

# PROCESS TECHNOLOGY FOR THE PRODUCTION AND USE OF "BK-LACT" DAIRY-PROTEIN PRODUCT.

M. P. VOYAKIN, "Protein Technologies International", 3 Gruzinskiy per., apt. 197, 123056 Moscow, Russia

M. L. MAMIKONYAN, "Cherkizovo" meat plant, 5 Permskaya str., 107413 Moscow, Russia

V.A. ASAFOV, Research Institute for Dairy Industry, 35 Lyusinovskaya str., 113093 Moscow, Russia

## SUMMARY

The objective of this study was to develop a new type of product based on Protein Technologies International "Supro" Isolated Soy Protein and acid dairy whey and technology of its application in the production of dry sausages. Research conducted demonstrated economic feasibility of the "BK-lact" application which provides reduction in drying and increase in the quality of finished product.

## INTRODUCTION

An issue of acid whey processing is critical not only in Russia. On the other hand in order to produce fermented sausages use of biologically active ingredients to intensify production processes is also important.

High quality and biological value of the newly developed type of dairy-protein product "BK-lact" due to accepted production technology are provided by the protein nitrous compounds, carbohydrates, lipids, mineral salts, vitamins, enzymes, organic acids, immune bodies and micro-elements as well as by the absence of lactates.

Presence of organic acids (up to 20% if calculated as lactic acid) gives bactericidal properties to "BK-lact" which, along with low pH values, facilitates alteration of microflora composition while it is used in the production of dry sausages.

Use of starter cultures in the production of dry sausages because of the presence of lactic-acid bacteria in them is well known. (Niinivaara, F. P. et al, 1964), (Leistner L., 1990), (Incze K., 1991).

"BK-lact" product cannot be considered as starter culture. It acts, primarily, as combined protein product of animal and vegetable origin, affecting dry sausages production technology. Aspects of the application of different protein ingredients have also been considered by a number of scientists (Endress J. G., Monagle C. W., 1987), (Whitehead et al., 1991) etc.

In this study an attempt to evaluate an effect of combined protein product on certain values of dry sausage was made.

## MATERIALS AND METHODS

Permeate, produced in the production of cheese, containing 5.3% solids, 0.22% protein and acidity of 16°T, which is fermented with *Lb. bulgaricum* in the amount of 5% up to 150°T acidity and then is evaporated to 38% solids, was used in the production of "BK-lact" product. Isolated soy protein "Supro 500E" containing 91.4% and 5.5% moisture was used as another ingredient in the production of "BK-lact" product.

Frozen -8°C meat was used in the production of "Zernistaya" (Grainy) sausage (lean beef - 45%, back fat - 55%, salt - 3500 grams and spices - 600 grams above formulation per 100 kg of meat) and 1 and 2% of "BK-lact" product to replace meat (test No. 1 and 2 respectively).

Final grinding was done in 200-liter "Kremer-Grebe" chopper. Ground meat was stuffed into "Fibrous" casing (50mm, "Viskase") and then transferred to ripening for 5 days at air temperature of 3°C and relative humidity of 85%. Smoking was done for 7 days at 14°C and 88% relative humidity and then for 23 days at 11°C and 76% relative humidity. Total duration of drying was 30 days.

Moisture content, pH value, yield, weight loss were controlled during drying process.

Finished product was evaluated by a taste panel of 12 individuals at 5 point scale at various drying stages.

## RESULTS AND DISCUSSIONS

Suggested way to produce a combined product has a number of advantages if compared to a common one:

- no whey neutralization stage, which along with the improvement of the technological efficiency of the process allows to reduce ash content;
- increased content of organic acids and bulk weight;
- low content of crystalline lactose.

This process was patented in the territory of Russia. Chemical composition and some of the functional-chemical values are shown in Table 1.

High rate of pH value reduction and lower pH values of finished test product must be noted. Weight losses varied within 23- 32%. Meanwhile, weight losses were 4-6% lower in test samples No. 2 than in the controls (probably due to the increase in the share of solids in ground meat).

Evaluation of the product by panelists (Table 2) demonstrated that desired texture and taste in test samples were achieved 5-7 days earlier than in the controls. A sample with reduced drying periods and 2% of "BK-lact" did not differ from the control and test sample No. 1 was a bit worse than control and test sample No. 2 with the reduced drying period. On day 30 of drying there were no true difference between control sample and test No. 1.

While evaluating periods of the process completion it was found that test sample No. 2 after 23-25 days of drying did not differ from the sample after 30 days of drying regarding presence of coliforms, Salmonella and sulfate reducing Clostridia.

Table 1.

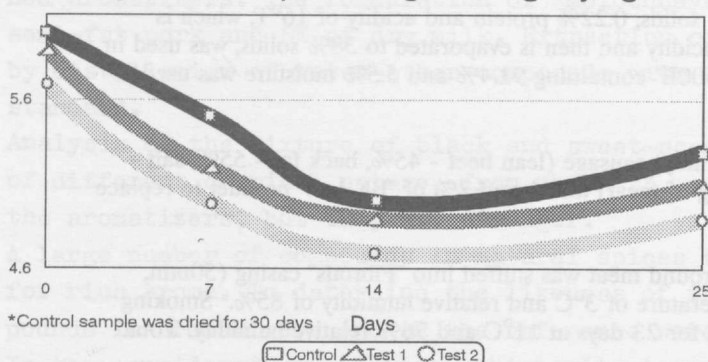
Typical analysis of "BK-lact" product	
Moisture, %	3.3
Protein, %	19.0
Fat, %	0.37
Lactose, %	
Titrate acidity (in % lactic acid), %	0.375
Solubility index, ml	0.7
Radiation (cs 134+cs 137), bq/kg	50.9
Sedimentation	B
pH	5.5
Minerals, %	9.05
BACTERIOLOGICAL SPECIFICATION	
Total plate count in 1 gram	1000
E. Coli in 0.1 gram	NEGAT
Salmonella in 25 grams	NEGAT

Table 2.

Description	Control	Test No. 1	Test No. 2
Taste	4.3 <sup>a</sup>	4.4 <sup>a</sup>	4.4 <sup>a</sup>
Texture	4.0 <sup>a</sup>	3.8 <sup>b</sup>	4.2 <sup>a</sup>
Total preferable value	4.3 <sup>a</sup>	4.0 <sup>b</sup>	4.4 <sup>a</sup>

Same letter means no difference between two mean values ( $P < 0.05$ ).

### Dynamics of pH change during drying



### CONCLUSIONS

Results of this study demonstrated feasibility to use the "BK-lact" product in the production of dry sausages which allows to accelerate drying process by 10-15%, reduce product cost by 2-5% and improve quality of finished product.

### LITERATURE

1. Ninivaara, F. P., Pojka, M. S. and Komulainen, S. E. (1964). Some aspects about using bacterial pure cultures in the manufacturing of fermented sausages. Food Technol. 18 : 25 : 31.
2. Liestner, L. (1990). Fermented and intermediate moisture products. 36-th ICMST, Havana, III, 842-855.
3. Incze, K. (1991). Raw fermented and dried meat products, 37-th ICMST, Kulmbach, II, 892-842.
4. Endres, J. G., Monagle, C. W. (1987). Non-meat protein additions in "Advances in meat research", 31, 331-350, Ed. A. M. Pearson, AVI, N. Y.
5. Whitehead P. A., Knight, M. K., Wood J. M. (1991). Functional properties of soya isolate, potatoe starch and wheat flour in British sausages. 37-th ICMST, Kulmbach, II, 995-1001.