

## THE STUDY OF MILKY BACTERIUMS' ADDITION ON THE QUALITY PARAMETERS FOR GERMAN SALAMI

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*The milky bacteriums are known and utilized from the most ancient times in fermentation processes in order to provide food and drinks minimum processed (acid dairy products, meat ripe mousses, vegetal fermented products, in bread sides).*

*At the manufacture of the meat mousses participate different auxiliar substances for conservation, absorption, colour enhancement, softening etc., additions of animal origin, vegetal or synthetic, necessary for the achievement of a product's personality, as well as secondary substances which contribute to the realization of the manufacturing process.*

*German salami belongs to the category of boiled and smoked sausages, which in its manufacturing recipe uses addition of milky starter cultures for directing some bio-chemical processes which guarantees a certain degree of inocuity (inclusively the conservation capacity), sensitive features and superior nourishing features.*

*In the present work it will be determined through organoleptic and physico-chemical examination the modifications which take place in the evolution of the physico-chemical characteristics in German salami's case, the direction to what these evolve and how much the milky bacteriums affect these modifications.*

**Key words:** *starter culture, riping (maturization), acidification*

The starter cultures from milky bacteriums are known as having a low proteolytic and lipolytic activity, the main effect being the acidification of the environment, fact that goes to the removal of pH to isoelectric pH of meat proteins, determining their coagulation [1,2]. When coagulated, proteins decrease their capacity of detaining the water, fact that assure the dewatering of the produces and the possibility of keeping them in a good form for long periods of time.

Beside the rough and contributory materials of irreproachable quality used in the fabrication of meat eradicators, by utilizing starter cultures from milky bacteriums, it is possible a micro-biological inocuity of alimentary produces [3,4].

The natural (spontaneous) micro-flora, including the pathogenetic one (salmonella, staphilococusses, clostridies), is hindered in her development by using starter cultures from milky bacteriums due to a complex antagonical system which include: organic acids (especially lactic and acetic); peroxides produced by some milky bacteriums non-generative of catalaza; the competition between the milky bacteriums, on a hand, and the alteration and pathogenetic bacteriums, on the other

hand; bacteriocines elaborated in substratum (beneficial action over the conservation of sausage and salami raw composition in the first stages of fermentation) [6,7].

Starter cultures can also contribute to the inhibition of nitrozamines production which can be formed from the residual azotite and the biogen amines. In this direction, the milky bacteriums from the starter cultures, realizing an optimous acidification of the composition, help at the more complete transformation of the added azotite (so it remains less residual azotite for the combination with amines).

For this reason we use, in the fabrication of meat eradicators, starter cultures for the enhancement of the structure, consistency and conservation capacity. The proportion of how much needs to be added has to be determined experimentally by each producer, for the concrete fabrication conditions.

That's why we found useful the realization of a study concerning the way milky cultures influence physico-chemical and micro-biological properties, and the technological process, also the quality of the German Salami obtained on a milky culture.

## MATERIAL AND METHOD

There used in these experiments samples from S.C. Killer S.A. Suceava. The starter culture used for inoculation is provided by the firm Enzymes&Derivates Romania. The technological scheme utilized in the fabrication of the German Salami is presented in (figure 1).

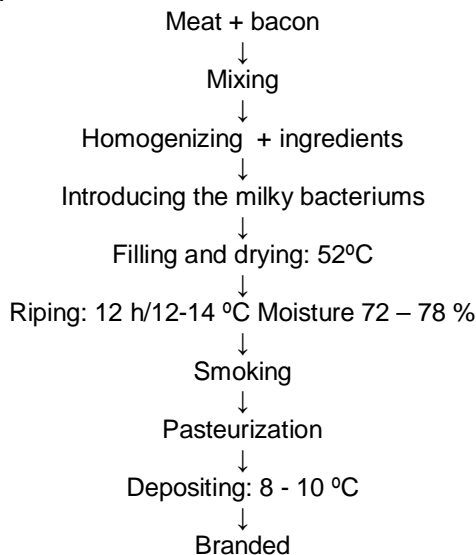


Figure 1 The technological fabrication scheme of German Salami

Setting out from the starting material, the analyzed samples were:

M – control sample, with no starter culture addition;

L1 - salami composition twelve hours after introducing the milky bacteriums;

L2 – salami composition eighteen hours after introducing the milky bacteriums;  
L3 – salami, the final product.

The quality assessment of the samples was performed by Romanian standards, using physical and chemical methods[5]. Moisture content was determined by STAS 6344-88, pH by STAS 8201-82, the total nitrogen (%) and the crude protein (%) were determined according to Kjeldahl method by STAS 9065/4-81, collagen by SRISO 3496/Al-99; azot usor hidrolizabil and content de nitrite by STAS 9065/7-74.

## RESULTS AND DISCUSSIONS

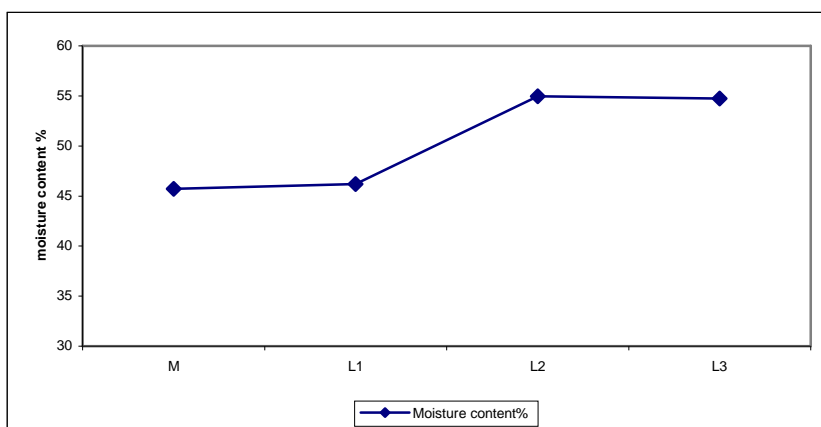
The results of determinations are reproduced in the *table 1*.

