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Metallomics in food safety and nutrition: From total amount to speciation of element**Yong Fang**

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Statement of the Problem: Food and agriculture products are able to accumulate heavy metals such as lead (Pb), cadmium (Cd), arsenic (As) and mercury (Hg) from mining, industrial processing, pesticide and chemical fertilizer at considerable levels, which can lead to impairment of human health. Studies also have indicated that some low dietary elements such as Se intake level are directly correlated with the incidence of various forms of cancer. However, the interactions and functional connections of metal ions and their species with proteins, metabolites and other biomolecules in biological systems have not been previously studied. The purpose of this study is to research the mechanisms of interaction on metallic elements in food safety and nutrition from total amount to speciation.

Methodology & Theoretical Orientation: Hyphenated techniques of high performance liquid chromatography inductively coupled plasma mass spectrometry (HPLC-ICP-MS), such as size exclusion chromatography (SEC), reversed-phase chromatography (RP) have been employed to RP-HPLC-ICPMS for the separation and specific element detection of metal species, while electrospray ionization ion trap mass spectrometry (ESI-ITMS) for the identification purposes to obtain organic structure of metal species like selenoamino acids, selenopeptides, metalloproteins etc., These analytical methods were combined to develop accurate, fast and efficient method to obtain information of metal speciation. A framework was developed to focus on the characteristics of interaction of total concentrations and their speciation of metallic elements both in food safety and nutrition.

Finding: Simultaneous determination method of various element species in food was developed. The beneficial nutritional value and safety assessment of metallome are based on both concentration ingested and their chemical form.

Conclusion & Significance: The studies on metallomics in food safety and nutrition from total amount to speciation can probably help people find elemental speciation with high nutritional value and high edible safety in the process of planting and consumption of food and agriculture products.

Biography

Yong Fang has obtained his PhD in food science from Nanjing Agricultural University, China. He joined the faculty of college of food science & engineering at Nanjing University of Finance and Economics in 2010. Since 2017, he was a professor of food science in NUFE. His research interests include analytical methodology of elemental speciation in food, processing of cereal grains etc. He has chaired several projects supported by the National Natural Science Foundation, the National Key Research of China, etc., and been financially supported by 5 Excellent-Talent funding including "the Jiangsu Six -Submit Talents Plan". He is also a referee for international peer reviewed journals, such as *Food Chemistry* and *Journal of Agriculture and Food Chemistry*. He received several Chinese government awards for scientists including the first prize of Shandong Provincial Promoting Science and Technology award.

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