EFFECTS OF APPLICATION OF ADITIVES IN PRODUCTION OF TEA SAUSAGE

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INTRODUCTION

Application of any additive or any additional water-binding ingredient in production of dry or fermented sausages used to be deemed incorrect, since core effect of this technological process is fast dehydration. However, application of protein preparations of soy, milk and yeast has had a different effect. The listed protein preparations may be successfully used in production of dry or fermented sausages both with and without implementation starter cultures. Besides economical justifiability due to the reduced loss of the mass, they significantly contribute to the sensorial properties of the product, especially to the more consistent aroma, taste and color of the product. (P. Modic and associates, 1978; D. Dimitrijevic and associates, 2001.)

In the literature available to us we have not found the information on the possibility of using hydrocolloids in dry or fermented sausages production.

Considering the fact that hydrocolloids, in their chemical structure, are polysaccharides, we have started from the assumption that these substances, and especially the products of their degradation might contribute to the quality of the dry or fermented sausages. The aim of the research was to define whether the addition thereof had any effect whatsoever on the physico-chemical, microbiological and sensorial properties of the tea sausage

MATERIAL AND METHOD OF RESEARCH

We have made the test and control sausages under the production conditions in the quantity of 100 kg, using the equal quality raw material (I class pork – 40 kg; I class beef – 10 kg and compact fat tissue – 50 kg). In test and control sausages we have used the mixture of additives **Adifos-20** (E 575, sugar and E 301) – in the quantity of 0,6% - produced by "Gradis AB" – Belgrade. Besides **Adifos-20**, in the test sausages we have used 0,3% of **carageenan (E407)** or 0,3% of **carob bean gum (E410)** purchased from Dr Gino Fumagalli s.p.a., Milan, Italy. Hydrocolloids have been added dry. Filling of the sausages has been stuffed in the artificial collagen cases (cutisin) of 35 mm dia. During the stuffing process the temperature of the filling was –3°C. Stuffing and combining in pairs completed, the sausages were delivered to the smoking chamber. Dripping, i.e. drying lasted for 24 hours at the temperature of 14 to 15°C, without air circulation. The sausages were smoked 4 days with daily interruption of 4-5 hours until they have reached the characteristic color. Dripping and smoking was carried out at the relative air humidity of 70 % and optimum air circulation. After smoking, the sausages were placed at the ripening chamber at the temperature of 16-18°C and relative humidity of 80%. The production process lasted 16 days. During the production process and storing of the sausages, chemical, microbiological, physico-chemical changes have been investigated. Changes of the chemical structure of micro flora, sensorial properties, loss of mass and pH were observed on: 0, 3rd, 8th, 15th and 23rd day from the production. The basic chemical composition and pH were determined by AOAC methods.

The losses in mass were determined on the ground of difference between the mass of the sausages immediately after stuffing in the cases and during testing at certain stages of the process, and were expressed in percentage as compared to the initial mass. Microbiological tests were carried out by the prescribed methods (4) and Lactobacillus types were determined at M.R.S. agar.

TEST RESULTS

Adding of hydrocolloids has not had significant effect on the chemical composition of the sausages. Reduction of water contents during the ripening process has resulted in the increase of the quantity of fat, protein and NaCl (Chart 1 and 2). The most significant increase of the quantity of protein, fat and NaCl in the sausages was observed during the period from 8th to 15th day from production.

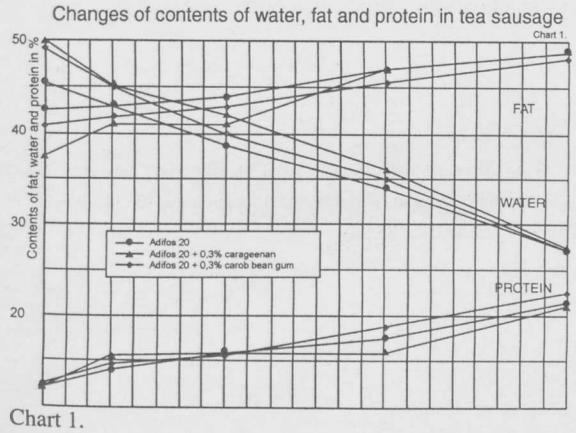

Chart 1.

