TOXICOLOGICAL STUDY OF ACRYLAMIDE IN HUMANS AND THE EXPOSITION ACROSS THE DIET

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Introduction

- Acrylamide (2-propenamide) is a colorless and odorless crystalline solid with a melting point of 84,5 ℃.
- It occurs in starchy foods rich in reducing sugars and amino acids.

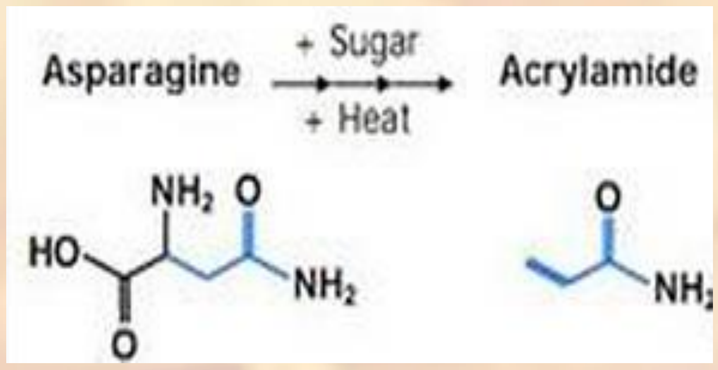

Figure 1: Acrylamide formation from the Maillard reaction.

Objectives

- Collect information about the acrylamide toxicology.
- Identify the toxic effects of the intake of acrylamide on humans.
- Know the levels of acrylamide intake for different age groups in different countries.
- Specify the legal issues that exist on acrylamide and their presence in food.

Methodology

- Web pages of science institutions:

aecosan agencia española de consumo, seguridad alimentaria y nutrición

Food and Drug Administration NCTR National Center for Toxicological Research

FAO FIAT PANIS

Organización Mundial de la Salud

- Search of articles:

Scopus ScienceDirect

FOUND 203

CONSULTED 47

USED 24

Results

- Acrylamide is absorbed quickly once the intake of the product.
- Acrylamide is classified as a possible human carcinogen (C1B) and as a possible inductor of mutation in humans (M1B).
- Acrylamide is oxidized by the cytochrome P450 2E1 in glycidamide, a potentially toxic compound, or is conjugated with glutathione.
- The risk level for humans (LMR) for oral exposure to acrylamide is 0,01 mg/kg.
- Neurotoxic, carcinogenic and genotoxic effects.
- Acrylamide and glycidamide can form adducts with DNA. This is used as a biomarker.

Food	Indicative values (µg/kg)
Potatoes ready to eat	600
Potato chips made from fresh potatoes and potato dough	
Crackers made with potatoes	1000
Bread made from wheat	80
Other bread	150
Bran cereals and whole grains, puffed grain	400
Grains of wheat and rye	
Corn products, oats, spelled, barley and rice	300
	200
Biscuits and wafers	500
Crackers except potatoes	500
Crispbread	450
Gincerbread	1000
Roasted coffee	450
Instant coffee	900
Coffee substitutes cereal	2000

Table 1: Indicative values of acrylamide in food from EFSA (2007-2012).

Conclusions

- Acrylamide is an important food contaminant to consider his risk to human health.
- It is necessary to study a common methodology to determine the content of acrylamide in food and consumption by humans.
- The intake of acrylamide is mainly produced through of potatoes chips and cereal products. The population that tends to have a higher consumption of these products are teenagers and children in the lunch.