

EFFECT OF PECTIN SUBSTANCES ON VITAMIN C STABILITY AND IRON ASSIMILABILITY IN CANNED MEAT PRODUCTS

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Lack of sufficient quantity of vitamins in a human organism has a negative effect on health, thus production of vitamin enriched food products is of great importance nowadays.

Taking into consideration synergism of vitamin C physiological effect on a human organism we used ascorbic acid to enrich poultry meat products for infant foods and dietary nutrition and to increase assimilability degree of iron.

Both foreign and Soviet science is concerned with the problem of vitamin C preservation in food products during heat treatment.

We studied the possibilities of increasing stability degree of vitamin C in food compositions made from poultry meat and enriched with vitamin C during heat treatment (90-120°C). The influence of pectin substances on vitamin C stability in meat compositions was also studied. It was determined, that adding 1,5% of apple pectin provides preservation of 72,17% of vitamin C during pasteurisation and 59,2% of vitamin C during sterilisation, for a control food composition the values were 14% and 10% lower respectively.

The biological value was studied in animal experiments. It was noted that the usage of pectin substances and vitamin C increases assimilability degree of iron from food products in human organism. High biological efficiency of food compositions with pectin and ascorbic acid was shown.

Lack of sufficient quantity of vitamins in food products has a negative impact on general physical development of people especially in childhood and in youth, reduces the activity of immune system, makes catarrhal and infectious diseases more frequent and severe, prevents the development of a healthy human organism, promotes gradual development of metabolic and chronic diseases.

Vitamin enrichment of food products can balance the main nutrients of a diet, enhance the efficiency of their assimilation.

Meat products including canned poultry meat products are characterised by low vitamin content and nearly complete lack of vitamin C (ascorbic acid), which is a very important vitamin for physiological functioning of a human organism. Therefore vitamin enrichment of meat products is an important problem and its solving is connected with as full as possible preservation of vitamins during processing.

High liability of vitamins under the influence of heat depends on a vitamin initial state in a food product, which is mainly determined by product ingredients ratio, it concerns especially vitamin C (depending on temperature and mode of treatment more than 50% of ascorbic acid is lost, (1).

The food products with minimum losses during processing have meat composition with a well-bound structure.

To improve meat product structure biologically active agents are used, some of them, for example polysaccharides, can bind product components into complexes preventing these components from decomposition. Thus pectin substances stabilise protein under high-temperature treatment (2) and at the same time enrich product with food fibres.

Taking into consideration high functional properties of pectin substances we examined their influence on the stability of vitamins and trace elements in compositions which include mechanically deboned meat and chicken by-products. A composition on the basis of chicken meat without pectin was a control. The quantity of apple pectin introduced into the food product met the requirements of a child organism. The compositions were subjected to heat treatment up to 90°C, then their vitamin and trace elements content was determined. It was found that compositions with pectin had higher content of trace elements, particularly iron, but vitamin losses in a control composition and in a test composition were equal.

The study of the biological value of food compositions in an animal experiment (young rats) showed high efficiency of protein utilisation from compositions with pectin, there were no substantial differences in this property between the control composition and the test one. At the same time haemoglobin concentration in experimental animal blood was 10% lower than in control animal blood, it indicated that compounds with free iron ions were formed, they were difficult to assimilate; the compounds were formed as a result of interaction between chicken by-products and pectin substances during heating of meat.

Thus the effect of trace elements preservation in the product and the reduction of iron assimilation is observed.

To prevent it compositions on the basis of mechanically deboned meat and by-products with addition of apple pectin were enriched with vitamin C (a control sample - a composition with vitamin C but without pectin). Ascorbic acid in the form of water solution was introduced into the meat mass, the quantity of vitamin C was determined by the necessity to provide end-product vitamin content which would meet daily requirements of a child (45-55 mg%).

Raw material and end-products were studied as described above, vitamin C content was determined with the help of Tilmans method.

Vitamin C content in compositions subjected to heat treatment (90-120°C) depended on the temperature of heating: control samples lost 14% more of vitamin during pasteurisation (90°C) and 10% more of vitamin during sterilisation (120°C) in comparison to test samples. Preservation of maximum vitamin content was observed during pasteurisation, it was 72% of the initial content.

Biological evaluation of samples showed that efficiency coefficient of protein for experimental animals was slightly superior to control data. The addition of apple pectin and ascorbic acid to meat mass provided better iron assimilation, it was proved by combined data of haematological and analytical studies: haemoglobin concentration in the blood of experimental animals was 23% higher than in the blood of control animals, and it became higher in each erythrocyte both in absolute and relative values; total number of erythrocytes increased. Iron content in liver, heart and spleen of

the rats fed experimental diet was higher in comparison to a control group, it proves superior and more efficient iron assimilation in experimental animals. Efficiency of protein utilisation in experimental animals. Efficiency of protein utilisation in experimental diets was also higher: 3,37 in comparison to 3,11 (control).

On the basis of received data we may conclude that pectin substances can increase the level of ascorbic acid stability: the ascorbic acid forms easily assimilated, readily soluble in water and in alkaline medium of intestine compounds with iron, it prevents interaction between iron and pectin substances, therefore it increases degree of iron assimilation.

Thus the study of the effect of pectin substances on vitamin C stability in compositions made from mechanically deboned chicken meat and enriched with vitamin C has shown that the addition of apple pectin to meat mass provides vitamin stability during pasteurisation and sterilization. Pectin and vitamin C increase the assimilation degree of iron, provide higher biological efficiency of meat compositions.

The study gave the basis for working out recipe and processing technology for production of canned foods for invalid diet and dietary nutrition.

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