STUDY REGARDING ANALYSIS OF THE MEAT PRODUCTS QUALITY

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RESEARCH ARTICLE

Abstract
Quality is a complex and dynamic notion, because merchandise must fulfill a series of conditions (technical, economic, aesthetic, ergonomic) and the dynamic character results from the fact that the demands of the consumer society increase from one stage to another. The qualitative attributes of products are attributed in the production process and are manifested in the sphere of consumption. Due to its chemical composition with high biological value (proteins, fats, mineral substances, vitamins), high digestibility, and culinary potential, meat is an indispensable food.
This paper realizes a study on the estimation of the quality of a raw-dried salami assortment using two methods of calimetry.

Keywords: quality, meat, raw-dried salami, calimetry methods
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INTRODUCTION

The totality of properties possessed by a product, an expression of the extent to which the needs of societies are satisfied, taking into account the technical - economic and aesthetic parameters, the degree of use and the economic efficiency in operation, together make up what is commonly called quality. (BANU C., et. al., 2003; ILOIU MIRELA, 2012)

The specialized literature provides an appreciable number of definitions (over 120) given to the concept of quality, in which it is considered as "degree of utility", "fitness for use", "conformity with requirements", "a certain level of satisfaction of customer requirements", "a systematic approach to excellence", "conformity with specifications", safety in operation" etc. (BANU C., et. al., 2003; ILOIU MIRELA, 2012)

The term "quality" originates from the Latin "qualitas", invented by Cicero, meaning "attribute", "characteristic" or "way of being". Today's times are constantly creating new expectations for product quality. The essential requirement for food products is that they are "fit for consumption". The expression "fit for consumption" is the fundamental content of the concept of quality. (ILOIU MIRELA, 2012)

The quality of goods is a derivative of use-value, because it is important not only that the product is useful, fulfilling a particular need, but also the degree to which it fulfills that need. (BANU C., et. al., 2003; ILOIU MIRELA, 2012)

From a commercial point of view, meat is the carcass of animals, poultry and the products obtained from them. From a dietary point of view, meat and meat products are an important source of energy and nutrients for humans. (DIACONESCU, I., et. al., 2008; STADNIK, J., 2024;https://ro.scribd.com/document/120033585/Calitatea-carnii) The factors that influence the meat quality and its chemical composition are: species, breed, age, sex, diet, health status, slaughtering, preservation and storage conditions. The meat of different animal species differs in chemical composition, the ratio of different tissues and organoleptic properties. (AHMAD R.S., et al., 2018; http://www.fao.org/3/ca7390en/CA7390EN.pdf 10 Martie 2020; https://ro.scribd.com/document/120033585/Calitatea-carnii)

Raw, dried and matured preparations (salamis and sausages) are products with a high nutritional value, which are obtained without heat treatment. The superior edibility and taste characteristics are obtained as a result of the maturing processes to which the products are subjected. The enzymes secreted by the natural microflora or cultures of useful micro-organisms (bacteria, molds, yeasts) added to the sausages contribute to the maturing process. The raw materials used for raw preparations are pork, beef, mutton and bacon. Pure cultures of bacteria and noble mold spores are used for the maturing process of raw salamis and sausages. (GLAVAN, C., 2020; https://ro.scribd.com/document/348930596/Salam-Crud-Uscat; https://dokumen.pub/meat-quality-

analysis-advanced-evaluation-methods-techniques-and-technologies.html)

Raw-dried salamis are meat preparations in which the matter is subjected to fermentations produced by the muscle fiber's own enzymes and enzymes produced by beneficial bacteria, molds, and yeasts. These processes take place throughout the entire manufacturing cycle, which is carried out at low temperatures. The production of raw-dried and raw-smoked salamis is characterized by a succession of processes in which controlled changes in the meat occur: fermentation /acidification, maturing and drying. Since these products are obtained without applying a heat treatment at high temperatures, it is essential that both the ingredients (raw materials, additives, spices) and the auxiliary materials used are standardized from a physico-chemical and microbiological point of view in order to obtain finished products that are safe for consumption. (GLAVAN, C., 2020; https://ro.scribd.com/doc/304199393/Standardizarea-Si-Controlul-Calitatii-Carnii-de-Porcine; https://ro.scribd.com/document/348930596/Salam-Crud-Uscat)

