

ASPECTS CONCERNING THE INFLUENCE OF ADDITIVES ON THE QUALITY OF RAW SALAMI

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Abstract: At the obtaining of dried salami type BACIU by S.C. LEFRUMARIN two food additives: glucono- δ -lactone (GDL) and sodium nitrite are used. Five concentrations of sodium nitrite are tested and the physical and microbiological characteristics are determined. The addition of GDL has a major contribution at the decrease of pH and of residual nitrite content. The number of microorganisms decreases also, most probably due the pH drop and of some technological steps (smoking).

Keyword: GDL, residual nitrite

INTRODUCTION

Sodium nitrite (E250) and glucono- δ -lactone (GDL, E575) play an important technological role at the obtaining of raw salami. Also, nitrite has a positive influence on the final product characteristics (Banu, 2000).

Nitrite is used in meat products for the formation of the characteristic colour and the product's preservation: it has antibotulin, bacteriostatic and bactericide action, which affects a large number of microorganisms and pathogenic bacteria (Dan, 1999). It also contributes to the flavour. Its use is strictly due to its antimicrobial character, so that is no risk of endangering human health.

GDL leads to a mild acidification of components (the same way the lactic acid is formed during the fermentation of bacteria) and thus eliminates the risk of alteration. At the solubilisation in water, it slowly changes into gluconic acid which leads to a pH drop. The decrease of pH contributes to the products reddish colour by the nitrite's decomposition in NO which reacts with myoglobin (Banu et al, 1997).

According to the law in force the producers are required to mention the use of additives on the product's label. The sodium nitrite is used as salt mixture and GDL is used by combining citric acid and dextrose (Banu, 2000).

The necessity of obtaining some products of an always higher standard is directly dependent on the consumers imposed demands. The improvement of the physical-chemical and microbiological characteristics of the final product (e.g. dried salami BACIU made by S.C. LEFRUMARIN by using food additives: E575 (GDL), and E250 (sodium nitrite) is the goal of the present study.

MATERIALS AND METHODS

The determinations were made on five product bulks from raw-dried salami type BACIU obtained at S.C. LEFRUMARIN during the main technological steps: filling, airing, smoking, drying at the demanded humidity (max 30%).

- The physical-chemical analyses were (Banu et al, 1997):
 - pH : the electrometrical method
 - nitrite content: Griess method
 - salt content: Mohr method
 - humidity: drying and gravimetric determination
 - hydrolysed nitrogen: by distilling and keeping in the solution 0.1nH₂SO₄.
- The microbiological analyses were (Dan, 2000):
 - the Number of Total Germs (NTG): agar-agar medium, incubated at 30°C for 72 h
 - the number of coliformic bacteria: doubly concentrated selected medium with triptose and lauryl sodium sulfate, incubated at 37°C for 48 h and then, for the positive test, tubes with VRBL substrate, incubated at 37°C for 48 h.
 - *Escherichia coli*: from the positive test tubes with coliformic bacteria, *E. coli* is sown in a doubly concentrated selected medium, incubated at 45°C for 48 h and then sown in tryptonite water incubated at 45°C for 48 h and testing the indole production (with Kovacs reagent)

The determinations were made on an average sample.

RESULTS AND DISCUSSIONS

The physical-chemical analyses led to the results presented in Table 1. The microbiological analysis of the samples gave the results presented in Table 2.

