

# HOW IMPORTANT IS SLICING TECHNOLOGY FOR LAMB QUALITY?

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**Abstract – The bandsaw and the shear cutter are the commonly used technologies to slice lamb in Spain. These technologies have different cutting mechanisms so they could exert different effects on meat quality. Seven lamb legs were sliced with each technology to evaluate the effect of both cutting systems on meat colour, lipid oxidation, microbial growth and visual acceptability. Significant differences between cutting systems were found in visual acceptability. Samples chopped with a bandsaw were given higher values for muscle and bone acceptability as well as for overall liking. These differences in acceptability may be explained due to the bone splinters produced by the shear cutter. Therefore, the bandsaw could be recommended for lamb slicing.**

**Key Words – Acceptability, Saw, Cutting system.**

## I. INTRODUCTION

Lamb for retail display is commonly packaged in oxygen enriched atmospheres to satisfy consumers demand for fresh and attractive appearance meat [1]. Meat industry has focused its efforts on improving packaging technologies and chilling conditions in the last decades [2]. Nevertheless, only limited information is currently existent on the effects of the available technologies to slice meat on lamb quality. Nowadays, the bandsaw and the shear cutter are equally used to slice lamb in Spain although both cutting mechanisms are very different. The first one is based on a sharp blade while the second one uses the shear effort to break muscle and bone tissues. Thus, the aim of this piece of work is to evaluate the effects of both cutting technologies on lamb quality.

## II. MATERIALS AND METHODS

Seven lamb carcasses were randomly chosen and chilled for 24 hours (-1.5 to 0.5 °C). Later, the right legs were sliced with a bandsaw whereas the left legs were cut using a shear cutter. Chops were packaged (40% O<sub>2</sub>/ 30% CO<sub>2</sub>/ 30% Ar) and displayed at 4 ± 0.5°C for 8 days. A Minolta CM-2002 spectrophotometer was used to measure meat colour. The 580/630 ratio was calculated following the recommendations of AMSA [3]. The relative content of metmyoglobin was calculated according to Krzywicki [4]. Lipid oxidation was determined as Thiobarbituric Acid Reactive Substances (TBARS) following the methodology described in Bellés *et al.* [5]. Aerobic total viable counts (ATVC) were determined as described in Bellés *et al.* [5]. The effect of slicing system on visual acceptability was assessed using an untrained sensory panel (n=50) which evaluated muscle acceptability, bone acceptability and overall liking at two different days of display (1 and 6) with a 9-point structured hedonic scale from 1 ('dislike extremely') to 9 ('like extremely') where the neutral central point had been deleted. All data were statistically analyzed by the general linear model procedure of IBM SPSS version 19. The model included slicing system and refrigeration storage duration as main effects and also their interaction. For the visual acceptability test consumer was included as random effect. Differences were considered significant when P ≤ 0.05.

## III. RESULTS AND DISCUSSION

Significant differences between treatments were only found after two days of display, when chops sliced by the cutting shape registered lower values both in the 580/630 ratio and the percentage of metmyoglobin (P = 0.006 and P = 0.03, respectively) (Figure 1A). The different slicing technologies did not affect lipid oxidation (Figure 1B). Differences in microbial counts between treatments were neither registered. Differences in muscle acceptability were only significant at 6 days of display, being not clear the reasons of these differences. A lower bone acceptability was noted in the chops sliced using a cutting shape at both days of evaluation. As a result, overall liking differed between treatments, being higher in the samples sliced by a bandsaw.

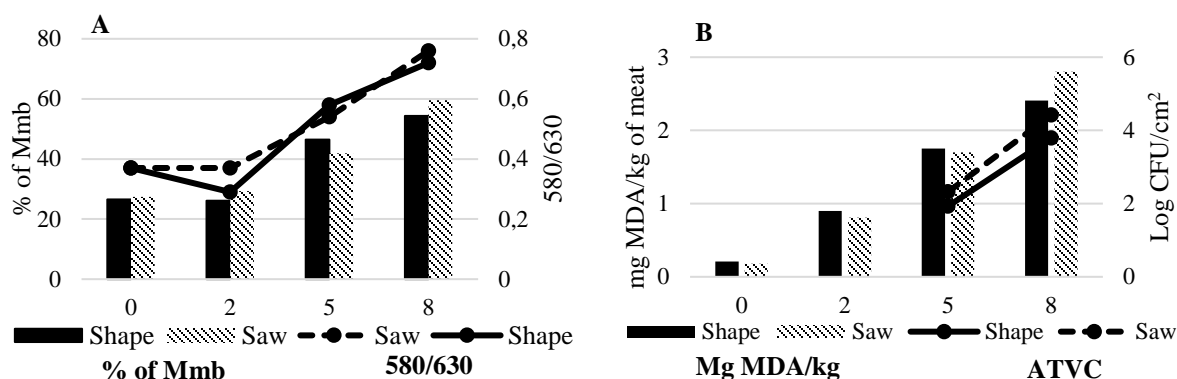


Figure 1. Effect of chopping system on: the 580/630 ratio and the percentage of metmyoglobin (% of Mmb) (A), the content of malondialdehyde (MDA) and aerobic total viable counts (ATVC) (B) during display (days).

Table 1. Effect of slicing system on visual acceptability of lamb chops during display

Variables	Display (d)	Saw*	Shape*	P
Muscle acceptability	1	6.01±1.22	5.67±1.39	0.055
	6	4.26±1.6b	3.81±1.40a	≤0.001
Bone acceptability	1	6.26±1.22b	4.76±1.40a	≤0.001
	6	4.89±1.64b	4.1±1.31a	≤0.001
Overall liking	1	6.25±0.3b	5.53±1.20a	≤0.001
	6	4.53±1.6b	4.00±1.40a	≤0.001

\*Mean and standard deviation. Different letters (a, b) in the same row indicates significant differences between slicing systems ( $P \leq 0.05$ ).

#### IV. CONCLUSION

Chopping with a cutting shape produced bone splinters which may have resulted in a significant decrease of overall liking. Thus, slicing with a saw could be recommended for fresh lamb.

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