Table 1

**The evolution of chemical values in sausage samples**

Analysed product	Sausage			
	M	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>
Moisture content %	45.73	46.18	54.96	54.73
pH	5.5	4.5	4.3	4.2
Fat content %	32.41	30.98	30.54	22.17
Crude protein (%)	19.02	18.12	17.02	10.04
Collagen, %	1.50	1.28	1.19	1.05
Ratio to collagen/crude protein, %	7.88	7.06	6.99	10.45
Nitrogen light hidrolisis, mg NH <sub>3</sub> /100g product	21.7	21.54	20.09	19.89
Content nitrite, mg NaNO <sub>2</sub> /100g product	1.14	2.03	1.75	1.78
Content of NaCl %	3.80	3.56	3.39	2.67

Following the *figure 2*, we observe an increasing of humidity, which finally gets to the value of 54.73%, point of 4 percents under the acknowledged maximum value.



**Figure 2 The evolution of moisture content values in sausage samples to influence of milky bacteriums' addition**

From the analysis of grease content and brute protein (figure 3), it can be seen a decreasing of the values.

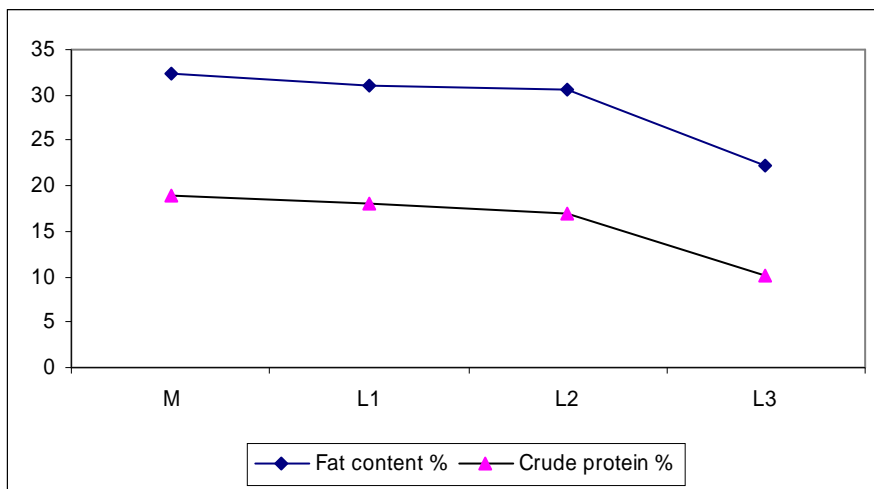


Figure 3 The evolution of fat content and crude protein content values in sausage samples to influence of milky bacteriums' addition

Following the *figure 2* we may see an obvious lowering of the proteic substances percent, reducing it to half, to a value of 10.04%, situated under the admitted limit of 11%.

Observing the pH values it becomes evident a significant acidification of the product, this fact being manifest twelve hours after introducing the milky bacteriums into the composition. The increase of the acidity is explicable, the drop of pH being a consequence of lactic acid accumulation, acid produced by the milky bacteriums from the added starter culture. This one's value is close to the pH izoelectric point where meat soluble proteins coagulate, fact that favors the water removal, therefore the growth of the final product's consistency and feliability. Thus, the water removal goes slightly to the increasing of product's humidity with 20,18% for L2 sample comparative to the control sample (see *figure 2*).

## CONCLUSIONS

The utilization of milky bacteriums in the fabrication of raw meat eradicators, actions positively over the following indicators:

- the water content from the analized produces which presents a liniar increasement to the value of 54.73% for the final product;
- the lipids percent goes low, the final value being of 22.17%, with approximately 8% under the admitted maximum at this salami category; this fact oughts to the advanced lipoza due to the added micro-flora in the form of starter cultures;

- observing the evolution of pH (according to *table 1*), we may see an acidification of the product, a sudden one happening in short time after introducing the milky bacteriums into the composition. The proper acidification occurs in the smoking phase and in the first drying phase, which results from the metabolization of the sugar (we have mainly lactic acid) and respectively through partial hydrolysis of the triglycerides (a release of fat acids);

- regarding to the content of brute protein, we see an evident fall of the percent of proteic substances, reducing it to a half, to the value of 10.44%, situated under the admitted limit of 11%. The modifications of proteins content in the various phases of the technological process are depending to: the composition of the paste, the temperature and the pH, the intensity of the maturization, the spontaneous micro-flora and the presence of starter cultures utilized here;

- the natrium chloride content decreases to the value of 3.8% for the control sample to the value of 2.67%, veri close to the admitted limit of 3%; this is dissolved in the water comprised in meat, contributing to the growing of meat particles which bind better between them; in the same time with the acidification of the paste, the water removal becomes easier and so becomes lower the NaCl concentration which is dissolved in the watery phase of the composition.

Using the starter cultures in the fabrication of German Salami enhanced the senzorial properties of the product (consistency, colour, taste), assured a higher micro-biological degree of inocuity due to: the accumulation of the lactic acid from the environment, the substances bacteriocine type elaborated in the environment, the inhibition of the nitrozamines' production.

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