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A Micronutrient Powder Containing a Low Dose of Iron and Zinc together with a Phytase Active at Gut pH Reduces Iron and Zinc Deficiency in South African Children

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Abstract

Micronutrient powders (MNP) are often added to complementary foods high in inhibitors of iron and zinc absorption. Most MNPs compensate for this by including high amounts of iron and zinc, but it is no longer recommended in malarial areas to use untargeted MNPs that contain the RNI for iron in a single serving.

To test the efficacy of a low iron and zinc (each 2.5 mg) MNP containing iron as NaFeEDTA, ascorbic acid and an exogenous phytase active at gut pH.

In a double-blind controlled trial, iron-deficient South African school children (n=200) were randomised to receive either the MNP or the unfortified carrier (dextrose) added just before consumption to a highly-inhibitory maize porridge 5 days per week for 23 wk; primary outcomes were iron and zinc status, a secondary outcome was somatic growth.

Compared to the control, the MNP increased serum ferritin (SF) ($p < 0.05$), body iron stores ($p < 0.01$) and weight-for-age Z scores ($p < 0.05$); it decreased TfR ($p < 0.05$), the prevalence of iron deficiency by 30.6 % ($p < 0.01$) and the prevalence of zinc deficiency by 11.8 % ($p < 0.05$). Absorption of the iron from the MNP was estimated to be 7–8 %.

Inclusion of an exogenous phytase in a MNP together with NaFeEDTA and ascorbic acid may allow significant reduction in the iron dose from existing MNPs, while still delivering adequate iron and zinc. An additional advantage of this MNP formulation is it will likely enhance absorption of the high native iron content of complementary foods based on cereals and/or legumes.

Keywords: In-home fortification, iron, phytase, phytic acid, zinc

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