The main organoleptic characteristics of raw-dried salami refer to external appearance and color, cross-sectional appearance, taste and smell and consistency. (BANU C., et. al., 2003; https://ro.scribd.com/document/348930596/Salam-Crud-Uscat; https://ro.scribd.com/document/410106993/Analiza-Calitatii-Senzoriale-a-Salamului-Crud-Uscat)

External appearance: cylindrical, undeformed bars with the surface covered with a thin layer of selected white-grey mold. (BANU C., et. al., 2003; https://ro.scribd.com/document/348930596/Salam-Crud-Uscat; https://ro.scribd.com/document/410106993/Analiza-Calitatii-Senzoriale-a-Salamului-Crud-Uscat)

Cross-sectional appearance must present a glossy, compact, well-knit, mosaic composition, with small islands of white fat, spread evenly over the entire surface of the section. Air voids, accumulations of melted fat under the membrane and on the section, accumulations of spices, foreign bodies, or bone fragments are not allowed. (BANU C., et. al., 2003; https://ro.scribd.com/document/348930596/Salam-Crud-Uscat; https://ro.scribd.com/document/410106993/Analiza-Calitatii-Senzoriale-a-Salamului-Crud-Uscat)

The *consistency* should be semi-hard to hard on the surface and in the peripheral area of the section, softer but bound and elastic towards the center; when pressing normally with a finger on the surface of the bar, it returns to its original shape. (BANU C., et. al., 2003; https://ro.scribd.com/document/348930596/Salam-Crud-Uscat; https://ro.scribd.com/document/410106993/Analiza-Calitatii-Senzoriale-a-Salamului-Crud-Uscat)

The *color in section* should be uniform from reddish brown to red. On the outside, the membrane is covered with a grayish-white or yellowish-white mold powder. (BANU C., et. al., 2003; https://ro.scribd.com/document/348930596/Salam-Crud-Uscat;https://ro.scribd.com/document/410106993/Analiza-Calitatii-Senzoriale-a-Salamului -Crud-Uscat)

The *taste* and *smell* must be characteristic of raw and dried products, without foreign taste and smell. (BANU C., et. al., 2003; https://ro.scribd.com/document/348930596/Salam-Crud-Uscat; https://ro.scribd.com/document/410106993/Analiza-Calitatii-Senzoriale-a-Salamului-Crud-Uscat)

The physico-chemical characteristics of raw-smoked or raw-dried salamis are presented in Table 1. Raw, smoked and dried salamis are stored at a temperature of 10-14°C and a relative air humidity of 70-80%; under these conditions they can be stored for a period of between 30 and 90 days. (https://ro.scribd.com/document/348930596/Salam-Crud-Uscat; https://typeset.io/pdf/nutritional-composition-of-meat-474otrw4dm.pdf)

Tabelul 1. Physico-chemical properties of raw-dried salami

Properties	Values
Humidity, %	30-35
Fat content, % max.	32
Total protein content, %	15-18
Sodium chloride, % max.	3
Nitrites (NO_2), mg/100g max.	7

Source: https://ro.scribd.com/document/348930596/Salam-Crud-Uscat

MATERIAL AND METHOD

Due to the complex nature of product quality, in practice an aggregated system of indicators is used to measure the level of each individual characteristic or group of characteristics, as well as the product as a synthesis of these characteristics. (Stanciu, I., 2001)

The indicator of product quality is the quantitative expression of the characteristics of the product, established in relation to the conditions of creation, use or consumption. (Stanciu, I., 2001)

The quality of raw-dried salami is analyzed using two methods of calimetry: Integral Synthetic Quality Indicator method and Overall Score method.

