

# EFFECTS OF WET AND DRY AGEING ON THE PHYSICAL, CHEMICAL AND SENSORY QUALITY OF FLECKVIEH CATTLE MEAT

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## I. INTRODUCTION

The beef quality encompasses various parameters such as food safety, nutritional value, traceability, colour, tenderness, flavour and aroma [1]. Ageing is one of the most common methods used to improve beef quality, especially tenderness and flavour, either in vacuum package (wet ageing) or without package (dry ageing) [2]. However, there are a number of factors, from *ante-mortem* factors to physicochemical properties that influence beef organoleptic quality and determine the optimum ageing method. Ageing conditions, such as time, temperature, humidity, and air flow also significantly determine the eating quality of the product [3]. Therefore, the aim of this study was to evaluate the effect of ageing method and time on the physicochemical and organoleptic properties of Fleckvieh beef loins.

## II. MATERIALS AND METHODS

Ten Fleckvieh bulls were slaughtered at the age of 22 months and the average hot carcass weight of 451 kg. Two days after slaughter, bone-in loins (*longissimus lumborum*) were collected and randomly divided into four parts. Two parts were deboned, vacuum-packed and wet-aged (2 °C), and the other two sections were dry-aged in a dry-ageing chamber (Friulinox AS-EN2-VTR, Friulinox, Italy) at 2 °C, 80% relative humidity and 15% air change per hour. At 2 (control), 35 and 50 days after slaughter, samples of the loins were evaluated for physicochemical parameters, following Lebedová *et al.* [4]. Descriptive sensory analyses were performed by trained panellists (n = 10) on days 35 and 50. Data were analysed using MIXED procedure in SAS package. For post hoc analysis Tukey's test were used.

## III. RESULTS AND DISCUSSION

The pH values increased during the ageing process. Meat aged for 50 days was redder than that of the control group. Warner-Bratzler shear force decreased by ~50% during ageing to the values considered to be tender [5], but neither method nor time differed in their effects.

Physicochemical characteristics of Fleckvieh bull *longissimus lumborum* muscles

Parameter	Control	Ageing 35 days		Ageing 50 days		SEM	P-value
		Wet	Dry	Wet	Dry		
pH	5.58 <sup>c</sup>	5.62 <sup>bc</sup>	5.68 <sup>ab</sup>	5.66 <sup>b</sup>	5.73 <sup>a</sup>	0.02	<0.001
L* (lightness)	36.9	37.8	38.0	38.3	38.0	0.58	0.245
a* (redness)	14.1 <sup>b</sup>	15.9 <sup>ab</sup>	14.9 <sup>ab</sup>	15.2 <sup>ab</sup>	16.0 <sup>a</sup>	0.46	0.035
b*(yellowness)	11.4	12.6	11.6	12.1	12.6	0.45	0.139
WBSF (N)	73.1 <sup>a</sup>	38.8 <sup>b</sup>	32.6 <sup>b</sup>	38.5 <sup>b</sup>	34.0 <sup>b</sup>	2.65	<0.001
Moisture (%)	74.3 <sup>a</sup>	73.9 <sup>a</sup>	72.7 <sup>b</sup>	74.0 <sup>a</sup>	71.8 <sup>b</sup>	0.35	<0.001
Protein (%)	21.2 <sup>d</sup>	21.9 <sup>c</sup>	22.8 <sup>b</sup>	22.0 <sup>c</sup>	23.7 <sup>a</sup>	0.23	<0.001
IMF (%)	2.31	1.92	2.09	2.09	2.12	0.32	0.780
Ash (%)	1.05 <sup>c</sup>	0.99 <sup>c</sup>	1.13 <sup>b</sup>	1.00 <sup>c</sup>	1.28 <sup>a</sup>	0.02	<0.001

<sup>a,b,c</sup> Means with different superscripts within the same row differ significantly (P < 0.05)

Dry aged meat had the greatest moisture losses, resulting in higher protein and ash contents over time. Sensory analyses revealed a more favourable assessment of dry-aged beef at both time points (Figure 1). At the ageing time of 35 days, differences were found for textural characteristics, while at 50 days, a number of different aroma and flavour characteristics were observed. In both ageing times, the wet-aged samples had lower overall acceptability scores than the dry-aged samples.

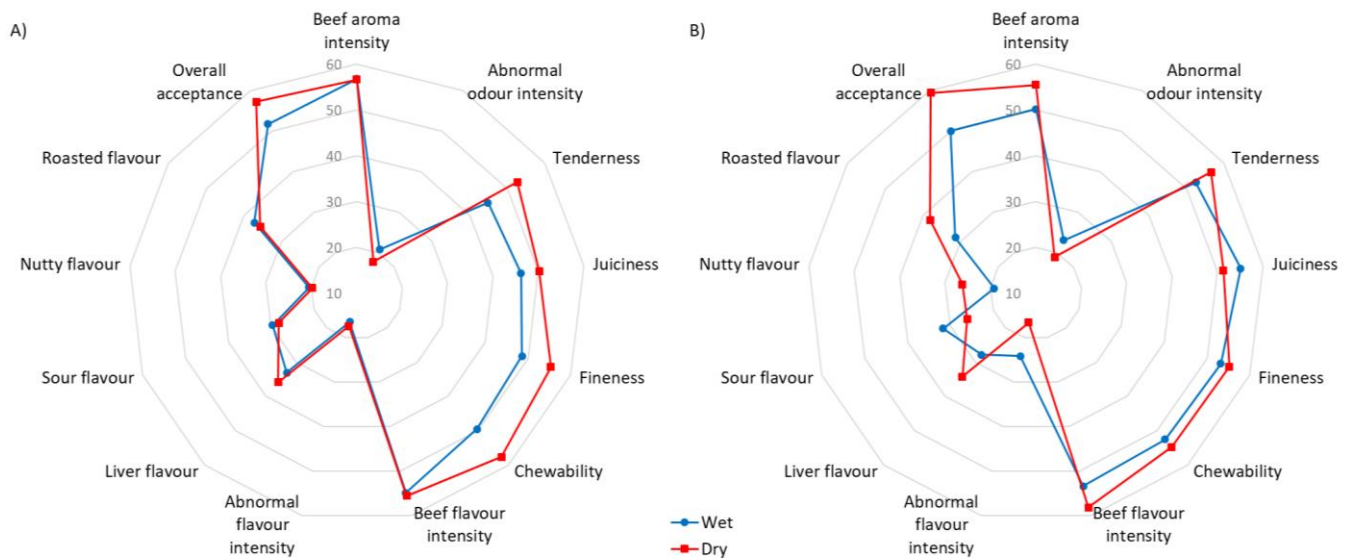


Figure 1. Sensory characteristics of grilled beef loins at 35 days of ageing (A) and 50 days of ageing (B). Scale for odours and flavours: 0 = very low, 100 very high, scale for texture: 0 = very unfavourable, 100 = very favourable.

#### IV. CONCLUSION

In conclusion, the ageing period of 35 days was sufficient for the meat to achieve sufficient instrumental tenderness using both wet and dry ageing. Dry-aged beef was more favourably assessed than wet-aged beef regardless of the ageing time. In spite of the additional meat weight loss associated with extended storage, dry ageing for 35 days can be recommended as a suitable method to improve the physical and organoleptic quality of the beef from Fleckvieh bulls.

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