

THE INFLUENCE OF ZOOTECHNICAL AND TECHNOLOGICAL PARAMETERS ON RHEOLOGICAL CHARACTERISTICS OF HAM SLICES.

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ABSTRACT

The aim is to study the influence of zootechnical and technological parameters on the process of ham, by means of rheological characteristics on slice ham. This can be evaluated by compression tests.

The zootechnical factors were : two genetics lines, two slaughter ages (160 and 190 days), two groups of pH24 (< 5.55 and > 5.7) and two types of muscles (Biceps Femoris and Semi Membranous). The technological parameters were : salt concentration (1.5 or 2.5 %), two different gradients with variables of speed but the same final temperature (0.16 °C/min and the other 0.55 °C/min), two pasteurisation values ($V_p^{10/70}$ 50 and $V_p^{10/70}$ 100) and absence or presence of epymisium.

The rheological characteristics of the sliced ham were evaluated using the Reichert model in conjunction with the evaluation of compression with the Instron 6022 machine. The parameters studied on the slice was with the maximal strength.

The variables of muscle, salt and epymisium were found to have a significant influence when subjected to a compression test, for muscle ($p < 0.01\%$), salt ($p < 5\%$) and epymisium ($p < 5\%$). Using Reichert module for compression test, a comparison can be made with the ham slicing process. Therefore the influence of the above variables can in the future, be predicted with respect to the ham slicing process.

INTRODUCTION

The study of the ham process is important due to the increase of pre-wrapped ham. therefore it is important to the meat industry to control the slicing process. The pH24 and the genetics line are important parameters to predict the slicing characteristics (G. Alviset et al., 1995, J. Reichert et al., 1984). Also, the slicing output moves between 42.44 and 90.84 %, if genetics lines and pH24 is considered. Simultaneously with these two parameters, was set another of parameters with factors both zootechnological and technological.

The Zootechnical factors were :

- Two genetics lines : (Large White (LW) x Pietrain(P)) x (LW x Landrace (LD)); (P76 a composite line of Pen Ar Lan society) x (LW x LD),
- Two slaughter ages of 160 days and the other 190 days with similar weight.
- Two groups of pH 24, one low at 5.55 and the other at 5.7.
- Two muscles were study the Biceps Femoris and the Semi Membranous.

The Technological parameters were :

- salt concentration (1.5 or 2.5 %).
- two different gradients with variables of speed but the same final temperature (0.16 °C/min and the other 0.55 °C/min).
- Two pasteurisation values ($V_p^{10/70}$ 50 and $V_p^{10/70}$ 100).
- Absence or presence of epymisium.

The object of experiment was to see the influence of these factors on the rheological characteristics on slice ham and to study the relation of this with technological output.

Materials and Methods

Influence of zootechnical characteristics

Three factors has been used to select the pigs : genetic line, age and pH24. These factors have no influence on the weight of carcasse and percentage collagen in meat.

Ham process protocol

The muscles were cut into pieces of 80 g. A mixture of salt solution with water, nitrite salt, sugar, and sodium isoascorbate was added. Two nitrite salt concentration was used (sodium nitrite salt, Compagnie des Salines du Midi et des Salines de l'Est, Varangeville, France) to obtain 1.5 or 2.5 % in the finished product. The salt solution concentration was 10 % of the original salt found in the meat. The duration of spinning was 10 hours with 20 min of spinning at 8 rt/min and 40 min with no rotation. The temperature whilst spinning was 8 °C. The spinning was carried out for one vacuum-packed meat which contains 1 kg of meat for 0.11 kg of salt solution. After spinning the meat is separated into two portions of 500 ± 10 g and cooked then vacuum-packed. During the cooking, two gradients which increase in speed with only one final temperature (65.5°C), followed by pasteurisation which is also noted.

Rheological caracterisation

The evaluation of rheological characteristics has been realised by a compression test using Instron 6022 machin (J. Reichert et al., 1984). The test is realised 48 hours after process of cooking. A slice ham of 2 mm was submit to a compression test similar to , the



speed was 100 mm/min and the displacement was 18 mm. The study was conducted by a factorial plan with resolution IV and eight factors.

RESULTS AND DISCUSSION

The influence of the eight factors study is given table 1.

table 1 : Evolution of maximale force of the slice in fonction of height factors evaluate with mean \pm standard error (NS : no significantly difference).

Several factors have an important influence on maximum force of the slice ham, salt and epimysium. The relationship between maximum force of the slice and technological output is significant for the Semi Membranous muscle as shown in figure I ($r^2 = 0.48$; $p < 0.01\%$).

Figure I : maximale force of compression test (N) in fonction of technological output for the Semi Membranous.

The relation ship between maximum force and technological output is interesting, it enables a confirmation of meat product with technological output which correlates with cut output. The compression test with Instron show similar results.

BIBLIOGRAPHY

- Alviset G., Braud J., Vidal E. 1995. Influence du pH ultime et de trois génétiques sur la qualité du tranchage des jambons label rouge commercialisés en libre service. Bull. Liaison CTSCCV. 5, 1, 10-24.
- Reichert J., Färber D. Flachmann A. 1984. Scheibenzusammenhalt bei kochschinken. Die Fleischerei, 10, 705-707.
- Reichert J., Färber D. 1984. Scheibenzusammenhalt bei kochschinken. Die Fleischerei, 11, 795-798.

	F en	N	p
male genetic line	LW*P	15.8 \pm 4.3	NS
	P76	16.6 \pm 6.11	
age in day	160	16.7 \pm 4.9	NS
	190	15.7 \pm 5.6	
muscle	Biceps Femoris	18.6 \pm 4.6	$p < 0.01\%$
	Semi Membranous	13.8 \pm 4.7	
pH	< 5.55	15.3 \pm 6.2	NS
	> 5.7	17.0 \pm 4.0	
salt	1.5 %	14.9 \pm 5.4	$p < 5\%$
	2.5 %	17.5 \pm 4.8	
epimysium	with	17.4 \pm 4.8	$p < 5\%$
	without	15.0 \pm 4.8	
different gradient of speed	slow	16.7 \pm 4.9	NS
	quick	15.7 \pm 5.6	
temperature			
	pasteurisation value	50	16.2 \pm 4.5
	100	16.2 \pm 6.0	

table 1

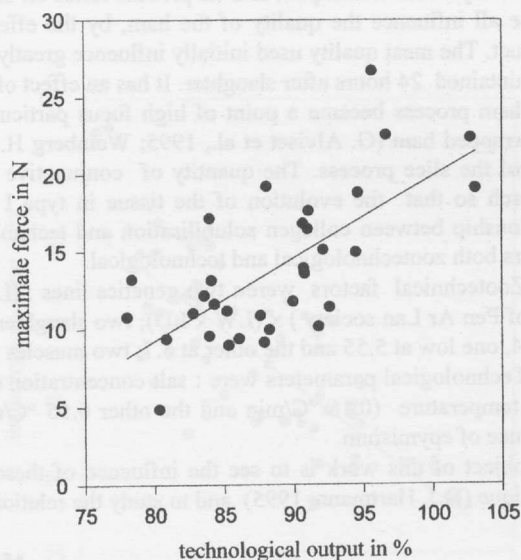


Figure I