

BIOAVAILABILITY OF ZINC IN RICE BASED MEALS OF PRE-SCHOOL CHILDREN: A STUDY FROM RURAL SRI LANKA

A.M. KARUNARATNE^{*1}, P.H. AMERASINGHE², V.M S. RAMANUJAM³,
H.H. SANDSTEAD³ AND P.A.J. PERERA⁴

¹Department of Botany, ²Department of Zoology, Faculty of Science, University of Peradeniya, Peradeniya ³Department of Preventive Medicine and Community Health, University of Texas Medical Branch, Galveston, TX, USA, ⁴Department of Biochemistry, Faculty of Medicine, University of Peradeniya, Peradeniya

The potential impact of zinc (Zn) deficiency on growth of children is reported in several studies elsewhere. Zn could become limited when the diet is mainly composed of plant-based food with negligible intake of animal food sources. The bioavailability of Zn from plant-based foods is known to be affected by antinutrients such as phytic acid (PA). The PA to Zn molar ratio in the diet is used to calculate Zn bioavailability. Daily intake of Zn of children aged 3 to 5 yrs was determined by qualitative and quantitative analysis of meals. Results presented, are on Zn and PA contents of 10 rice-based meals (fresh) collected from the field (Nawagurukele, Doluwa, Kandy District). Each well-mixed sample (n = 10, range 10 -72 g) was dried (120 °C, 1 hr) to determine the moisture content. Zn and PA contents were determined on dried, ground samples. Zn analysis was by digestion in hydrogen peroxide and using flame atomic absorption spectroscopy. PA was precipitated as ferric phytate using 3% trichloroacetic acid and quantified using a colorimetric method. Additionally, monthly records of height and weight data of children are being gathered.

Overall, meals (n=10) consisted of rice (parboiled, n=6; raw, n=4) with either a single (n=5) or multiple accompaniments (n=5). Legumes were the most popular accompaniment (n=7), either as soya textured vegetable protein (TVP), dhall (*Lentinus culinaris*), or bean pods (*Phaseolus vulgaris*). Animal sources were rare [n=2, fresh fish 'Alagodu' or anchovies (*Anchoviella* sp.)]. The moisture levels of meals ranged from 66 to 73%. Zn levels ranged from 0.94 to 2.11 mg/100 g in dried meals. A meal with anchovies and green leaves appeared to contribute to a high level of Zn. Levels of PA in dried rice meals varied (58 to 273 mg/100 g). PA was high in meals with TVP and dhall. Of the rice meals, 5 had phytic acid to zinc molar ratios >15, and 5 had values ranging 5 - 15. Comparing with WHO recommended values, Zn bioavailability ranged from low (bioavailability, 15%) to medium (bioavailability 30-35%).

Anthropometric indices indicate that malnutrition is prevalent (40 and 30% boys and girls at -2SD respectively, for, weight for age). With the exception of one meal, the others cannot be regarded as balanced, as the consumption of vegetables and animal sources were negligible. While there could be many limiting factors leading to malnutrition, the present study shows that inadequate Zn nutriture could be considered to be one of them.

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