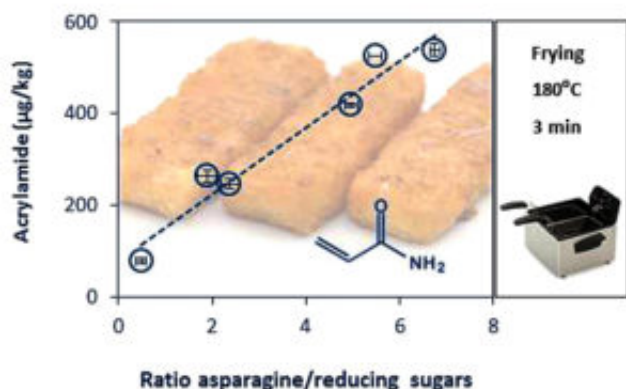


## The composition of the breadcrumb influences acrylamide formation in a breaded product

Dietary habits have changed over the last years, decreasing the consumption of fresh foods and increasing the consumption of processed foods such as fast foods, where battered and breaded products are included. Breaded products are characterized by an outer layer of breadcrumbs which both controls the moisture losses and contributes to the properties of the product as it forms a crust which is more attractive once fried. The negative aspect of the consumption of these foods is primarily related to the high energy content, but moreover, an emerging risk is also associated due to a high exposure to Maillard reaction products (MRPs). Breaded foods are subjected to deep frying in vegetable oils at high temperature, where the Maillard reaction takes place with the resulting formation of process contaminants, such as acrylamide. Acrylamide is generated as a result of the reaction between asparagine and reducing sugars as main precursors. Recently, the European Food Safety Agency has confirmed that the presence of acrylamide in food is a public health concern, requiring continued efforts to reduce its exposure.



Relationship between asparagine and reducing sugar content with acrylamide formation in breadcrumb samples fried at 180 °C for 3 minutes

Researchers from the Chemical Modifications in Processed Food – CHEMPROFOOD group at the Institute of Food Science, Technology and Nutrition (ICTAN-CSIC) have confirmed that the composition of the breadcrumb as an ingredient during the domestic and industrial preparation of breaded foods have direct influence on the formation of acrylamide in breaded products. Results showed significant differences in the levels of the contaminant according to the concentration of the potential precursors in the breadcrumbs. Levels of acrylamide were significantly correlated with the ratio between asparagine and reducing sugars. As expected, acrylamide was directly related to the frying time and temperature.

In summary, although the frying conditions are critical to the acrylamide formation, the appropriate adjustment of the ingredients used in the breadcrumb formulation may contribute to minimize the formation of potentially harmful compounds in the crust of breaded products. Taking into account these experimental data, it should be possible to manufacture breaded products with reduced levels of acrylamide by controlling both the composition of the product and the frying parameters and, subsequently, reducing their contribution to the dietary intake of the population.

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## **Publication**

[An investigation of process contaminants' formation during the deep frying of breadcrumbs using a bread coat model.](#)

Mesías M, Holgado F, Márquez-Ruiz G, Morales FJ  
*Food Funct.* 2016 Mar 16