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Storage changes in sterilised canned meat.

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The storage lifeof sterilized meat products is influenced by the quality of the raw meat, processing hygiene, regime of thermal processing, the packing and conditions of storage. In this connection, viewing the possible production and business losses, are made numerous studies (1,2,3,4,5,6,8,9, and others).

With our present work we have endevoured to establish the quality and storage life of some sterilized meat products, kept under refrigeration and room temperatures.

Material and Method.

Studied are four types of sterilized canned meat products from 15 lots. The characteristics of same is given in Table 1.

Characteristics of the essayed lots sterilized meat products.

Type of product	N° lots	Net wgt /g/	Sterilization	Storage life	Inside surface of can	NaCl %	Nitrite mg%
Chopped pork	2	200	10-40-10 / 118°C	26 - 31	Laqquer	1,55-2,20	0,60-9,16
Luncheon meat	2	200	10-40-10 / 118°C	26 - 30	Lacquer	1,74-2,12	0,42-4,06
	2	340	15-50-15 / 118°C	25 - 36	Lacquer	1,80-2,22	0,50-8,33
Chopped pork	2	340	15-50-15 / 118°C	25 - 32	Lacquer	1,62-2,35	0,50-7,50
Pork in own juice	2	220	15-50-15 / 118°C	22 - 25	Not Lacq.	1,54-1,93	0,42-3,00
	2	340	15-70-15 / 118°C	27 - 28	Lacquer	1,16 -1,83	0,25-3,02
Jellied (boiled) veal	3	220	15-50-15 / 118°C	25 - 33	Not Lacq.	1,25-1,75	0,40-4,10

From each lot, samples were kept under refrigeration (3-5°C) and room (20-22°C) temperatures. The condition of the canned products was checked each 3 months, with 4-5 cans analysed under the following indexes:

a) physico-chemical - pH value, tin contents (mg in kg product) contents in volatile bases and aminoamonium nitrogen after Sörensen (mg in 100 g product).

b) microbiological - for anaerobes and aerobes, on hermetically proved cans.

c) condition of the inner surface of the can, with corrosiograms of those not lacquered.

d) organoleptic evaluation of the can content - 9 point scale, hedonic and written with evaluations : odour-aroma, taste, consistency

colour of the cut surface and juiciness, with marks from +5 to -4, performed by especially learned degustators. The canned meats were evaluated as follows:

- Mean quality - good for short storage (1,0 to 2,0 mark);
- Unsatisfactory - not good for further storage, but good for consumation (0 to 1,0 mark).

Results and Discussion.

A.Physico-chemical investigations.

The pH value of the sterilized canned meats under refrigeration and room temperatures, is fluctuating between 5,50 and 6,80.

Tin content in the meat canned in unlacquered tin plate, reaches 95,0 mg%, which is significantly under the permitted quantity after the bulgarian standarts (200 mg%).

The quantity of volatile bases is between 21,0 to 46,9 mg%.

Amino ammonical nitrogen after Sörensen, in most of the cases show significant fluctuations - from 27,0 to 63,1 mg% with 3-5°C, and from 30,1 to 71,3 mg% with the cans stored at 20-22°C.

Results from the investigations show, that there is no regularity in the fluctuations of the pH value. volatile bases and amino ammonical nitrogen, in relation to the type of canned meat, temperature and length of storage. Therefore, these indexes could not be used as objective criterium in evaluation of quality and fitness for further storage of sterilized canned meats. This confirms our conslusions (7) under the same indexes and with the pasteurized canned meat products,ham and tender lojns in cans.

B.Microbiological investigations.

In the storage of 622 cans under refrigeration, there was no swelling, inclusive of thermostatically kept samples for 10 days. From the 610 cans kept under room temperature, there were only two swellings - chopped pork of 340 gr on the 13th month and luncheon meat of 340 gr on the 12th month of date of production.

From 271 cans, kept under refrigeration and investigated after 10 days of thermostatic temperature, in 10,3% were established bacilli and in 0,7% Clostridia, with no organoleptic changes in the contents due to microbiological action.

From 290 cans, kept under room temperature, in 8,2% were established Bacilli and in 6,9% Clostridia (without the two swelled cans) also, without any organoleptical changes due to microbiological action.

Microorganisms are present exclusively in innoculation of com-

paratively big quantities of material - 2 to 5 g.

Therefore, in the investigated 461 c ans in all, with 9.3% were established Bacilli and with 3.9% Clostridia, which however were not in position to develop and multiply to a degree sufficient to cause organoleptic changes.It should be noted that the majority bacteriologicaly positive samples, are cans containing minced meat without any souce, sterilized at 118°C.

C.Condition of the inner can surface.

In a part of the cans, having the inner side lacquered,inspite of the type and conditions of storage, are demonstrated point like and marble like spots on different elements of the can, without, however any signs of lacquer parting. The rest of the cans are without any visible changes.

With canned meat in not lacquered cans on the inside, are demonstrated single point like corrosions of the tin plate after storage of 17 - 26th month kept under temperature of 3 - 5°C, respectively after 15 - 23d month with those kept under temperature of 20 - 22°C. With the increasing of the storage period, the deteriorations become more significant, which is very valuable in determining the storage period and durability.

D.Organoleptic evaluation of can contents.

From the canned products in cans having the inner side lacquered and with good to excellent quality, fit for storage to the end of the investigations, proved to be all lots of chopped pork,luncheon meat and pork in own juice stored at 3 - 5°C and one lot of each kind from those kept under 2o - 22°C. The rest, kept under 2o - 22°C, keep good or excellent quality to the end of the second year of storage.Exceptions are, separate samples from one lot of luncheon meat and one lot of chopped pork in own juice, which lost their quality accordingly on the 21 st to 23d month from date of production.

With canned products in cans having the inner sides not lacquered with good to excellent quality and good for storage, were left the lots till 2o-26 month which were kept under 3-5°C and to 19-21st month those under 20-22°C. After the mentioned periods of time, the c anned products received evaluations for mean or unsatisfactory, without however becoming totally unsatisfactory for edible purposes, to the end of the investigations.

In addition could be said, that on the surface of the meat block with the cans with chopped pork and luncheon meat are observed slight yellowish tints under the cover,along the seams and the air cavities.They seem to appear along the end of the storage period

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and are insignificant for the quality of the canned product. In the canned pork in own juice and jellied(boiled)veal, similar changes are obesrved only in singular samples.

It should be noted, that the evaluations of the especially trained degustators, on the bases of which we have made the evaluations of the investigated lots of canned products, were a lot more exigeant and more precise than those of specialist degustators.

Conslusions.

On the bases and from the results of the investigations could be derived the following considerations :

1)The canned products in lacquered cans, kept under efrigeration temperature, keep their good to excellent quality and fitness for storage above 30 months from date of production. Those kept under room temperature, begin to reduce their quality after the 24th month.

The canned products in not lacquered cans, reduce their quality in relation to the temperature of storage from the 19th to 26th month from date of production,independant from the appearance of single point like corrosions on the tin covering.

2)The pH values, volatile bases and amino ammonical nitrogen, could not be used as objective indexes in the evaluation of the quality and fitness for storage of the sterilized meat products.

3)The results from the microbiological investigations give us indications for the hygienic conditions of the production,the effect from the regime of sterilization and stability of the canned products during storage.

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