

The effect of alpha-tocopherol concentration and antioxidant enzyme activities on the shelf life stability of beef from different feeding systems

***Garcia-Galicia, Ivan A.
Richardson, R. Ian
Ball, Rose
Coulmier, Didier
Scollan, Nigel**

Material and methods

- Charolais x Friesian steers
 - G1: 9 steers fed forage (grazing/silage)
 - G2: 10 steers fed barley straw and concentrate
 - G3: 10 steers barley straw and concentrate + lucerne-based extract (PX)
- ***Sampled Longissimus thoracis***
- **Tocopherol analysis (Butriss and Diplock, 1984).**
- **Simulated retail display (MAP, O₂:CO₂, 75:25, 700 lux, 16h light, 8h dark, 4°C), 10 d.**
- **Colour (L*, a*, b* and Chroma*).**
- **TBARS determination (Tarladgis et al., 1960).**
- **Superoxide Dismutase (SOD) and Catalase (CAT) activity by spectrophotometry (Marklund and Marklund, 1974; Aebi, 1974).**



Results

	α -Toc mg/g	ΔC^* 10days	TBARS mg/g	CAT unit/mg protein
Grass/silage	5.08 ^a	7.83 ^a	1.1 ^a	9.50 ^a
Concentrate	2.35 ^b	11.77 ^b	3.4 ^b	13.43 ^b
PX	3.01 ^c	12.32 ^b	5.7 ^b	12.64 ^{ab}
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Correlations

	SOD	CAT	ΔC^*	TBARS
α -toc	0.14	-0.39*	-0.43**	-0.59**
SOD		-0.11	-0.17	-0.22
CAT			0.44*	0.25
ΔC^*				0.75**

*P<0.05, ** P<0.01, *** P<0.001



Conclusions

- Meat from grazed cattle had an improved colour and lipid stability than that from concentrate-fed cattle due, to a higher deposition of α -tocopherol.
- SOD was not affected by diet, or correlated with measures of oxidation
- Catalase activity increased when α -tocopherol concentration was low and consequently lipid oxidation was higher