MAIN PHYSICAL-CHEMICAL CHARACTERISTICS OF PRESSED HAM COMMERCIALIZED IN TIMIS COUNTY

Gabriel Bujancă, Teodor Ioan Trașcă, Adrian Riviș, Alexandru Rinovetz, Corina Miscă, Corina Costescu, Călin Jianu, Ioan David, Ariana Velciov

[1]*Banat's University of Agricultural Sciences and Veterinary Medicine ofTimisoara, Faculty of Food Processing Technology, 300645-Timisoara,Calea Aradului 119, Romania, Phone: +40-256-277327; Fax: +40-256-277261,*
e-mail: gabrielbujanca@yahoo.com

Abstract
The paper proposes the study of some quality characteristics of pressed ham by standard methods of package, a widely spread product int the Western area of Romania (Timis county) as well. The samples were evaluated in terms of admissibility of sensory, physical, chemical and microbiological indicators, known by the consumer through various information methods. There have been identified and quantified, the following characteristics: water content, NaCl, NO2, fat and protein percentage, and among those with potential pathogenic microorganism interest: Coliforms, Escherichia coli, Salmonella, Staphylococcus coagulase-positive. The maximum limits for admissibility were recorded in water (75.5 to 78.4% (up to 80% max.)), NaCl (3.0-3.3% (3.5% max.)), a moderate protein (16 6% (up to 13% max.)), and modest limits lipids (3.6 to 4.0% (up to 16% max.)) and for NO2 the values are below the admissibility limit. As for microbiological analyzes, the obtained values, they prove the product as being fit for consumption.

Keywords: pressed ham, physical-chemical characteristics, quality of pressed ham, microbiological contamination of pressed ham.

Introduction
The preserving of pork leg as ***ham*** has a long history, with*Cato the Elder*writing about the "*salting of hams*" in his *De Agri Cultura* tome around 160 BC [1].
Cooked (pasteurized) and pressed ham falls into the specialties category, characterized by an exclusive presence of pork meat (pork leg). By the specific manufacturing technology, the end product, takes the form and shape of the pasteurization vessel. [2]. There is a very complex relationship between the constituents of meat products, such as moisture, protein, and fat, which provide the desired sensory attributes, especially in terms of texture (tenderness, cohesiveness, chewiness) and color [3,4]. The study characterizing the quality hams, applying a multi-disciplinary approach. Ham sensory profile depending as physico-chemical, aromatic, morphological and textural characteristics [5]. Among porcine meat products, cooked ham has the highest level of consumption in several European countries, making it an economically important product. Besides the current technological guidelines adopted in the different countries for the production of cooked ham, genetic aspects together with breeding conditions of pigs play a crucial role on the quality of finished product [6,7]. The evaluation of physicochemical detectable parameters of ham represents an important tool to define and characterize this product. For example, the moisture level measured in cured-cooked ham might represent a performing and informative parameter used to classify the product [8,9]. The final quality of the product results from a combination of different properties that involve raw and processed meat [10,11]. This research was carried out to define the quality parameters of pressed hams from pig,of different origin, and processed under commercial guidelines. Our

aim was to highlight the organoleptic, physico-chemical and microbiological characteristics of the different kinds of cooked ham and show the differences useful for characterizing the product.

Materials and methods

Materials: Six samples of pressed ham were analyzed from different producers of Timiș county. Samples were collected according to law, in the period June-July 2015.

Methods: For quality assessment of the pressed ham obtained from pork leg were checkedpackaging and labeling, organoleptic characteristics, physico-chemical and microbiological quality of six assortment of finished product. Samples were subjected to sensory (appearance, color, consistency, taste and smell), physical-chemical (water, salt, protein, fat and NO_2content) and microbiological examination (coliforms, *Escherichia coli*, *Salmonella*, Staphylococcus coagulase-positive).

Measurements were carried out according to the following standards:

- Water content: SR ISO 1442:2010;
- Sodium chloride content: SR ISO 1841-2: 2000;
- NO_2 content: SR EN 12014-3: 2005;
- Fat content: SR ISO 1443:2008;
- Coliforms: SR ISO 4831/92 and 4832/92;
- *Escherichia coli*: SR ISO 7251/96;
- *Salmonella*: SR EN 12824/2001;
- Staphylococcus coagulase-positive: SR ISO 6888/92.

