EFFECT OF THERMAL PROCESSING ON THE TRYPTOPHAN CONTENT OF BABY FOODS

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Holz's /1972/ method for the determination of tryptophan, adapted to the Contiflo automatic analyzer is optimized for determining the tryptophan content of baby food. The effect of heat treatment /40-100 °C/ and humidity during storage /0-80 % relative humidity/ is studied on the tryptophan content of the baby food "Linolac". The decomposition can be described well by a first order kinetic model. Its activation energy is found to be 105 kJ/mol. The effect of moisture on the activation energy is interpreted as a decreasing factor.

In judging the biological value of baby foods an important role is played by its amino acid composition, especially the amount of essential amino acids is of great importance. The determination of tryptophan cannot be carried out from the acid hydrolysate of the protein, as its sensitive ring decomposes in acidic media. Therefore numerous methods are elaborated for its analysis by its alkaline and enzymatic hydrolysis or modified acidic hydrolysis. We have reported earlier /Örsi and Zsigmond, 1980/ on the adaptation of the method of Holz /1972/ for a Contiflo type analyzer, which method is successfully applied in the determination of tryptophan in alkaline hydrolysates since then.

In the present work the parameters of this method were optimized for the determination of tryptophan in the baby food "Linolac", and changes due to heat treatment as well as the effect of humidity on the tryptophan content during storage of the baby food at 40 °C were studied.

1. MATERIALS AND METHODS

The baby food "Linolac", product of the EgyT Lacta Baby Food Factory /Hungary/ has been used for the investigations. The p-N,N-dimethylaminocinnaldehyde /Koch-Light Ltd./ has been applied as reagent for the determination of tryptophan. For the preparation of the standard tryptophan solutions DL-tryptophan produced by REANAL has been used.
1.1 **Hydrolysis of the protein sample**

Baby food corresponding to about 60 mg of protein was weighed into a test tube, 10 cm³ of a 4M NaOH solution was added, the solution freed from air by bubbling N₂ through it, then the test tube was sealed. Hydrolysis was carried out at 105 °C for 16 h. After that the test tubes were opened and acidified by 10 cm³ of 4M H₂SO₄ solution, transferred into a 25 cm³ normal flask and filled up. Determinations were made immediately after filtration.

1.2 **Determination of tryptophan by automatic Contiflo analyzer**

The modul produced by Labor MIM for total sugar determination /OL-734/ has been modified for the analysis of tryptophan and is shown in Fig. 1.

1.2.1 **Reagents needed are the following:**

1.2.1.1 **Diluting solution:** 0.2 cm³ water solution of detergent Brij 35 in a concentration of 0.3 g/cm³ /BDH Ltd./ is added to 1 l of distilled water.

1.2.1.2 **H₂SO₄ solution:** 7 volume unit of concentrated sulfuric acid is diluted with 3 volume unit of distilled water. The concentration of the resulting sulfuric acid solution is about 78 % /m/m/.

![Fig.1. Modul for tryptophan analysis.](image-url)