Variation of Zinc Concentration in Rice Caryopsis and Husk among Southern Rice Varieties Grown in Southern and Northern Thailand

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ABSTRACT

This study evaluated the concentration of Zn in rice caryopsis (intact with pericarp and embryo) and husk (palea and lemma) among rice varieties from southern Thailand and whether the pattern in the Zn concentration of selected varieties was altered by production in a different genetic resource area in northern Thailand. Forty-eight southern rice varieties were grown in a paddy field at Phatthalung Rice Research Center, Thailand, designated as the southern location. Seeds of each variety were harvested and analyzed for Zn concentration in the caryopsis and husk and compared with the standard check varieties with low (RD21) and high (Namroo) Zn concentrations. Four varieties with different Zn concentrations in the caryopsis were selected from among the 48 above varieties and grown in a demonstration field at Chiang Mai University, Thailand, designated as the northern location, for examining the effect of planting location on Zn concentration in the caryopsis. Zn concentrations ranged widely, from 19.2 to 33.3 mg Zn/kg in the caryopsis and from 6.2 to 20.0 mg Zn/kg in the husk among the 48 southern varieties planted in the southern location. Zn concentrations in the caryopsis and husk planted at the southern location correlated significantly (r = 0.55*). The rice varieties Chaw Gam Preud, Leuang Hawm, Mai Yah, and Nahn Hak had the highest caryopsis Zn concentrations; all were higher than the high standard Zn check variety (29.0 mg Zn/kg). The wide range of Zn concentrations in the caryopsis among rice varieties from southern Thailand provides an opportunity for selective inclusion in breeding strategies to enhance dietary Zn uptake by rice consumers. The caryopsis Zn concentrations were reduced by 20-42% in