

Effect of soaking on phytates and correlation between total phosphorous and phytate levels of brown (unpolished) rice

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Abstract

Phytic acid (myo- inositol hexaphosphate or phytate when in salt form) is the principal storage form of phosphorous in cereal grains. Many of the phytate-mineral complexes are insoluble and therefore reduce the bioavailability of mineral nutrients such as Fe, Zn, Ca, Mg. Recently, micronutrient malnutrition problem has been raised by scientists and they have shown a great concern to find out solutions to alleviate micronutrient deficiencies found in rice consumers. Although brown rice (unpolished rice) is richer in phytic acid, it has a nutritional advantage over milled rice. Therefore, it is important to promote brown rice consumption rather than polished rice.

Studies were undertaken to determine the total phosphorous and phytate contents in unpolished rice, to analyze the correlation between total phosphorous and phytate in unpolished rice and to find out the effect of soaking on phytate content of ten rice varieties. For this study Beath Heenati, Kalu Heenati, Rathu Heenati, Sudu Heenati, Pachchaperumal, Batapolal, Kattamanjal, Rathal, Suwanda Samba, and Bw 267-3 varieties of 2006/2007 Maha- Bombuwala were used. Phosphorous content was determined by using colorimetric method while phytate content was determined by using anion exchange method. Three varieties with highest, medium and lowest phytate contents were used to find out the effect of soaking.

There was a significant ($p < 0.05$) difference between some unpolished rice varieties in their phosphorous content. Beath heenati had the highest phosphorous content and Bw 267-3 had the lowest phosphorous content. Also Suwanda Samba had the highest phytate content while Bw 267-3 had the lowest phytate content. There was a positive correlation between total phosphorous and phytate levels based on correlation analysis. Correlation coefficient for unpolished rice was 0.76. Furthermore, it can be concluded that 60-80% of total phosphorous is present as phytate in unpolished rice. There was a significant difference between phytate levels before and after soaking in high phytate containing varieties such as Suwanda Samba and Pachchaperumal. When the soaking time increased phytate reduction also became significant. But in the case of low phytate containing varieties there was no significant difference in phytate reduction. Phytate

level can be reduced by soaking which is a simple pre-treatment practiced at domestic level before preparing complementary foods. Phytate reduction by soaking occurs due to activation of phytase enzyme. Therefore, if optimum conditions for phytase enzyme activation can be maintained, more phytate reduction may be observed.

Keywords: Rice, Phytate, Phosphorous, Soaking, Correlation