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Dietary strategies based on iron supplements for reducing the bioavailability of inorganic arsenic

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Inorganic arsenic (iAs) [As(III) and As(V)] has been classified as a human carcinogen. Diet is the main source of exposure for the general population. The amount of iAs that reaches the bloodstream (bioavailability) is high; however, some studies demonstrate that certain food components can reduce it. To reach the bloodstream, the contaminant has to be solubilized from the food matrix during digestion (bioaccessibility) and must be absorbed by the intestinal epithelium. Food components may reduce iAs bioavailability interfering one of these steps. The aim of this work is to search for iron dietary supplements able to reduce iAs bioavailability. For this propose, initially iron salts or dietary supplements have been added to As(III) or As(V) aqueous solutions or to food containing iAs (rice and seaweeds) and the mixture has been submitted to a simulated gastrointestinal digestion in order to determine the ability of iron to reduce iAs bioaccessibility. Additionally the effectiveness of these iron compounds for decreasing iAs intestinal absorption has been tested using intestinal cells (NCM460/HT29-MTX). Finally, the most effective treatments *in vitro* have been tested *in vivo*. The results show that iron salts produce a substantial reduction of As(III) and As(V) bioaccessibility in water (>93%) and food (35-94%). Supplements of Fe(II) and Fe(III) are also effective at decreasing iAs bioaccessibility with reductions $\geq 85\%$. The addition of iron compounds to As(III) and As(V) aqueous solutions reduces iAs absorption by intestinal cells, especially Fe(II) salts (30-46%) and Fe(II) dietary supplements (27-40%). This data has also been confirmed *in vivo*.

Biography

M^a Jesús Clemente Peiró has completed her graduation in Agricultural Engineering at Politechnical University of Valencia (Spain). She completed her Master's in Food Quality and Safety at University of Valencia. Currently, she is pursuing her PhD in the Laboratory of Trace Elements at the Department of Food Preservation and Quality of the Institute of Agrochemistry and Food Technology (IATA-CSIC, Spain). She has published 8 original research articles in reputed journals of food sciences and analytical chemistry fields.

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