



Contribution ID: 8 Contribution code: S1 Physics Innovation

Type: Poster Presentation

Elemental analysis in rice samples by wavelength dispersive X-ray fluorescence spectrometry

Elemental composition including P, Mg, K, S, Cl, Ca, Zn, Mn, and Fe in rice samples cultivated from Phatthalung, Nakhon Si Thammarat, and Songkhla provinces using a simple, rapid and non-destructive wavelength dispersive X-ray fluorescence (WDXRF) spectrometry. A good agreement was achieved between the certified and measured values with the recoveries higher than 94%. The repeatability was found to be satisfactory with the relative standard deviations lower than 12%. The mean concentrations of P, Mg, K, S, Cl, Ca, Zn, Mn, and Fe found in rice samples were 3321.8, 3159.7, 3333.8, 1278.1, 288.9, 124.0, 23.8, 37.3, and 13.3 mg kg⁻¹. Statistical differences in the elements in rice collected from different regions were tested by one-way ANOVA and Duncan's post hoc. There were statistical differences in the mean concentrations of Mg, K, Cl, Mn, and Fe in rice cultivated from different provinces in the south of Thailand.

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Session Classification: Poster: S1 Physics innovation

Track Classification: Physics Innovation