

CONCLUSION

Approximately 2,000 Jao Hom Nin rice grain mutagenized with Fast Neutron were screened for high levels of free phosphate in order to identify low phytic acid mutants. Seeds of each 1,274 non-lethal mutagenized M1 plants were analysed by molybdate staining and high free phosphate (HIP) contents were scored for low phytic acid mutants. The results of HIP analysis found that two (M331 and M783) out of 1,274 non-lethal mutagenized M1 plants showed high level of inorganic P (HIP) through M2, M3, M4 seeds with the segregation of 3 : 1 ratio for LIP:HIP showing the LIP is a single dominant gene and HIP phenotype is recessive inheritance. The result of HP-TLC analysis demonstrated that HIP phenotypes corresponded to low phytic acid. Furthermore, the HP-TLC profile can detect some intermediate molecules of myo-inositol phosphates derivatives. Low phytic acid mutants were tested for seed viability and found that HIP grains showed defect in respiration and could not survive during germination test. The low inorganic P (LIP) grains, however, can germinate and grow normally. From HPLC data, the HIP phenotype of M783 mutant displayed InsP_4 , InsP_5 , and InsP_6 values of 38.77, 75.98 and 530.23 mg/100g respectively while the normal seeds (LIP) of M783 mutant were 6.99, 40.56, and 748.99 mg/100g respectively. The HPLC data of HIP phenotype from M331 mutant showed the phytic acid content of 677.62 mg/100g while the portion of low inorganic P from M331 mutant contained 991.11 mg/100g of phytic acid. The HPLC results were corresponded with the HPTLC. Therefore, HPTLC could be used for fast and low cost method for phytic acid study.

The result of quantitative analysis by HPLC corresponded with HP-TLC method. Then, HP-TLC method was feasible to screen for isolated low phytic acid from large mutagenic population and alternative for identification of genes in the biosynthetic

pathway to phytic acid and the development of low phytic acid rice with high nutritional value.