MEAT QUALITY OF RABBITS REARED UNDER ORGANIC PRODUCTION SYSTEM

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Introduction

In some EU Countries of Latin origin the rabbit meat production is greatly diffuse. In Italy, the Organic Rabbit Production is just developing so, the permitted breeds are not yet selected for carcass and meat quality. Among the adoptable breeds, Vienna Blue and Burgundy Fawn are those the more profitable. The aim of this study was to compare the meat quality of rabbits derived from two sire genetic origins, Vienna Blue and Burgundy Fawn, reared in organic system and under different seasons.

Materials and Methods

Thirty rabbits of both sexes, derived from Vienna Blue (B) and 28 from Burgundy Fawn (F) sire genetic origin (SGO), housed indoor in a farm certified for the organic technology system, were selected. The maternal genetic origin was a mongrel. The rabbits were born January-April and weaned at 46±5d. Organic diet, in pelleted form, was given *ad libitum* (13.3 % CP, 4.0 % EE, 14.5 % cellulose and 16.5 MJ GE/kg). Feed intake was recorded weekly only on rabbits slaughtered in summer. Rabbits were slaughtered at 2.8±0.13 kg of live weight. The dressing out percentage was determined. Twenty-four hours *post mortem* both chilled (+4°C) hindlegs and loin (*Longissimus lumborum* -LL- muscle) portions were dissected, and pH (pHu) and L*a*b colour values (CIE, 1976) were measured on LL muscles. Hindlegs and LL portions were stored for 9 months at -20°C. LL portions were used for pH, L*a*b*, thawing and cooking losses, Warner-Bratzler Shear Force (WBSF) determinations. On hindlegs, only weight losses and WBSF were measured. ANOVA was performed using the proc GLM of the SAS (1990) program, by including the SGO (B, F), the slaughter season (SS: spring, summer), the sex (S) and their interaction as fixed effects. LS means were calculated for all the effects involved in the model and the *t* test between means was calculated. For pH and L*a*b* traits measured on LL muscle the storage effect (ST) (chilled, frozen) was also tested by ANOVA.

Results and Discussion

Rabbits belonging to the Vienna Blue (B) SGO showed higher growth rate than Burgundy Fawn (F) ones but, during summer rearing, the feed conversion index was better in the latter SGO. The dressing out percentage was high on both SGO's (Table 1). Due to the fact that B and F rabbits were slaughtered at equal slaughter weight, having F rabbits lower growth rate, they exhibited more mature meats (more lipids) that could be more appreciable by consumers (Dalle Zotte and Paci, 2006). As expected, the hot season significantly reduced the rabbit's live performance but improved their dressing out percentage (Table 1). Also other slaughter yield increases during hot season, as reported elsewhere (Dalle Zotte and Ragno, 2005). The meat quality was not affected by the SGO and sex, and it was only slightly influenced by the slaughter season (SS) that modify lightness (L*, $P<0.05$; Table 2), thawing loss ($P<0.001$) and WBSF ($P<0.10$) (Table 4) of the frozen loin. Nine months freezing at -20°C if compared to 24 hours chilling at +4°C significantly ($P<0.01$) decreased pH (5.64 *vs* 5.70), a* (-0.01 *vs* 2.79) and b* (-2.13 *vs* -0.35) values, and increased L* value (62.3 *vs* 58.2) resulting in worse loin meat colour (Table 3).

Table 1. Growth and slaughter performance

	Sire genetic origin (SGO)		Slaughter Season (SS)		Sex (S)		*Probability*			RMSE
	B	F	Spring	Summer	Female	Male	SGO	SS	S	
Rabbits, N.	30	28	22	36	23	34				
Average daily gain, g/d	26.4	24.9	27.9	23.4	25.2	26.1	†	***	ns	2.8
Feed conversion index[(2)]	4.94	4.07	--	--	4.34	4.67	†	--	ns	0.62
Dressing out percentage	57.7	58.3	57.3	58.6	57.6	58.3	ns	*	ns	1.56

[(2)]Measured in summer on 15 B and 13 F; ns: not significant; †: $P<0.10$; *: $P<0.05$; ***$P<0.001$).

Table 2. pH and L*a*b* colour of the *Longissimus lumborum* (LL) muscle

	Sire genetic origin (SGO)		Slaughter Season (SS)		Sex (S)		*Probability*			RMSE
	B	F	Spring	Summer	Female	Male	SGO	SS	S	
Chilled (24h at +4°C):										
pHu	5.69	5.72	5.69	5.72	5.69	5.72	ns	ns	ns	0.08
L^*_{24h}	58.2	58.6	58.2	58.5	58.3	58.5	ns	ns	ns	2.18
a^*_{24h}	2.87	2.62	2.76	2.73	3.07	2.42	ns	ns	ns	1.30
b^*_{24h}	-0.65	-0.55	-0.70	-0.51	0.04	-1.25	ns	ns	*	1.55
Frozen (9 months at -20°C):										
pH_{9m}	5.63	5.66	5.65	5.63	5.63	5.66	ns	ns	ns	0.10
L^*_{9m}	62.2	62.3	61.5	63.1	63.1	61.5	ns	*	*	2.07
a^*_{9m}	-0.03	-0.07	0.03	-0.12	-0.05	-0.04	ns	ns	ns	0.76
b^*_{9m}	-2.14	-2.23	-2.53	-1.83	-1.67	-2.69	ns	ns	ns	2.06

ns: not significant; *: $P<0.05$.

Table 3. Effect of type of storage on pH and L*a*b* colour of LL muscle

	Storage		*Probability*	RMSE
	Chilled	Frozen		
pH	5.70	5.64	**	0.09
L*	58.2	62.3	***	2.08
a*	2.79	-0.01	***	1.05
b*	-0.35	-2.13	***	1.87

**: $P<0.01$; ***$P<0.001$.

Table 4. Weight losses and Warner-Bratzler shear force of frozen hindleg and loin meats

	Sire genetic origin (SGO)		Slaughter Season (SS)		Sex (S)		*Probability*			RMSE
	B	F	Spring	Summer	Female	Male	SGO	SS	S	
Hindleg thawing loss, %	1.33	1.29	1.09	1.53	1.32	1.30	ns	*	ns	0.57
Hindleg cooking loss,%	20.9	21.7	21.1	21.4	21.2	21.3	ns	ns	ns	1.74
Loin thawing loss, %	6.24	6.08	7.70	4.62	6.48	5.83	ns	***	ns	1.62
Loin cooking loss, %	22.4	22.6	22.6	22.4	22.7	22.3	ns	ns	ns	0.95
Warner-Bratzler shear force, kg/cm^2:										
- Hind leg meat	1.08	1.11	1.12	1.07	1.12	1.07	ns	ns	ns	0.19
- Loin meat	1.20	1.22	1.08	1.33	1.19	1.23	ns	†	ns	0.38

ns: not significant; †: $P<0.10$; *: $P<0.05$; ***$P<0.001$.

Conclusions

Meat quality of the 2 sire breeds tested are quite comparable even though rabbits belonging to the B SGO showed better growth rate, but worse FCI in hot environmental conditions. The hot season reduced the growth and slaughter performance. The storage of rabbit meat at freezing temperature significantly decreased the pH and worsened the colour variables. Research supported by MIUR (PRIN 2002, 2002078279_004).

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