

CHEMICAL CHARACTERISTICS OF "SALPICÃO" A TRADITIONAL PORTUGUESE SMOKED SAUSAGE

CONCEIÇÃO MARTINS(1), F.LEON CRESPO and J.C.PENEDO PADRON(2)

- (1) University of Trás-os-Montes and Alto Douro - Vila Real, Portugal
 (2) Faculty of Veterinary - Cordova - Spain

SUMMARY

The chemical composition of a traditional Portuguese smoked sausage, was studied on twenty samples randomly drawn from five batches produced by an intensive technological process, particularly in the maturation and ripening periods. The means of the experimental data were the following: pH - 5.94 ± 0.12 ; aw - 0.89 ± 0.10 ; moisture - $49.00 \pm 0.63\%$; fat - $15.02 \pm 3.73\%$; protein - $28.11 \pm 1.54\%$; ash - $7.23 \pm 0.63\%$ and $6.04 \pm 0.55\%$ for sodium chloride.

According to the E.E.C. decision 77/79 (1976); the studied sausage do not require refrigeration, as the aw values assure stability. Except for fat, no significant differences ($P < 0.05$) were observed among batches. This study has shown the feasibility of making homogeneous products with organoleptic characteristics similar to those of the traditional type. Raw material and technology must, however, obey the quality criteria.

INTRODUCTION

Portugal has a large variety of traditional sausage products, including dry ham, dry sausages, smoked sausages, and many others.

Among the various kinds of smoked sausage "Salpicão" available in northern Portugal, there is the Vila Real type, which is the object of this study.

By "Salpicão" we mean a kind of large sausage (± 50 mm of diameter), cured with smoke, varying in composition, spices and technological process according to the region. In the wine production zones, wine is one of the major seasoning ingredients. In the plateau zones, where wine production has no expression, this ingredient is substituted by water.

The objective of this work was to study a traditional type of smoked sausage produced by an intensive technological process, particularly in the ripening periods, in order to obtain a stable pattern.

The studied variables were the following: pH; water activity (aw); moisture; protein; fat; ash and salt (NaCl).

MATERIAL AND METHODS

The Vila Real type of smoked sausage consists of a single piece of meat (pork loin or ham), weighting 200 - 300gr, matured for four days at 5°C with salt (4.5%), garlic (0.2%) and red wine (7.5%). The stuffing is filled into gross pork gut, subject to the drying effect of smoke for three days in a traditional smokery, and kept at environmental temperature for four days.

The samples studied were vacuum packaged to prevent variations, especially in terms of moisture.

The study was based in twenty samples randomly drawn from five batches produced according to identical technology.

The pH was measured with an Orion pH meter, model 601A, in the water extract.

The aw was determined by exposing the samples to an environment with relative humidity controlled by saturated salt solutions at 25°C (Serrano Moreno, 1979).

Moisture, fat, protein, ash and salt content (NaCl) were determined according to the A.O.A.C. procedures (1975).

The analysis of variance was made according to Steel and Torrie (1982). The Duncan test was used to evaluate the significance of the differences among the means.

RESULTS AND DISCUSSION

Table 1. The proximate composition of the "Salpicão"

Batches	pH	aw	Water %	Protein %	Fat %	Ash %	Salt %
1	5.75c	0.89	50.55	29.64	11.07b	7.63	6.43
2	5.96ab	0.91	46.75	26.79	21.28a	6.13	5.10
3	6.10a	0.89	50.75	26.90	15.71ab	7.64	6.56
4	5.88bc	0.87	47.00	29.73	11.29b	7.84	6.33
5	6.02ab	0.90	50.00	28.48	15.74ab	6.94	5.70
\bar{X}	5.94	0.89	49.00	28.11	15.02	7.23	6.04
SE^{**}	0.06	0.02	1.57	1.44	2.29	0.65	0.60
Signif. $P < 0.05$	NS	NS	NS	$P < 0.05$	NS	NS	NS

* Each value is the mean of four repetition

** Mean standard error

a,b,c, Means followed by similar letters do not differ significantly at $P < 0.05$

