The prevention of spoilage of meat products caused by thermo-resistant streptococci.

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A so called "summer tourist" sausage is processed in our country. In bacteriological respect this sausage may be ranged between the durable and semi-durable meat products. It is stuffed into an "SP cutisin" casing or into casings prepared from the gut of horses. The diameter of casings is about 65 mm. This sausage is dried for several days after smoking, cooking and contra-smoking. The water content should decrease during this drying process to 35 % .

During our laboratory control investigations we noticed that though this meat product stood all bacteriological demands immediatly after the process, nevertheless the thermo-resistant streptococci multiplied in it usually from the fourth day during the drying procedure which is carried out around 18° C. These microbes belonged to the Lancefield D serological group, of enterococci species. Only mild if any organoleptic alterations went with this microbiological change. The organoleptic alterations were manifested only by a mild sour smell.

In other cases a green discoloration occurred . We could observe sausages with green rings or green discolorations at the core or by chance in the whole cross section.

Examining the cause of contamination and multiplication of streptococci, we found that one of the causes of the troubles was the shortness of the smoking-cooking procedures, which might help the multiplication of streptococci of a relatively high thermoresistance which were not all destroyed during these treatments and multiplied in the sausage during the drying time.

The isolated streptococcus species proved to be Streptococcus faecalis /Str.glycerinaceus/. The thermo death time of many streptococcus species was examined in vitro and it was found that they remained alive after a heat treatment at 72° C for 5, at 71° C for 1o, at 69° for 2o, at 67° for 4o, and at 65° C for 6o minutes.

Subsequently model examinations were carried out to establish the proper temperature and length of time of smoking-cooking. The model procedure was experimentally worked out in which in the thermal centre /from the standpoint of heat treatment the most unfavourable middle of sausage /the streptococci were certainly destroyed. Summer tourist raw material was contaminated with heat resistant streptococcus separated in our laboratory. During the smoking-cooking procedure the formation of temperature in the center of the product was observed with thermoelements. The samples were cooked in a vapor cabinet. Prior

to our experiments this meat product was smoked at 7o to 8o° C for 1 to 1,5 hour and by cooked at 72° C for 9o minutes. The central temperature reached not more than 37 to 49° C after smoking.

Cooking the samples to destroy streptococci at 72° C we lengthened gradually first the time of cooking from 9o minutes to 14o minutes. Str.faecalis remained alive after cooking the samples at 72° for 14o minutes if, - according to the not rare practice -, the cooking did not succeed immediately after the smoking and therefore the temperature of the filling decreased to 28 to 3o° C.

We chose a higher temperature for cooking in the second part of our experiments. Our samples were cooked at 8o° C and the cooking procedure was worked out in which the thermal centre of the product reached at least 74° C for 2o minutes which proved enough to destroy streptococci. This is in agreement with the literature data.

Cookers in the plants were against cooking at 8o°C therefore in our further experiments the samples were cooked at 78° and starting from 25° temperature at the core, 72 minutes were required to reach a temperature of 74° C for 2o minutes at the core. The cooking followed immediately after smoking could naturally be decreased proportionally.

From our experiments the following conclusions could be drawn:

1/ the cooking was to be carried out without delay

immediately after smoking that the cooking temperature should add to the temperature reached at smoking.

2/ The 72° C water or steam temperature was not enough to destroy all the streptococci, cooking at 78° C was desirable.

3/ Contra-smoking, drying and storing should not be done at a temperature higher than 18° C with a relative humidity not exceeding 75 %.

4./ The handling of raw material, the processing had to be carried out according to the rules of hygiene because if these rules are not considered, no satisfactory results may be hoped.

Mitä vaikutusta korkeampi lämpötila