Results and discussions

External examination revealed that all samples were submitted data necessary to identify the product, they were not cracked, shell was smooth and clean.The products had a round section.

The contents were examined from a sensory, physical-chemical and microbiological point of view.

Direct microscopic examination of smears made from the contents of each sample did not reveal the presence of a number of microscopic germs in the field, over the allowed limit.

Sensory characters corresponded to STAS: *appearance*: the contents of containers filled entirely, showed no air pockets, form in the section was cylindrical; *color*: light pink, specify to boiled meat; *consistency*: normal, specify to boiled meat, good behavior at slicing; *taste* and *smell*: pleasant, specifically the cooked meat and spices, without foreign taste and smell.

In the physical-chemical analysis of the samples were considered the following conditions of admissibility: Water – maximum 80%; NaCl – maximum 3.5%; Protein– minimum 13%; NO_2 – maximum 7 mg/ 100 g product; Fat – maximum 16%.

The physical-chemical and microbiological characteristics of the analyzed samples are shown in the following tables and charts:

Table1. Main physico-chemical characteristics of examined pressed ham samples

Sample / Characteristics	1	2	3	4	5	6
Water	78.4	75.6	76.0	76.6	77.2	75.5
NaCl	3.3	3.0	3.2	3.2	3.1	3.0
Proteins	13.9	16.1	16.2	15.7	15.3	16.6
NO_2	5.5	5.3	4.9	6.0	5.8	6.1
Fat	3.7	3.8	3.7	3.9	3.6	4.0

