

Tida Amon 2006: Characterization of Low Phytic acid in Purple Rice Grains (*Oryza sativa* L.). Doctor of Philosophy (Genetic Engineering), Major Field: Genetic Engineering, Interdisciplinary Graduate Program. Thesis Advisor: Mr. Somvong Tragoonrung, Ph.D. 88 pages.  
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Most of the phosphorus in rice grains is stored in the aleurone layer in the form of phytic acid. Phytic acid (myo-inositol 1, 2, 3, 4, 5, 6-hexakisphosphate,  $\text{InsP}_6$ ) is a strong chelator of mineral cations, such as iron, zinc and calcium. The complex of phytic acid is considered to be an important antinutritional factor preventing the uptake of a range of important minerals. The objective of this study was to isolate low phytic acid mutants using fast neutron treatment.  $M_2$  grains from mutagenized rice were screened for high levels of free phosphate in order to identify low phytic acid mutants. Seeds of two low phytic acid mutants (M331 and M783) showed a high inorganic phosphorus (HIP) phenotype. The progenies of these mutants displayed 3 : 1 segregation ratio of HIP in both M2 and M3 generations. The homozygous recessive of HIP phenotype seeds could not germinate or showed abnormal germination. HIP phenotype seed showed defective on respiratory system base on tetrazolium test. HP-TLC analysis could be distinguished of these low phytic acid mutants into two patterns. The HP-TLC patterns of M331 mutants showed reduction of phytic acid level which were corresponded to HIP. Mutant patterns of M 783 seed contained very high level of free inorganic P, low level of phytic acid and some intermediates of myo-inositol phosphates derivatives. In contrast to the mutant, wild type seed contained high level of phytic acid but low in HIP.

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