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Colour characteristics of *soppressata* obtained from *Casertana* pig autochthonous ancient genetic type (AAGT)[1]

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SUMMARY – The aim of the research was to investigate colour characteristics of *soppressata* stored for 45 and 90 days under vacuum and under perirenal fat. The products were obtained from 20 pigs (10 castrated males and 10 entire females) belonging to AAGT *Casertana*, reared in multiple boxes at ConSDABI experimental farm. For each *soppressata* the colorimetric profile was determined on 7-8 samples by using spectrophotometer (U3000, Hitachi) equipped with integrated sphere. The results showed that: (i) castrated males provide a product with higher redness value (a*) and a lower hue value at 45 days if stored under perirenal fat, while the females showed higher yellowness value (b*) when stored under vacuum; and (ii) at 90 days of storage the differences in the colour characteristics are confirmed.

Key words: Salami, *soppressata*, colour, *Casertana* pig.

RESUME – *"Caractéristiques colorimétriques du* soppressata *issu de porcins de l'ancien type génétique autochtone* Casertana *(TGAA)". La présente recherche a étudié la couleur de la* soppressata *après une conservation sous vide et sous panne pendant 45 et 90 jours. Le produit a été issu de 20 sujets (10 mâles castrés et 10 femelles entières) du TGAA* Casertana *élevés dans des box multiples près de la structure expérimentale du ConSDABI. Le profil colorimétrique, relevé par spectrophotomètre (U3000, Hitachi), pour chaque* soppressata, *a été obtenu à partir de 7-8 échantillons. Les résultats mettent en évidence que : (i) après 45 jours de conservation les mâles castrés donnent un produit avec un indice élevé de rouge (a*) et une valeur plus petite de teinte s'il est confectionné sous panne (P < 0,05), au contraire, les femelles ont des valeurs plus élevées (P < 0,05), et aussi pour l'indice de jaune (b*) si le produit est conservé sous vide ; et (ii) après 90 jours de conservation les différences colorimétriques relevées pendant la première période se confirment.*

Mots-clés : *Salami,* soppressata*, couleur, porc* Casertana*.*

Introduction

In Italy, the ancient salami tradition, different in relation to the climatic conditions and to the various AAGTs reared, was characterized from heterogeneity of products. But, in the last years, the strong heterogeneity between salami has been lost and some salami was increasingly characterized rather by standardized "flow diagram" than the genetic origin of the raw matter. This situation has led to a wide diffusion of some salami on whole national land and limitation of other ones only in specific production area.

The *soppressata* is a typical and traditional product broadly diffused, in the past, in the South of Italy with some different denominations: *lucana*, *calabrese*, *di Gioi*, etc. The qualitative characteristics of a cured product, such as the *soppressata*, are due not only to the raw matter used but also to the

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endogenous enzyme activity and environmental conditions such as temperature, humidity, conditions of storage, etc.

In this study, the effect of sex as well as of conditions of storage and period of storage on colour characteristics of *soppressata* obtained from pig AAGT *Casertana* was investigated.

Material and methods

The research was carried out on *soppressata sannita* stored for 45 and 90 days under vacuum and under perirenal fat. The *soppressata sannita* was manufactured in Circello (BN) by the partial ham trimming, *Longissimus dorsi* and subcutaneous fat in the proportion of 2-3% out of the total meat weight employed. During the ripening period, about 45 days, humidity and temperature were checked.

The experimental relieves were carried out on 20 subjects (10 castrated males and 10 entire females) belonging to AAGT *Casertana*, reared in multiple boxes at ConSDABI experimental farm. The spectrophotometric profile (from 380 to 780 nm) and L*, a*, b* with the four illuminants A, B, C and D65, were determined on 7-8 samples from each *soppressata* by using spectrophotometer (U3000, Hitachi) equipped with integrated sphere.

Data were analysed by GLM procedure of SAS (SAS Institute) using sex, condition and conservation period, and first order interactions as fixed factors. Using this model the average of the levels of each factor were estimated and weighted for all factors considered singularly and interactively (Matassino *et al.*, 1984). The significance of the differences between the means was evaluated by Students' t test.

Results

The results point out that at 45 days of conservation the *soppressata* obtained from castrated males, in comparison with that obtained from entire females has, on average, a higher red index (a*) and a lower hue value if stored under perirenal fat, a higher lightness value ($P < 0.01$) and a lower hue value if stored under vacuum (Table 1).

The comparison between two storage conditions within the sex, shows significant differences only for the lightness value, higher under vacuum that under fat ($P < 0.01$).

Reflectance spectrum (Fig. 1) shows a globally lighter colour in the product stored under vacuum for 90 days and obtained by females, while *soppressata* stored under fat for 45 or 90 days looks darker and flatted.

The conservation of *soppressata* under perirenal fat, in the past, was a way to reduce the significant variations of the colorimetric and rheological characteristics of the product in the long time. Indeed, the perirenal fat might avoid a fast dryness of the external part of the salami, allowing a minimum decrease of the humidity. In the *soppressata* stored under vacuum, on the contrary, the humidity fraction is unchanged explaining the higher lightness value observed.

The absence of nitrite and nitrate in the mixture makes the product "more natural", but allows the final colour to be on average darker, in comparison with the product prepared with their addition. The higher value of a* is a good index of the lean fraction of the product, according to Montemurro *et al*. (1991). Extending the conservation period for other 45 days, the colorimetric differences between the two sexes were unchanged for both lightness and red index as well as for hue with the A illuminant, while no significant difference was observed with the other illuminants, except for L* value. This suggests that the A illuminant is more suitable to detect eventually differences in the colour of salami with a higher meat percentage.

