

Evaluation of toxic compounds produced during the elaboration of Syrah wines

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The wine has beneficial properties relating to the presence of phenolic compounds and stilbenes which can reduce the risk of cardiovascular diseases and possess antioxidant and anti-inflammatory properties, among others. However, some toxic compounds can be produced during the elaboration of wine, including acetaldehyde, formaldehyde, ethyl carbamate and acrolein. The International Agency for Research on Cancer (IARC) has classified formaldehyde and acetaldehyde ingested specifically through alcoholic beverages as carcinogenic to humans (group 1), ethyl carbamate as probable carcinogenic to humans (group 2A) and acrolein in group 3, in which the IARC needs further study to classify this compound regarding carcinogenic effects. The objective of this study was to verify the occurrence of four toxic compounds (acetaldehyde, formaldehyde, ethyl carbamate and acrolein) in Syrah wines through the use of comprehensive two-dimensional gas chromatography with time-of-flight mass spectrometry detection. Nineteen commercial samples of Syrah wine produced in Brazil were evaluated. The four toxic compounds were simultaneously extracted by headspace solid phase microextraction after derivatization of the sample with 2,2,2-trifluoroethylhydrazine. Calibration curves were constructed and octanal was used as internal standard (IS) for the determination of formaldehyde, acetaldehyde and acrolein and ethyl nonanoate was the IS used for the quantitative evaluation of ethyl carbamate. These toxic compounds have been found in all samples with a concentration ranging from 0.02 to 0.16 mg/L for formaldehyde, 0.05 to 0.96 mg/L for acetaldehyde, 0.02 to 0.24 for ethyl carbamate and 0.08 to 0.41 for acrolein. In Brazil, there is no legislation establishing the maximum concentration of the target compounds of this research in wines. Nevertheless, the risk assessment related to exposure to these toxic compounds through the wine consumption is necessary to verify if the concentrations found in Syrah wines represent risks for consumer health.

Theme: Segurança dos Alimentos

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