According to the E.E.C. decision 77/79, Dec. 21th, 1976 (Cantoni *et al.*, 1977; Leon Crespo *et al.*, 1984), the studied sausage is among the products which do not require refrigeration. The pH values (5.94 ± 0.12) are higher than the defined ones (4.5-5.2), but the aw values (0.89 ± 0.01) are low and assure the product stability, guaranteeing that microorganisms which cause spoilage or food poisoning will not develop (Leistner and Rödel, 1976; Barraud and Billon, 1980). Except for fat, no significant differences were observed among batches. A short ripening time and vacuum packaging might have caused high moisture values ($49.00 \pm 0.63\%$).

The fat content ($15.02 \pm 3.73\%$) was within the Portuguese Norm (NP-59-1969). The variation of this parameter can be explained by heterogeneity in raw material (pork loin or ham).

The amount of protein ($28.11 \pm 1.54\%$) was found to be high, compared with similar French (25.00%) or Spanish (18.30%) products (Cheftel, 1976; Serrano Moreno, 1979).

The ash content ($7.23 \pm 0.63\%$) was high compared with the values founded by Schön (cited by Grau, 1965) in loin and ham, respectively 1.09% and 1.13%. This difference is due to the seasoning, particularly the sodium chloride. This element (NaCl) was also high ($6.40 \pm 0.55\%$) compared with foreign products. This reflects the concern to reduce salt in food. For example, to Durand *et al.* (1970), the French dry sausage presents 5% of NaCl; 4.0 and 5.1% were found in Italian Salami (Cantoni *et al.* 1977); and 4.03% in the Spanish dry sausage (Serrano Moreno, 1979).

The organoleptic characteristics of the studied smoked sausage were considered normal, the taste and flavour were pleasant. However, it should be stressed that the texture and naturally all the

other features, would be improved with increased ripening time.

Considering that the chemical composition is an indicator of the raw material quality and technological process, this study has shown the feasibility of making homogeneous products with organoleptic characteristics similar to those of the traditional type, when raw material and technology obey the quality criteria.

REFERENCES

- A.O.A.C. 1975 - "OFFICIAL METHODS OF ANALYSIS", 12^{ed} Assoc. of official Analytical Chemists, Washington, D.C..
- BARRAUD, CL. et J.BILLON, 1980 - L'activité de l'eau (aw) des produits carnes signification du point de vue de la conservation. RTVA (155):5-8.
- CANTONI, C., P.CATTANEO e M.PERLASCA, 1977 - Sulla classificazione dei prodotti di salumeria proposta dalla C.E.E. Industrie Alimentari, Gennaio 8pp.
- CHEFTEL, J.C. e H.CHEFTEL, 1976 - Introduction a la bioquímica y tecnología de los alimentos (vol.1) Ed. Acribia ; Zaragoza, pag.84.
- DURAND, P., J.ROZIER et J.P.MONGIN, 1970 - Resultats d'une enquête sur les caractères du saucisson sec français. Rec.Med.Vét. TOME CXLVI: 513-523.

GRAU, R.1965 - Carne e produtos carnicos.Ed. Acribia Zaragoza, pag.28.

LEISTNER, L. and RODEL, 1976 - Inhibition of micro-organisms in food by water activity. In inhibition and inactivation of vegetative microbes. Ed.F.A.Skinner, Academic Press, London,p.219-237.

LEON CRESPO, F.E.M. PEREZ-BARQUERO, F.B.HEREDIA, J.C. PENEDO PADRON, A.LOPEZ ESCAR, O. MATA MORENO e A.B. SANCHEZ 1984- -Características de estabilidad y seguridad sanitaria del Jamon Serrano Comercial. Alimentaria (149):35-37.

SERRANO MORENO, A.1979 - Evolucion várias microfloras y su interdependencia con las condiciones fisico-químicas durante la maduración del Salchichon. Alimentaria (100):39-56.

STEEL, R.G.D., J.H. TORRIE, 1982 - Principles and procedures of statistics. A. Biometrical Approach. Ed. Mc.Graw. Hill International Book Company.