The variations of colorimetric characteristics of the product between 45 and 90 days are not statistically significant.

Table 1. Effect of storage conditions and period, separately for castrated males [(♂)] and entire females (♀)

Characteristic	45 d				90 d			
	Fat		Vacuum		Fat		Vacuum	
	(♂)	♀	(♂)	♀	(♂)	♀	(♂)	♀
Illuminant A								
L*	32.72	31.89	34.82^{A}	33.25^{B}	33.42^{A}	31.40^{B}	35.78^{A}	33.08^{B}
a*	7.14	6.98	7.36	7.51	7.08^{a}	5.82^{b}	7.37	6.48
b*	6.96	7.30	7.10	7.41	7.58	7.42	7.11	7.17
Chrome	10.30	10.60	10.53	10.95	10.81	9.95	10.55	10.10
Hue	46.22	51.24	45.64	47.58	48.43^{A}	55.57^{B}	45.84^{A}	51.83^{B}
Illuminant B								
L*	32.08	31.24	34.17^{A}	32.57^{B}	32.77^{A}	30.82^{B}	35.14^{A}	32.47^{B}
a*	5.12	5.06	5.25	5.44	4.92	3.99	5.25	4.58
b*	6.65	6.91	6.77	7.01	7.39	7.23	6.79	6.88
Chrome	8.9	9.25	9.01	9.41	9.44	8.94	9.00	8.84
Hue	53.79	58.19	53.5	54.6	56.52^{a}	63.31^{b}	53.98	59.65
Illuminant C								
L*	31.86	31.01	33.04^{A}	32.33^{B}	32.54^{A}	30.62^{B}	34.89^{A}	32.25^{B}
a*	3.63	3.62	3.71	3.90	3.32	2.59	3.69	3.15
b*	6.59	6.80	6.70	6.91	7.37	7.19	6.73	6.80
Chrome	8.13	8.48	8.18	8.54	8.71	8.38	8.16	8.15
Hue	61.46	65.21	61.51	61.97	64.43	70.65	62.12	67.31
Illuminant D65								
L*	31.84	30.89	33.91^{A}	32.30^{B}	32.52^{A}	30.59^{B}	34.87^{A}	32.23^{B}
a*	3.94	3.93	4.09	4.22	3.65	2.90	4.01	3.46
b*	6.41	6.64	6.52	6.73	7.17	7.01	6.55	6.63
Chrome	8.11	8.47	8.18	8.55	8.66	8.31	8.16	8.11
Hue	59.17	63.10	59.12	59.71	62.13	68.50	59.68	65.03

$^{a,b}P < 0.05$; $^{A,B}P < 0.01$.

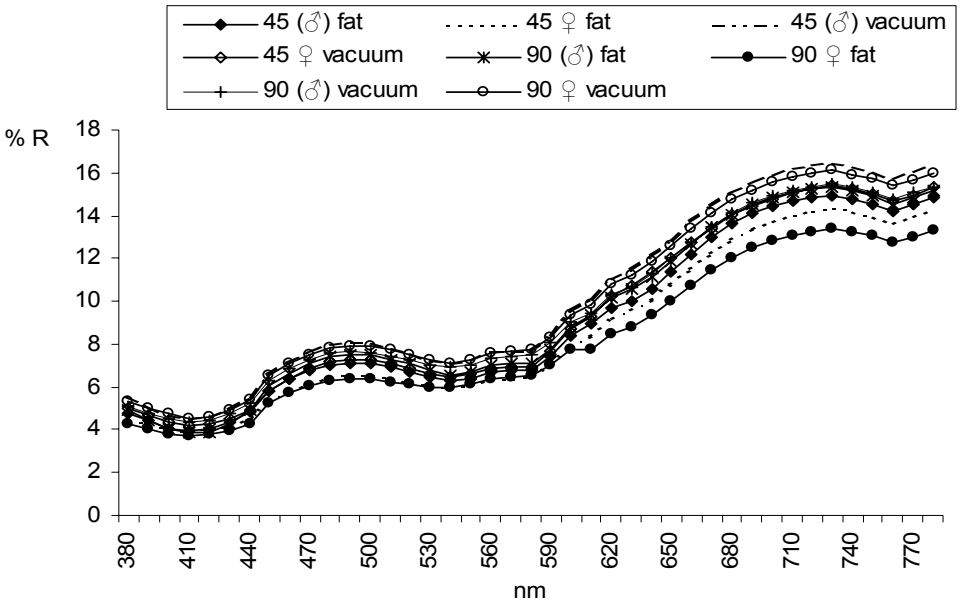

Fig. 1. Reflectance spectrum in relation to considered factors.

Conclusions

The results of the research showed the influence of sex in determining the lightness value of *soppressata* stored under vacuum for both 45 and 90 days, with castrated males that have higher values. The product stored under perirenal fat, instead, showed significant differences between the two sexes only at 90 days. Finally the A illuminant was more able to detect differences in the colour of this salami that has a high meat percentage.

References

Matassino, D., Cosentino, E., Freschi, P. and Grasso, F. (1984). Studio comparativo fra bufali e bovini alimentati con fieno e mangime concentrato composto. XVI. Variazione nelle caratteristiche colorimetriche della carne dagli 8,5 ai 15 mesi di età. *Prod. Anim*., 3, ns: 83-94.

Montemurro, N., Girolami, A., Grasso, F., Zullo, A. and Matassino, D. (1991). Influenza del mese di preparazione e della durata della stagionatura sull'insaccato tipo "*Napoli".* II. Caratteristiche colorimetriche. *Prod. Anim.*, 4 (III Serie): 109-129.