AN EFFECT OF THE COMPOSITION AND PARAMETERS OF STERILIZATION ON ACRYLAMIDE FORMATION IN MODEL SYSTEMS OF MEAT AND PLANT CANNED FOODS FOR CHILD NUTRITION

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Abstract

In Russia, canned foods on the mixed basis, which composition includes meat and different carbohydrate containing ingredients, are used for complementary feeding in nutrition of children at an early age. Acrylamide that forms during high temperature processing as a result of interaction of carbohydrates and proteins is recognized as carcinogen. Acrylamide exerts the most negative effect on the child body. Therefore, the study of the acrylamide content in the model systems of canned foods for child nutrition depending on the recipe composition and sterilization regimes is topical. The objects of the research were model compositions with the maximum potential risk of acrylamide development.

The model composition 1 consisted of: beef, soy protein, wheat flour, and water, while the model composition 2 consisted of: potato, water, beef, rice flour, and vegetable oil. Thermal treatment was carried out by the standard regime (120 ^{0}C, 30 min.), as well as with increased treatment duration and temperature. Acrylamide was detected in the system of high performance liquid chromatography Agilent 6410B using columns Zorbax HILIC PLUS (Agilent Technologies, USA). The significance of differences between the mean values was assessed applying the Student's t-test with the use of Microsoft Excel 2010. The selected significance level was 5 % ($p < 0.05$).

It was established that when using the standard regime, the acrylamide content was 55.2 ± 22 µg/kg in composition 2 and 27.6 ± 11 µg/kg in composition 1. Analysis of the effect of processing regimes shows that when increasing duration of heating up to 50 min., the level of acrylamide accumulation increased by 1.6 and 1.2 times, respectively. When the temperature was increased up to 130 ^{0}C, its level increased by 1.5 times in composition 1, while in composition 2 its significant increase was not observed.

Thus, duration of thermal treatment had higher effect on the acrylamide level in the model compositions than a temperature.

Key words: *Child nutrition, Canned food, Sterilization, Acrylamide.*