

ABSTRACT BOOK

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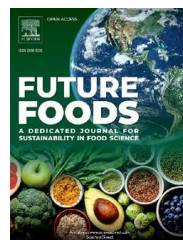
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Abstract:

Arsenic (As) toxicity depends on its chemical form: the inorganic forms are more toxic compared to the organic forms. Therefore, obtaining occurrence data on inorganic arsenic (iAs) at national and European level in different kinds of foodstuff is necessary in order to assess more accurately the dietary exposure of the population to this contaminant. This is a challenging task given the extremely low levels of iAs in most of the food matrices. As speciation has been the subject of much attention for decades but most of the studies focused on fish and seafood, algae, and rice and rice-based products. This study investigates the levels of inorganic arsenic in several categories of foodstuffs prepared as consumed as fish and seafood, cereal, especially rice, cereal-based products, fruits and vegetables and beverages. The determination of iAs (as the sum of As(III) and As(V)) was performed using an internal method adapted from the European Standard NF EN 16802. Briefly, the As(III) into As(V) species from fresh or dried samples were extracted using a solution nitric acid in oxygen peroxide and a closed microwave system. Using this extraction procedure, As(III) is oxidized to As(V) which allows to determine the iAs fraction (the sum of As(III) and As(V)). The oxidized As(V) form is separated from the other co-extracted As species by anion exchange-high performance liquid chromatography and detected on-line by Inductively coupled plasma - mass spectrometry. A robust method validation was carried out using the accuracy profile approach. The method was proved to be highly suitable for the routine determination of iAs all types of foodstuffs with satisfactory analytical performances hence allowing accurate risks assessment related to ingestion of iAs from food.

A Comparative Study of Minor Winter Cereals and Bread Wheat: Agronomic Assessment, Grain Quality, Phytochemical Composition and Flour Rheology

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Abstract:

In recent decades, there has been a renewed interest in underutilized grains in response to consumer's demand for sustainable and value-added foods.¹ However, the successful reintegration of ancient and minor cereals requires comparative studies with modern reference varieties.² In the present work, the quality of cultivars of ancient (einkorn, emmer, spelt) and old varieties of bread wheat, minor cereals (barley, rye, triticale, durum wheat) and new species (tritordeum) was studied in terms of the main agronomic, qualitative, nutritional, and sanitary traits. Overall, twenty genotypes have been compared in a field experiment carried out over three growing seasons in north-west Italy according to a full factorial design, using the same agronomic technique for all genotypes. Rye, triticale, tritordeum and ancient wheats were characterized by significantly lower yields compared to bread wheat, ranging from -27% to -46%. Tritordeum and the old wheat variety had the highest protein contents, but weaker flours. Barley and rye showed, respectively, the highest content of soluble and bound phenolic acids. Tritordeum emerged for high concentrations of total phenolic acids, carotenoids and tocopherols, while the β -glucan content was similar to that of bread wheat. The sanitary risks were found to be relevant for durum wheat and tritordeum, both showing high levels of regulated and emerging mycotoxins. The extensive intra-species variation examined in this study suggests the possibility of selecting the best genetic material with good yield and quality performance for different major and minor crops, to fully exploit the health-promoting grain composition in high value-added supply chains.