

NUTRIENT COMPOSITIONS AND ZINC-BIOAVAILABILITY ESTIMATION (IN-VITRO) OF THE EDIBLE TROPICAL CEREALS

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ABSTRACT

Nutritive value and Zn-bioavailability estimation of the edible tropical cereals were investigated in this study. White and yellow maize (*Zea mays*), brown and white sorghum (*Sorghum bicolor (L). Moench*), and yellow and brown millet (*Pennisetum glaucum*) of the cereal samples were air-dried and milled into powder. Subsequently, the samples were analyzed for their proximate, mineral composition and calculated [phytate]/[Zn], [Ca]/[Phytate] and [Ca][Phytate]/[Zn] molar ratios were used in predicting the effect of phytate on zinc bioavailability.

The result revealed that brown sorghum was significantly higher ($P < 0.05$) in protein content ($12.5 \pm 0.3\%$) while yellow millet had the least value. Millet (yellow and brown) had the highest carbohydrate content in all the cereal grains analyzed. Moreover, yellow maize ($13.5 \pm 0.1\%$) had the highest crude fat content while white sorghum ($5.5 \pm 0.3\%$) had the least. The macro-elements (Na, K, Mg and Ca) contents of the cereals were significantly higher ($P < 0.05$) than the micro-element (Fe, Zn, Pb, Cu and Ni). Furthermore, yellow (58.1 ± 0.16 mg/g) and white (52.7 ± 0.15 mg/g) maize had the highest phytate content. The calculated [Ca][phytate]/[Zn] molar ratios indicated that the phytate contents of the cereals may reduce zinc bioavailability to a critical level. Moreover, values obtained in the present study for [phytate][Zn] molar ratios for the cereals were far above 15.0. The high value of phytate content in the cereals is an indication of the critical factor for the decrease in the bioavailability of Zn. However, cereals grains such as sorghum (Brown & White and Yellow maize) are good sources of minerals but low in protein yet with substantial nutritional value, it can avert the case of malnutrition.

KEYWORDS: Cereals, Molar Ratio, Nutrient Composition, Phytate, Zn-Bioavailability