14 TH EUROPEAN MEETING
OF MEAT RESEARCH WORKERS
BRNO. CZECHOSLOVAKIA AUGUST 26th – 31st 1968

SECTION A 17

Boleslaw Wojtoń, Amelia Kossakowska, Stanislaw Kafel,
Teresa Wideńska, Zbigniew Gaugusch

The Veterinary Research Institute, Pulawy
Department of Hygiene of Animal Food Products
Head: Prof. Dr. Zbigniew Gaugusch

The Influence of Curing Salts on the Behaviour of Clostridia in Canned Pasteurized Hams Stored at Various Temperatures.

In previous investigations carried out in this Department the incidence of Clostridium types in some meat products was investigated. The aim of those works was to determine the frequency of appearance of these microorganisms and to find some relationships between different Clostridium types and the meat environment. It was found that these microorganisms were able to survive heat processing used in the production of pasteurized hams, their multiplication was evidently related to the initial number of these microorganisms in the product, to the temperature of storing, and to curing salts content, e.g. NaCl, KNO_3 and $NaNO_2$.

Previous investigations have also shown that the amount of curing salts used so far in the production of pasteurized canned meat were not sufficient to inhibit the multiplication of microorganisms of Clostridium genus. The effective inhibition of these microorganisms is, however, very important as stability of canned meat is concerned.

Material and Methods.

The purpose of the present investigations was to check the possibility of using increased amount of curing salts for canned hams and to determine the effect of these salts on some microorganisms of Clostridium genus occuring in the product.

Six hundred of 320 g pasteurized canned hams, were produced experimentally and they were divided into 3 groups, of 200 hams each, depending on the salt content used for their production.

Normal/333 g KNO_3 and 150 g $NaNO_2$ for 100 liters of water/, 50 per cent decreased and 100 per cent increased amounts of nitrite and nitrate were used for the production of the hams belonging to groups I, II and III, respectively. The levels of NaCl and sugar were normal in all groups.

Before sealing, 0,5 ml of a 24-hour culture of Cl. sporogenes or Cl. bifermentans, grown on cooked meat medium, was introduced into each meat block in the can. The strains were isolated from spoiled canned meat. These species of clostridia are encountered very often as contaminants in this kind of meat products.

After processing the canned hams of each group were divided into 3 parts which were stored at different temperatures, namely at 4°C, 20°C and 37°C. At different time intervals the hams were then examined organoleptically chemically and microbiologically. After homogenization of the whole block of each ham, clostridial counts were made by plate count method using the medium of Willis and Hobbs. Sodium chloride content was determined by Mohr's method and those of KNO_3 and $NaNO_2$ by the method of Grau and Mirna.

Results.

The results of the investigations showed that curing salts used for the production of experimental canned hams inhibited the multiplication of artificially introduced clostridia.

Inhibitory effect of salts was especially marked in the hams stored at 20°C and 37°C.

Nineteen out of 40 hams of group I, inoculated with Cl. bifermentans or Cl. sporogenes, were spoiled within 4-week storage at 20°C. Under the same conditions, 32 hams of group II and only 13 of group III were spoiled.

All hams of group I were spoiled after 8 days, in group II - after 7 days and in group III - after 53 days of storage at 37°C.

Mean percentage content of curing salts in the hams of different groups were as follows:

group I - KNO_3 20,28 mg%, $NaNO_2$ - 2,06 mg%,
group II - KNO_3 9,88 mg%, $NaNO_2$ - 0,92 mg%,
group III - KNO_3 29,25 mg%, $NaNO_2$ - 1,98 mg%.

According to official regulations, the highest content of curing salts in canned hams are 300 mg% of KNO_3 and 20 mg% of $NaNO_2$. The curing salt contents found in these investigations proved to be significantly lower and therefore, increased amounts of these salts may by safely used for the production of canned hams.

The increased amounts of curing salts may inhibit clostridial multiplication and thus increase stability of pasteurized canned hams.