The Integral Synthetic Quality Indicator (Icq) method takes into account only the values of the quality characteristics of the product chosen in the study. (Stanciu, I., 2001) The general formula is:: (Stanciu, I., 2001)

$$I_{cq} = \sum_{i=1}^{n} \frac{X_{ai}}{X_{ri}} \cdot p_i + \sum_{j=1}^{m} \frac{X'_{rj}}{X'_{aj}} \cdot p'_j$$

in which:

x_a and x_r – the quality characteristic values of the product to be analyzed and the reference product;

i - the number of product characteristics directly proportional to quality;

j – the number of product characteristics inversely proportional to quality;

p and p' – the weights of the quality characteristics, their sum being equal to 1.

Overall score (Qp) method consists of assigning points (between 1-100) by a group of consumers (or experts) to different quality characteristics, in increasing order of satisfaction (100 points for maximum). Based on the score, the quality indicator is calculated, which can have values between 0-1. (Stanciu, I., 2001) The general formula is:

$$Q_p = \sqrt[n]{C_x \cdot C_y \cdot C_z \cdot .....}$$

$$C_X = \frac{i \cdot c_i}{100^2}$$

when:

Op - quality indicator value;

Cx,Cy...Cz - quality coefficients for each characteristic x, y, z;

n - number of quality characteristics analyzed;

i - the score given (between 1 and 100) to the quality characteristics;

ci - percentage of consumers scoring points.

This method applies to all products regardless of whether they are qualitatively assessed through characteristics expressed in absolute or notional values, because all are brought to the same denominator through the score awarded. (Stanciu, I., 2001)

RESULTS AND DISCUSSIONS

We chose the raw-dried product Salam Banatean, offered by several producers (Agricola, Aldis, Agil, Cris-Tim and Meda): SBa, SBb, SBc, SBd, Sbe. For confidentiality reasons, the product variants chosen in the study are coded.

The following quality characteristics are chosen for selected products:

– fat content (%)

– aspect in cross-section

– external aspect

– taste and odor

According to the methodology for the application of the first method, the reference product chosen was the Banatean salami SBc, with the longest age on the market of the producing company.

The organoleptic quality characteristics (expressed attributively) are transformed into points on a scale of quality points (0-1), divided by a certain number of ratings (1-very good, 0.75-good, 0.50-normal, 0.25- satisfying). The transformation of these quality characteristics into points was done in relation to the specifications of these properties in the product standard, using specialists from the food industry.

The weights of the quality characteristics chosen in the study were given using the expertise method, their values being listed in table 2 along with the other data, and in figure 1 the values of the indicators calculated with the synthetic, integral quality indicator method are graphically represented. The values of the indicators calculated by this method for the product variants chosen in the study are: IcqSBc= 1; IcqSBa= 1,080; IcqSBb= 0,801; IcqSBd= 0,616; IcqSBe= 0,715

Table 2 Centralizer table

Reference and analysis product	Characteristics directly proportional to quality			
	Aspect in cross-section	*External aspect*	*Taste and odor*	*Fat content (%)*
SBc	1	0,75	1	37,2
SBa	0,75	1	1	46
SBb	0,75	0,75	0,5	37
SBd	0,5	0,5	0,5	32,3
SBe	0,5	0,5	0,75	39
Weights for quality characteristics	0,2787	0,2727	0,2545	0,1939

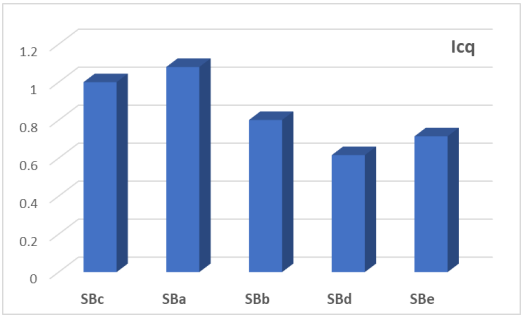

Figure 1 The values of the quality indicators determined by Integral Synthetic Quality Indicator method

Overall score (Qp) method consists of assigning points, on a scale from 1-100, to each quality characteristic. A group of 80 consumers were questioned and given points in ascending order of satisfaction.

The values of the indicators calculated by this method for the product variants chosen in the study are:

QpSBc= 0,718
QpSBa= 0,768
QpSBb= 0,632
QpSBd= 0,587
QpSBe= 0,617

Figure 2 graphically represents the values of the indicators calculated by the overall score method, and Figure 3 represents the ranking of the product variants chosen in the study according to the values of the indicators determined by the two methods of calimetry.

