

Role of lipids in rice grain quality

Jeanafior Crystal T. Concepcion^A, Mary J. Garson^B, and Melissa A. Fitzgerald^A

^A School of Agriculture and Food Sciences, The University of Queensland, Brisbane, Australia 4072

^B School of Chemistry and Molecular Biosciences, The University of Queensland, Brisbane, Australia 4072

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Introduction

Lipids are a group of generally water-insoluble molecules that play key roles in energy storage, structural integrity and signalling in plants such as rice. Often overlooked, lipids are increasingly becoming a point of interest in medical research and stress-related biological mechanisms due to their important contributions in regulating such phenomenon. In this study, we highlight the role of lipids in rice grain quality, which is one of the most important factors considered in breeding new varieties.

Materials and Methods

Milled rice samples from a collection of diverse rice varieties were used in the study. Lipid profiling was carried out using ultra-performance liquid chromatography-tandem mass spectrometry (UPLC-MSMS), whereas fatty acid analyses was done using gas chromatography and mass spectrometry (GC-MS). In conjunction, untargeted profiling of volatile compounds was carried out using headspace two-dimensional gas chromatography-time-of-flight mass spectrometry (GC×GC-TOF-MS). Data from triplicate measurements were analysed using multivariate statistics.

Results and Discussion

We identified the lipid classes and species that characterise high quality rice varieties. The amounts of unsaturated fatty acids — oleic and linoleic acids — were found to be significantly different between fragrant and non-fragrant varieties, and in turn affecting the amounts of lipid-oxidation derived odour-active compounds that characterised rice fragrance.

Conclusion

Among the quality traits of rice, aroma is one of the most important for which lipids play important roles. The talk will explore the link between aroma and rice lipid content with the aid of different metabolomics approaches.