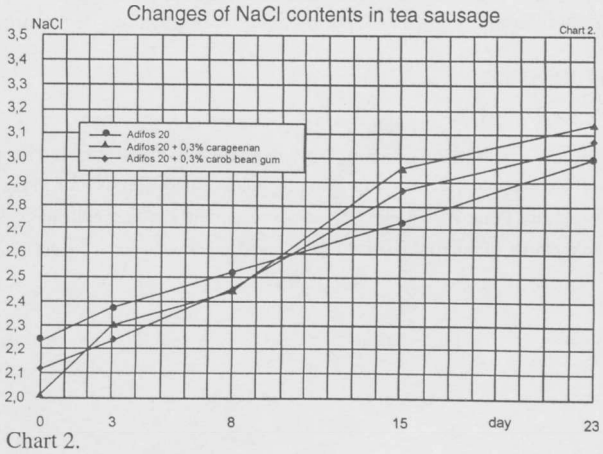

Chart 2.

Until 8th day from production, no significant change was observed in the pH value of the test and control sausages (Chart 3).

The most significant drop of the pH value was observed on the 8th day from the production, when also the change of the micro flora in the tea sausages was observed (Chart 4). The presence of lactose-acid bacteria, which have intensively multiplied during the 8 days, as well as the influence of their bio-chemical activity, has antagonistically affected the harmful types of bacteria (Chart 4). The ripening process of the test and control sausages has been regular and lactobacillus have been dominant in the sausages, ensuring obtaining of the high quality dry

or fermented sausages, appropriate for consumption in terms of health. These results prove that adding of hydrocolloids has not disturbed the ripening process of the tea sausage.

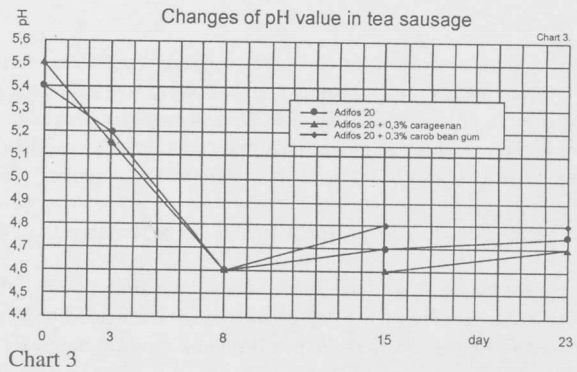

Chart 3

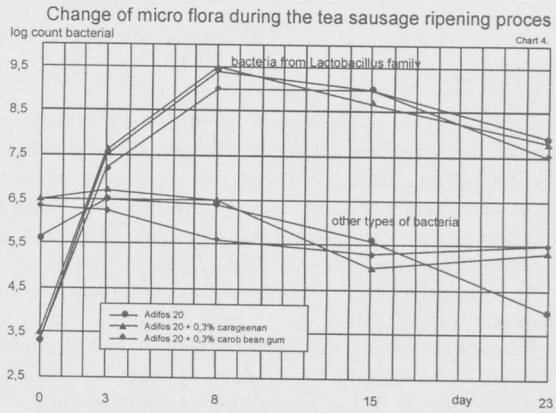

Chart 4.

Differences in losses, at the end of the testing process (23 days) of the test and control sausages are provided in Table 1. The smallest loss in mass was observed in tea sausages produced with **Adifos - 20** + 0,3 % of **carob bean gum**. As compared to the control sausages, the difference is 2,91%, which is significant, from the economical point of view, especially in industrial production. Application of 0,3% of **carageenan** and **Adifos - 20** did not have such significant effect on reduction of the loss in mass during the production process.

Table 1. Loss of tea sausage mass on 23rd day from production

TEA SAUSAGE	LOSS IN MASS (CALO) %
with Adifos – 20	**36,15**
with Adifos –20 + 0,3% of carageenan	**35,57**
with Adifos – 20 + 0,3% Adifos	**33,24**

In terms of appearance, color, consistency, taste and aroma, the test and control products were of appropriate quality and characteristic for this type of dry sausages. The only difference has been observed in the taste of the sausages produced against application of **Adifos – 20** + 0,3% **of carob bean gum.** These sausages had the best score on the account of their prominent and specific taste, characteristic for dry sausages.

CONCLUSIONS

Hydrocolloids (**carageenan** and **carob bean gum**) in the quantity of 0,3% and combined with the mixture of additives called **Adifos– 20**, can justifiably be used in production of the tea sausages.

Adding of hydrocolloids does not have significant effect on change of the chemical structure and micro flora during the ripping process of the sausages.

Application of hydrocolloids is economically justifiable due to the reduced losses in the mass of the tea sausage.

Sensorial properties have been characteristic for this type of products.

Combination of **Adifos – 20** and **carob bean gum** has been introduced in regular industrial production of the tea sausage.

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