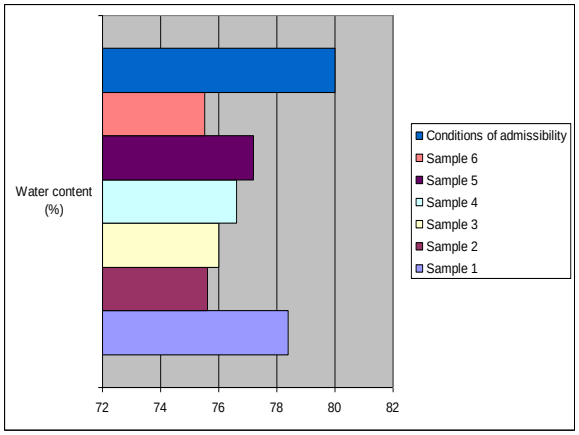

Figure 1. Water content of analyzed pressed ham samples

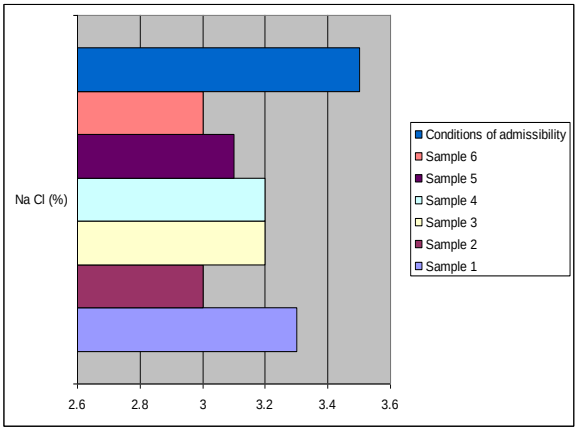

Figure 2. NaCl content of analyzed pressed ham samples

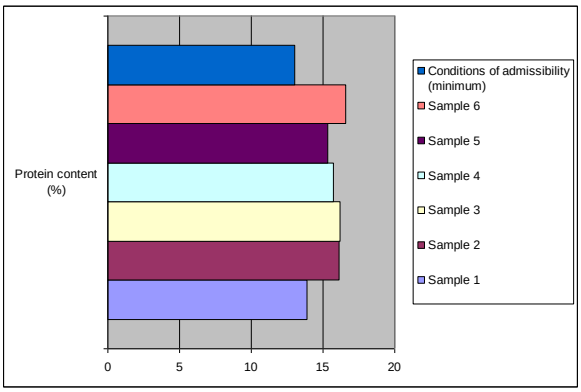

Figure 3. Protein content of analyzed pressed ham samples

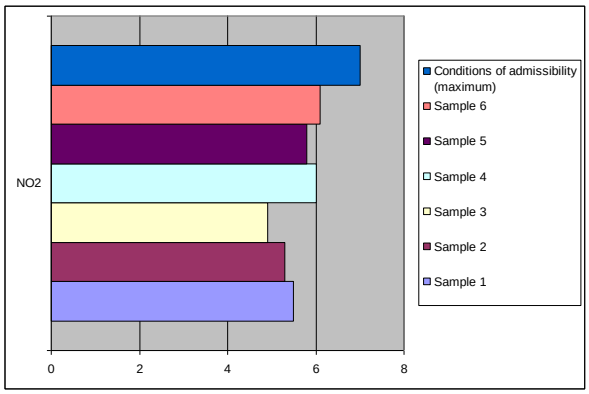

Figure 4. NO_2 content of analyzed pressed ham samples

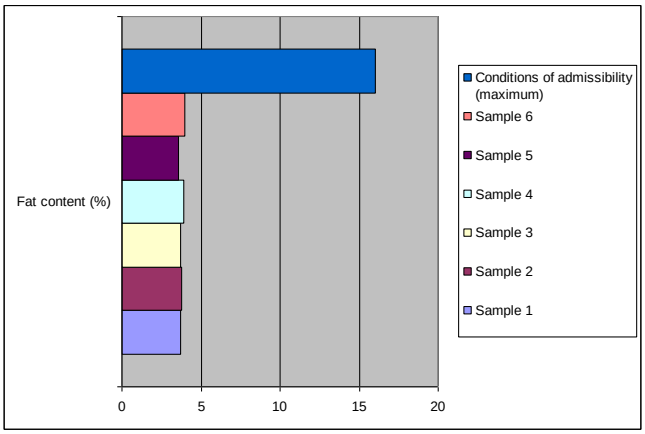

Figure 5. Fat content of analyzed pressed ham samples

Table 2. Microbiological composition of examined pressed ham samples

Sample / **Microorganisms**	**1**	**2**	**3**	**4**	**5**	**6**
Coliforms/g	53	0	31	14	67	22
***Escherichia coli*/g**	2	0	0	0	5	0
***Salmonella*/25 g**	Absent	Absent	Absent	Absent	Absent	Absent
Staphylococcus coagulase-positive	2	0	3	0	6	0

Water contained in the analyzed products did not exceed the maximum allowablelimit, values hovering between 75.5% and 78.4%.
The percentage of protein exceeded the allowable minimum limit of 13% in all cases. This demonstrates the high quality of these products.
The fat content was not exceeded in any case and so the legislation is respected.
The percentage of sodium chloride has been hovering around 3.1%, a value that is within the maximum limit of 3.5% stipulated by STAS.
Medium nitrites content was 5.6 ppm, under the 7 ppm imposed limit.
Determined microorganisms were present in very small quantities, fits within the legal limits.

Conclusions

The experimental results lead to the following conclusions:

- all analyzed pressed ham samples had labels under current law;
- packaging did not show any defect;
- the microbiological examination did not reveal the presence of any class of pathogens beyond the limits imposed by the law;
- physical-chemical parameters were within the specific limits of the product;
- analyzed products are optimal for consumption, not putting consumers' health at risk.

References

[1] Callow, E. H., 1947, British Journal of Nutrition,1(2-3), p. 269-274.
[2] Mircea, C., Tehnologia preparatelor din carne, Editura Universitatii Lucian Blaga, 2000.
[3] Francine Gomes Basso Los**,** Daniel Granato**,** Rosa Cristina Prestes**,** Ivo Mottin Demiate, 2014, Food Sci. Technol (Campinas) 34(3), 577-584.
[4] Cheng et al., 2005. Journal of Food Engineering, 67(4), 427-433.
[5] Monica Laureati et al., 2014.Meat Science, 96(1), 288–294.
[6] Lindahl, G.,Henckel, P.,Karlsson, A.H.and Andersen, H.J.,2006. Meat Sci.72, 613–623.
[7] Moretti, V. M., Bellagamba, F., Paleari, M. A., Beretta, G., Busetto, M. L., & Caprino, F. 2009.Journal of Food Quality,32(1), 125-140.
[8] Pedrelli, R.,Barbieri, G.,Franceschini, M.andPizza, A.,2005.Ind. Conserv. 80, p. 159–171.
[9] Casiraghi, E.,Alamprese, C.andPompei, C.,2006. Food Sci. Technol.40,164–169.
[10] Mcdonald, K.,Sun, D.andKenny, T.,2001.J. Food Eng.47,139–147.
[11] Santos, C.et al.,2004.Food Chem. 88, p. 123–128.