Table 1. The physical-chemical parameters of the salami bulks after four technological stages

Stage of technological process	Product	pH	Salt %	NO ₂ ⁻ mg/100g	NH ₃ mg/100g	Humidity %
1. Filling	I	5.11	2.69	3.70	13.56	49.96
	II	5.06	2.87	4.12	14.51	50.53
	III	5.14	2.79	3.89	13.76	50.68
	IV	5.38	2.96	4.46	14.16	50.32
	V	5.53	2.72	4.67	14.38	49.89
2. Airing- Ripening in the membrane	I	4.99	2.71	1.07	13.67	49.56
	II	4.87	2.88	2.28	14.50	50.23
	III	4.98	2.86	2.03	13.98	50.56
	IV	5.01	3.10	2.79	14.10	50.12
	V	5.02	2.90	2.86	14.20	49.72
3. Smoking	I	4.70	3.50	0.75	15.44	44.87
	II	4.82	3.15	1.11	16.88	45.27
	III	4.69	3.25	0.98	16.10	45.12
	IV	4.77	3.57	1.26	17.04	45.49
	V	4.81	3.15	1.45	16.83	44.93
4. Drying- Ripening	I	4.83	3.97	0.11	21.25	28.66
	II	4.79	4.15	0.23	23.54	29.76
	III	5.03	4.06	0.17	24.15	29.88
	IV	4.72	4.23	0.26	24.20	29.94
	V	4.69	4.10	0.31	22.78	29.14

On analyzing the data from Table 1, it can be observed that pH has dropped with 0.73 from the demanded value for minced meat before the filling stage, followed by a relatively even drop of 0.21 items (the average value) between the other stages. The rapid drop of the residual nitrite content evolves simultaneously with the pH drop due to the addition of GDL, especially at the end of the second stage (airing and ripening in the membrane) with a percentage of 5.28% NO₂ as compared to the initial value. The use of GDL contributes to the appearance of some sensorial characteristics typical for the raw-dried salami as a consequence of the chemical and biochemical processes.

Due to the technological applied process: control of temperature, air humidity and air velocity variation in the laboratory, the products humidity has dropped gradually, losing up to 41.37% (the average value) compared to the initial average value. The loss of water content in the Baciú salami leads

to a slow growth of its salt content with a percentage of 68.54% (the average value) compared to the initial value.

The hydrolysed nitrogen (NH₃ expressed in mg/100g product) is slightly growing up to 9.11 mg/100g product (average value) compared to the initial average value. This happens due to the processes of proteolysis which evolves under the action of the salami's typical microorganisms. All the determinations made are in accord with the standard values.

Table 2. The Baciú bulks microbiological characteristics after certain technological stages.

Stage of technological process	Product	NTG	Coliformic bacteria	<i>E.coli</i>
1. Filling	I	9 700.0	100.0	1.0
	II	10 400.0	100.0	absent
	III	16 200.0	10.0	absent
	IV	14 300.0	10.0	absent
	V	8 500.0	10.0	absent
2. Airing- Ripening in the membrane	I	7 300.0	>10.0	absent
	II	8 600.0	>10.0	1.0
	III	13 800.0	< 10.0	absent
	IV	10 100.0	< 10.0	absent
	V	5 800.0	absent	1.0
3. Smoking	I	3 000.0	absent	absent
	II	3 700.0	absent	absent
	III	5 200.0	absent	absent
	IV	3 900.0	absent	absent
	V	4 100.0	absent	absent
4. Drying- Ripening	I	absent	absent	absent
	II	absent	absent	absent
	III	absent	absent	absent
	IV	absent	absent	absent
	V	absent	absent	absent

A drop of the NTG values in all the analyzed products is observed during the technological process. The decrease is due to the conditions existents in the products (acid pH and decrease of pH at the addition of GDL, decrease of water content), but also to the technological stages, especially smoking.

The values for the coliformic bacteria and *E.coli* in meat at the beginning and during processing are in the limits imposed by the romanian hygienic norms (Dan, 2000).

CONCLUSIONS

At the obtaining of five types of dried salami two food additives: GDL and sodium nitrite were used. As the results showed, GDL gave a decrease of pH values in all the products. The use of GDL contributed also to the considerable reduction of NO₂ through the gluconic acid formed in composition. The addition of GDL gave a reduction of the nitrite content to values tending towards zero. So, the safety degree for the consumers was enhanced.

As consequence of respecting the hygienic norms during the process and of the conditions assured during the technological stages (pH, water content), the final product is bacteriological safe.

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