Contribution ID: **243** Type: **Poster**

INFLUENCE OF CROSS-BREEDING ON THE PHYTIC ACID CONTENTS OF LOW PHYTIC ACID RICE AND SOYBEAN MUTANTS

Phytic acid (myo-inositol 1,2,3,4,5,6-hexakisphosphate), the major storage form of phosphorus in crops, is considered as an anti-nutrient for monogastric animals and humans, and phytic acid-derived P in animal waste plays an important role in water pollution. Therefore, various efforts have been made to obtain low phytic acid (lpa) crops, e.g. by mutation breeding. Lpa mutant lines often exhibit lower grain yield and seed viability compared to their wild-types, and there have been attempts to minimize these negative effects by cross and selection breeding. However, the impact of these crossing steps on the contents of phytic acid in the resulting progenies have not been investigated. In this study, three lpa mutants of rice (Oryza sativa L.) called: Os-lpa-XQZ-1, Os-lpa-XS110-2 and Os-lpa-MH86-1; and three lpa mutants of soybean (Glycine max L. Merr.) including: Gm-lpa-ZC-2, Gm-lpa-TW-1 and Gm-lpa-TW-1-M developed through γ-irradiation mutation induction were used for cross-breeding experiments with different commercial wild-types. The progenies were genotyped using molecular markers to identify homozygous WT and lpa plants from generations F3 to F8. For rice, the contents of phytic acid in the homozygous lpa mutant progenies grown at different field trials were dependent on the phytic acid contents of the crossing parents, the environmental conditions and the type of mutation. For soybean, all homozygous lpa mutants carrying the GmIPK1-mutation showed a significant signature of lower inositol phosphates. For each cross the generated homozygous lpa mutant progenies displayed consistently decreased levels of phytic acid contents compared with the corresponding homozygous wild-type progenies and the original parental wild-types. The elaborated data provide an important analytical basis for further implementations of mutation breeding in the generation of lpa crops.

Country or International Organization

Germany

Author: Ms GOSSNER, Sophia (Technical University Munich, Chair of General Food Technology)

Co-authors: Mr ZHOU, Chenguang (Technical University Munich, Chair of General Food Technology); Ms YUAN, Fengjie (Institute of Crop Science and Nuclear Technology Utilization, Zhejiang Academy of Agricultural Sciences); Prof. ENGEL, Karl-Heinz (Technical University Munich, Chair of General Food Technology); Prof. SHU, Qingyao (Zhejiang University, State Key Laboratory of Rice Biology, Institute of Crop Sciences); Dr TAN, Yuanyuan (Zhejiang University, State Key Laboratory of Rice Biology and Zhejiang Provincial Key Laboratory of Plant Germplasm, Institute of Crop Sciences)

Presenter: Ms GOSSNER, Sophia (Technical University Munich, Chair of General Food Technology)

Track Classification: Enhancing agricultural biodiversity through new mutation induction techniques