

INVESTIGATIONS REGARDING THE INFLUENCE OF CERTAIN TYPES OF FAT CONTENT ON ACRYLAMIDE LEVEL IN BISCUITS

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Abstract

Acrylamide (AA) in 1999 has been classified by the International Agency for Research on Cancer (IARC) as "potentially carcinogenic to humans" (Group 2A) and in 2002 was recognized as a genotoxic carcinogen by the European Union (EU), the Scientific Committee on Food. The aim of this study was to evaluate the correlation between the AA level formed in biscuits and colour difference (ΔE), the lipid content of fats used, respectively the water content of biscuits.

In the formulation of biscuits were used vegetable oils (sunflower oil, margarine, palm oil) and animal fat (butter, lard). For each type of fat used in biscuits were used three types of wheat flour with different ash content: 0.88% d.m. (F1), 1.27% d.m. (F2), respectively 2.2% d.m. (F3). The acrylamide level was determined by gas chromatography tandem mass spectrometry (GC-MS/MS) using internal standard (isotopically labelled AA 1, 2, 3-¹³C).

The AA level from the assortment of biscuits obtained with those 5 types of fat varied similarly, increasing for all types of wheat flour studied, as follows: palm oil > sunflower oil > lard > butter > margarine. When biscuits were obtained from the same type of fat and various types of wheat flour, the AA level increased for the wheat flour as follows: F3 > F2 > F1. Using in the recipe for the manufacture of biscuits of different types of fat (the same amount of fat with different lipid content) resulted in visible changes in the colour of products and changes in the AA level (F1 - 14.63 - 95.84 mg/kg, F2 - 153.26 - 608.87 mg/kg, F3 - 166.03 - 667.67 mg/kg). When the biscuits samples were obtained by using the wheat flour F2 and different amounts of fat with the same lipid content, the AA level ranged from 151.38 to 407.51 mg/kg.

The acrylamide level from biscuits is influenced by the type of fat and wheat flour used in their formulation, in this study the best combination to obtain a lower level of acrylamide was the use of margarine and flour with the lowest ash content.

Key words: Acrylamide, Biscuits, Fat, Wheat Flour, GC-MS/MS.