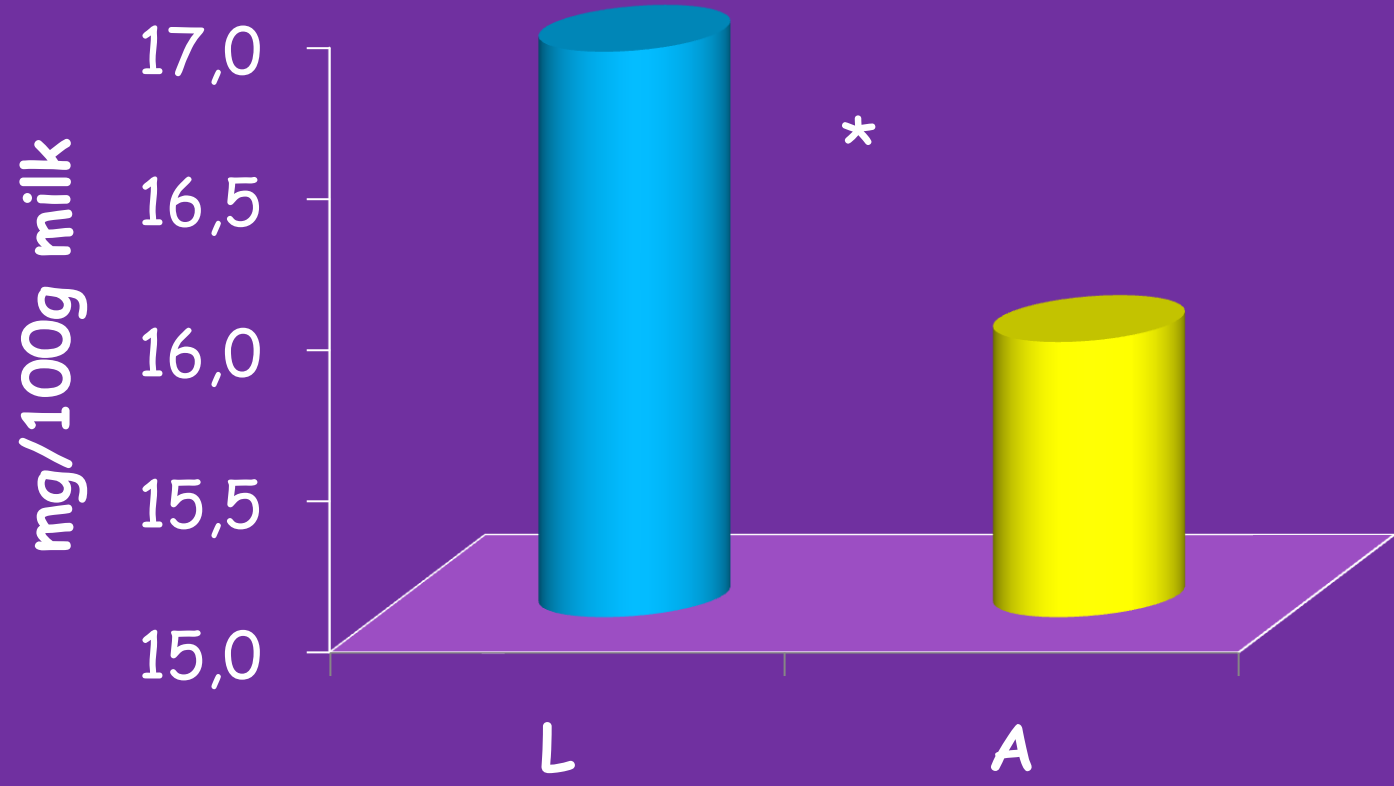
Fatty acid	Leccese		Altamurana	
	Mean	SD	Mean	SD
C17:0	0.41 ^a	0.06	1.15 ^b	0.25
C17:1	0.33 ^a	0.04	0.24 ^b	0.03
C18:0	8.69	0.45	7.74	1.35
C18:1n-9 (trans)	4.81 ^a	0.39	2.78 ^b	0.46
C18:1n-9 (cis)	17.88	0.52	17.96	1.65
C18:2n-6 (trans)	0.74	0.11	0.69	0.16
C18:2n-6 (cis)	0.89	0.07	1.09	0.49
C20:0	0.19 ^a	0.02	0.35 ^b	0.10
C18:3n-6	0.45	0.11	0.46	0.21
C18:3n-3	1.33 ^a	0.20	0.53 ^b	0.19
CLA	1.83	0.15	2.05	0.50

^{a,b}Means within a row with different superscripts differ ($P < 0.05$).

