The Concentrations of Iron, Calcium, Zinc and Phytate in Cereals and Legumes Habitually Consumed by Infants Living in East Lombok, Indonesia

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There is a paucity of analysed data on contents of minerals and phytate in Asian complementary foods. Thus, cereals and legumes \( (n=27) \) consumed by Indonesian infants were analysed for iron, zinc and calcium using flame Atomic Absorption Spectrophotometry and for phytate using high performance liquid chromatography (HPLC). Results (per 100 g dry weight) showed unfortified cereals had lower concentrations of zinc (1.5–3.2 mg/100 g vs. 3.2–5.8 mg/100 g), iron (0.3–5.4 mg/100 g vs. 2.9–17.4 mg/100 g), calcium (5–48 mg/100 g vs. 41–926 mg/100 g) and phytate (hexa- and penta-inositol phosphates; 70–246 mg/100 g vs. 177–1042 mg/100 g) than legumes and lower phytate: mineral molar ratios. Tempe had the lowest concentration of phytate (236–366 mg/100 g vs. 763–1042 mg/100 g), and the lowest molar ratios of phytate: zinc (6.3–12.6 vs. 14.3–21.1) and phytate: iron (1.6–4.0 vs. 5.0–11.3) compared to other soybean products. Milling increased concentrations of iron and calcium in rice (1.2 vs. 0.4 mg/100 g, \( p=0.002 \); and 8.1 vs. 5.1 mg/100 g, \( p=0.029 \), respectively); but reduced zinc (1.6 vs. 1.7 mg/100 g, \( p=0.013 \)). Boiling increased calcium concentrations in rice and rice flour (5.1–16.7 mg/100 g, \( p=0.004 \); and 8.1–31.4 mg/100 g, \( p<0.001 \), respectively); whereas frying decreased iron concentrations in tempe (13.3–6.1 mg/100 g, \( p=0.038 \)). When expressed per infant portions, fortified cereals and tempe were the best sources of zinc, iron, and calcium, because of their relatively high mineral and low phytate contents.

Keywords: Zinc; Iron; Calcium; Phytate; Indonesia; Cereals; Legumes