

Enrichment of iron into rice using natural raw materials

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Abstract

This study was progressed to identify the potential of producing iron enriched rice using natural raw materials with the aim of overcoming the high prevalence of iron deficiency in Sri Lanka. Initially four improved Sri Lankan rice varieties (*Oriza sativa* L.) (Bg-300, At-362, Bg-352, Bg-360) were analyzed for the proximate composition and water uptake capacities. The effect of parboiling and polishing steps in rice processing process on the proximate composition was also studied. The rice variety with the highest water uptake percentage was selected for the mineral enrichment treatments using leaves of *Moringa oleifera*. Finally, the iron content of the selected best treatment and untreated samples were compared. Among the selected rice varieties, percentage water uptake for paddy and de-husked whole grains were ranged from 45.95 ± 1.29 to 143.37 ± 5.84 and 32.14 ± 0.92 to 168.94 ± 5.22 , respectively. At-362 recorded the highest percentage of water uptake for both forms. Paddy form and polished rice of At-362 were subjected for different treatment conditions with *Moringa oleifera* leaves. Among them treatment of paddy with minced *Moringa oleifera* leaves during hot soaking at parboiling resulted the maximum percentage ash content of 1.34 ± 0.10 . Control paddy sample showed only $1.21 \pm 0.03\%$ ash content. Different paddy: leaves ratios were studied under this selected treatment condition and 10:9 paddy: leaves ratio which was resulted $1.96 \pm 0.11\%$ of ash content was selected as the ideal ratio to develop iron enriched rice. Hence, the best method to enrich minerals into the rice grain using natural raw materials was identified as the treatment of paddy with minced leaves of *Moringa oleifera* during hot soaking (70°C) at 9:10 ratio of leaves to paddy in paddy parboiling. According to the results of ICP-MS analysis, rice from paddy treated under these conditions was resulted in 18.72% increment in iron content and 38.10%, 41.16%, 95.97% and 114.38% increments in Mg, Mn, Ca and K, respectively. Hence it can be concluded that incorporation of *Moringa oleifera* leaves into the paddy parboiling mixture is a cost effective, convenient method to enrich essential minerals into rice and it is an effective method to address the iron deficiency problem meanwhile adding value into the rice.

Keywords: Iron, Minerals, Enrichment, Water uptake

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