

FACTORS INFLUENCE TO FORMATION OF ACRYLAMIDE IN FOOD

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Abstract

Acrylamide - AA is a chemical compound formed during the heat treatment of a wide variety of foods through the Maillard reaction and it is a concern for the snack food industry, because acrylamide has shown toxic effects on the nervous system and fertility, as well as carcinogenic effect. The major limiting factors responsible for the formation of acrylamide in potato and cereal products are reducing sugars (glucose and fructose) and free asparagine (amino acid) respectively. Acrylamide formation primarily takes place under conditions of high temperature (usually in excess of 120 °C) and low moisture.

Two sensitive and fast batch and flow-injection spectrophotometric methods for the determination of acrylamide are proposed. The methods were based on oxidation-reduction reaction of acrylamide with potassium permanganate. The calibration graphs are linear over ranges 1.0 - 0.8 and 2.0 - 13 µg/mL of acrylamide, with detection limits of 0.6 and 1.0 µg/ml, respectively. The methods are applied to the routine analysis of acrylamide in potato chip samples. Reduction of some cationic interference was carried out in the batch and flow injection analysis using cationic exchange. Because of gaps in the databases and the fact that results for different years are not always comparable, a reliable Europe-wide temporal trend analysis is not feasible. However, according to European food safety authority - EFSA, a dataset of manufacturers' measurements of AA levels in 40.455 samples of fresh sliced potato crisps from 20 European countries for the years 2002 to 2011 showed a substantial downward trend for mean levels of AA, from 763 ± 91.1 µg/kg in 2002 to 358 ± 2.5 µg/kg in 2011.

This indicates, that caution for reducing the factors that influence acrylamide formation need to be disclosed, at first glance, at the field, and to proceed continuously with storage and production processes.

Key words: *Acrylamide, Potato chips, Spectrophotometric methods, Toxin.*