Potential of phytase-mediated iron release from cereal-based foods: a quantitative view.

The major part of iron present in plant foods such as cereals is largely unavailable for direct absorption in humans due to complexation with the negatively charged phosphate groups of phytate (myo-inositol (1,2,3,4,5,6)-hexakisphosphate). Human biology has not evolved an efficient mechanism to naturally release iron from iron phytate complexes. This narrative review will evaluate the quantitative significance of phytase-catalysed iron release from cereal foods. In vivo studies have shown how addition of microbially derived phytases to cereal-based foods has produced increased iron absorption via enzyme-catalysed dephosphorylation of phytate, indicating the potential of this strategy for preventing and treating iron deficiency anaemia. Despite the immense promise of this strategy and the prevalence of iron deficiency worldwide, the number of human studies elucidating the significance of phytase-mediated improvements in iron absorption and ultimately in iron status in particularly vulnerable groups is still low. A more detailed understanding of (1) the uptake mechanism for iron released from partially dephosphorylated phytate chelates, (2) the affinity of microbially derived phytases towards insoluble iron phytate complexes, and (3) the extent of phytate dephosphorylation required for iron release from inositol phosphates is warranted. Phytase-mediated iron release can improve iron absorption from plant foods. There is a need for development of innovative strategies to obtain better effects.

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