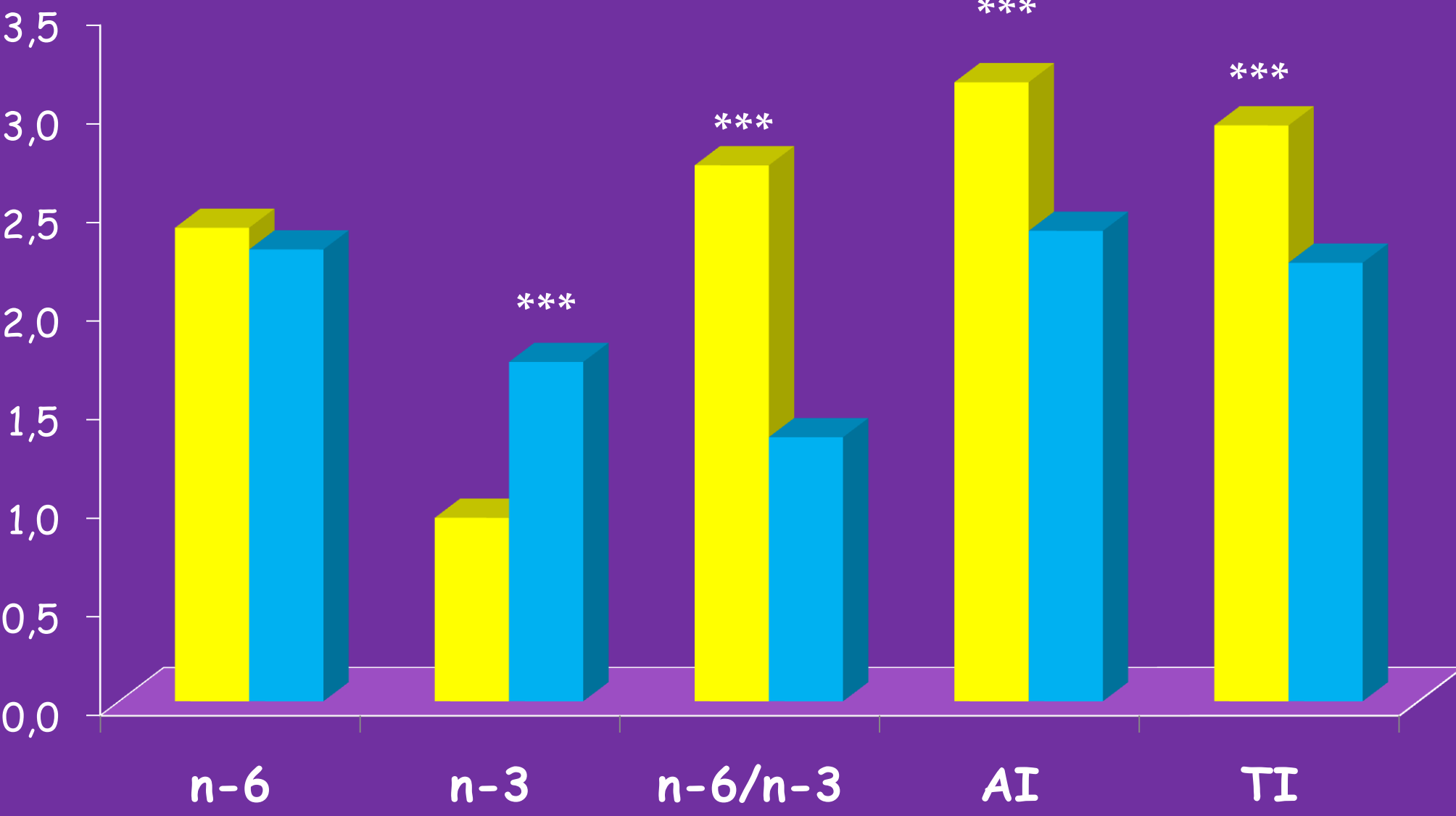
Fatty acid	Leccese		Altamurana	
	Mean	SD	Mean	SD
CLA	1.83	0.15	2.05	0.50
C20:1n-9	0.18	0.01	0.09	0.04
C22:0	0.05	0.01	0.06	0.01
C20:3n-3	0.22	0.02	0.22	0.05
C22:1n-9	0.06 ^a	0.02	0.03 ^b	0.01
C20:3n-6 + C23:0	0.15 ^a	0.01	0.06 ^b	0.02
C20:4n-6	0.23 ^a	0.01	0.10 ^b	0.02
C22:2	0.04	0.01	0.03	0.01
C24:0	0.03 ^a	0.01	0.05 ^b	0.03
C20:5n-3	0.17	0.01	0.18	0.04
C24:1	0.08	0.01	0.04	0.02



Cholesterol



The highest cholesterol content was detected in L milk (16.87 mg/100g milk) compared to A milk (15.91 mg/100g milk; $P < 0.05$).



PUFA n-3 content was higher in L milk (1.72 vs 0.93%); consequently, A.I. and T.I. were significantly higher in A milk than L milk (3.14 and 2.92% vs 2.38 and 2.22%),

CONCLUSIONS

The differences highlighted in this study on fat characteristics could be ascribed to the genetic peculiarities of the genomes of the two considered breeds, which are the result of a selective process linked to adaptation.