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Effect of the brewing process on the acrylamide content in coffee beverages

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Abstract

One of the latest neurotoxic and carcinogenic substances discovered in food is acrylamide (AA). The main pathway for AA formation in foods is the Maillard reaction (MR). Heat treated carbohydrate-rich foods such as potato, cereal and bakery products, together with coffee contain high levels of acrylamide. The high consumption of coffee in many countries makes it a potentially significant source of daily exposure to acrylamide. The purpose of the present investigation was to study the influence of the brewing method on the acrylamide level in coffee beverages. The experiment was performed with six different roasted coffee from local supermarkets. For coffee beverages preparation four different methods were used: boiled coffee (Turkish coffee), steeping (French press coffee), infusion (filtered coffee), and Italian pressure method (espresso coffee). Each time coffee beans were mechanically powdered and 100 ml brew was prepared using 6 g of ground coffee. AA contents in the brew coffee samples were determined by the RP - HPLC - DAD method. The results for AA contents were presented as mean values \pm standard deviations (SDs) of six independent samples, analysed in triplicate ($n = 18$). Obtained results showed that the method of brewing coffee influences the level of AA in infusions. AA concentrations for Turkish coffee (4.10 $\mu\text{g}/100 \text{ ml}$), French press (3.19 $\mu\text{g}/100 \text{ ml}$) and filtered coffee (2.95 $\mu\text{g}/100 \text{ ml}$) were higher than for espresso (2.13 $\mu\text{g}/100 \text{ ml}$). Results showed also that the highly water-soluble acrylamide is easily extracted from the ground coffee to the liquid phase of the beverage. The extraction percentage variation according to the brew method was: from 52% for espresso to 95% for Turkish coffee. The brewing procedure for espresso extracted acrylamide incompletely from ground coffee comparing to other brewing methods, due to the short contact time between coffee and water. When compared with other common coffee beverages, espresso is the most concentrated brew. However, its acrylamide content per cup may be lower, due to the lower level of this substance extraction to the brew. The brewing time has a significant influence on the extraction level of AA for the beverage.

Conflict of Interest

There is no conflict of interest