Entry No. IRRC-0561

Category	: International Rice Research Conference
Select Theme	: Pathways to health and nutrition
Endorsement email	:
Keyword 1	: Healthy food systems
Keyword 2	: Nutrient-dense rice
Keyword 3	: Novel nutrition products
Title of Entry	: Beyond the bran: Comprehensive profiling of lipids in a diverse set of rice reveals lipid's vital role in grain nutrition and quality
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Select only one type of presentation	: 15 minute oral presentation
Abstract	: Lipids are complex biomolecules that are present in rice in small amounts. They are mostly found in the bran but plays an important function beyond the grain's outer layer. In this study, we exploited high definition mass spectrometry to conduct a global lipid profiling in the grains of a subset of rice from the 3K Rice Genomes Project, and a population derived from 2 indica rice varieties. We've also used these set of samples to comprehensively identify volatile compounds using two dimensional gas chromatography, and textural properties using rapid visco analyser. These information were subsequently used to identify the genetic basis of lipid biosynthesis, origin of low odour threshold compounds that influence aroma and rice pasting properties of rice. Several quantitative trait loci (QTL) and candidate genes were identified for fatty acids, triglycerides, diglycerides and phospholipids. Similarly, a number of QTLs were identified for volatile compounds that are characterised as pleasant aroma and in particular 2 QTLs were associated with several compounds derived from linoleic and oleic acid oxidation. We have also identified several QTLs that were linked with different textural traits of rice during and after cooking. A similar lipid profiling was also conducted in 4 Australian rice varieties of different grain length grown in 4 nitrogen conditions. Using principal component analysis, the greatest variations in the lipid profile were due to genotype and grain length and less of environmental effect. These studies have shown that lipids are involved not only in energy storage, signalling and structural functions but also contributes to the overall quality of rice.

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