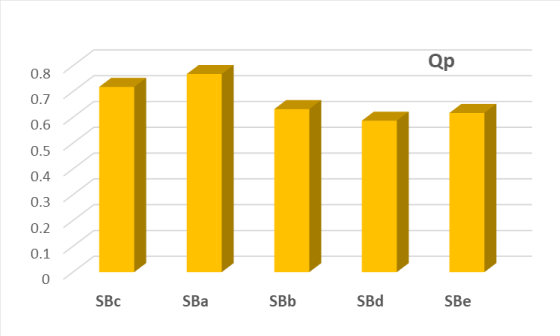

Figure 2 The values of the quality indicators determined by Overall Score method

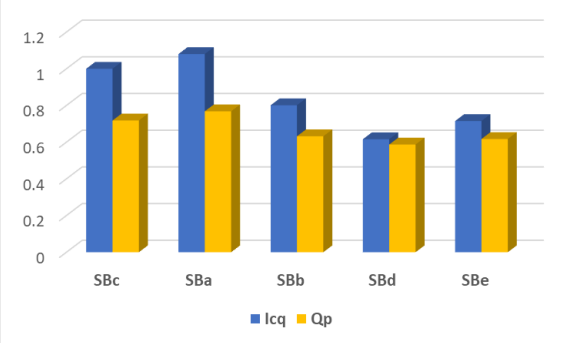

Figure 3 Ranking of the product variants chosen in the study according to the values of the indicators determined by the methods of calimetry

CONCLUSIONS

By applying the two methods of calimetry in analyzing the quality of raw-dried salami, those quality characteristics that are important to both consumers and the producer are identified.

A similar ranking of the chosen product variants is observed when applying the two methods of calimetry, which means that both methods are suitable for analyzing product quality .

Although the overall score method is a more subjective method, it can be used to compare the level of product quality based on consumer preferences.

The results obtained show that the reference product, Salam Banatean SBa, is superior in terms of quality to the other product variants: Icq = 1,08 and Qp = 0,782.

REFERENCES

Ahmad R.S., et al., (2018), Nutritional Composition of Meat, Chapter 4. Meat Science and Nutrition.

Banu C., Alexe P., Vizireanu C., (2003), Procesarea industrială a cărnii, Editura Tehnică, București.

Diaconescu, I., Ardelean Dorina, Diaconescu Mirela, (2008), Merceologie alimentară. Calitate și siguranță, Editura Universitară, Bucureşti.

Glavan, C., (2020), Culturi starter în fabricarea salamurilor crud afumate, Universitatea Tehnică a Moldovei.

Iloiu Mirela, (2012), Bazele mereologiei, Litografia Universitatii Petrosani.

Stanciu, S., et al., (2015), Study on the Competitiveness of the Romanian Meat Processing Industry. Amfiteatru Economic, 17 (Special No. 9).

Stanciu, I. şi colab. 2001, Calimetrie, Editura Oscar Print, Bucureşti.

Stadnik, J., (2024), Nutritional Value of Meat and Meat Products and Their Role in Human Health, Nutrients 16(10):1446

https://ro.scribd.com/doc/304199393/Standardizarea-Si-Controlul-Calitatii-Carnii-de-Porcine

http://www.fao.org/3/ca7390en/CA7390EN.pdf 10 Martie 2020

https://ro.scribd.com/document/120033585/Calitatea-carnii

https://ro.scribd.com/document/348930596/Salam-Crud-Uscat

https://ro.scribd.com/document/410106993/Analiza-Calitatii-Senzoriale-a-Salamului-Crud-Uscat

https://www.ndvsu.org/images/StudyMaterials/LPT/NUTRIVE-VALUE-OF-MEAT.pdf

https://typeset.io/pdf/nutritional-composition-of-meat-474otrw4dm.pdf

https://dokumen.pub/meat-quality-analysis-advanced-evaluation-methods-techniques-and-technologies-9780128192337-012819233x.html