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8th World Congress on
Agriculture & Horticulture
and
16th Euro Global Summit on Food & Beverages

March 02-04, 2017
Amsterdam, Netherlands

Fast identification of new rice and stored rice by laser-induced breakdown spectroscopy

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Statement of Problem: The harvest year of the rice (*Oryza sativa* L.) is one of the most important factors of consideration when customers decide to buy rice and new rice has always been a favorite for customers. This phenomenon gives opportunities to the traffickers who substitute stored rice for new rice to sell in order to gain profit, which is not only illegal, but also deceive consumers and even impair their health if the traffickers add some hazardous substances to make stored rice look like new rice. However, studies aimed at identifying new rice and stored rice is a rare seen. The purpose of this study is to report on a simple and fast classification procedure for the quality control of new rice by means of laser-induced breakdown spectroscopy (LIBS) coupled with chemometrics.

Methodology & Theoretical Orientation: LIBS spectra between 300 nm to 850 nm of new rice which was harvested in 2016 and stored rice which was harvested in 2015 but unpacked with the new rice at the same time were studied and min-max normalization was the method for preprocessing. According to the X-variables loading produced by principal component analysis (PCA), characteristic wavelengths were acquired and linear discriminant analysis (LDA) models were built on the basis of them.

Findings: The results showed that the LDA model based on characteristic wavelengths could identify new rice and stored nice rapidly. The accuracy of the calibration set and the prediction set all reached 100%.

Conclusion & Significance: The combination of LIBS and chemometric has its potential to be used in the cereal industry, providing a methodology to perform the quality control of cereal.

Biography

Xiao-Lan Yu is a PhD candidate in Biosystems Engineering at the Zhejiang University, China. She works on analyses of plant materials by Laser-induced Breakdown Spectroscopy. She also has knowledge and research interests in Tea Plants.

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J Food Process Technol 2017
ISSN: 2157-7110 JFPT, an open access journal

Agri World & Euro Food 2017
March 02-04, 2017

Volume 8, Issue 1 (Suppl)

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