



1st International Conference on
**Frontiers in
Chemical Technology**

20 - 22 July, 2020

**Institute of Chemistry Ceylon
Adamantane House, Rajagiriya, Sri Lanka**

FCT - 2020

Conference Proceedings

Differentiation of coconut testa flour and its lipid component of selected Sri Lankan coconut cultivars by FTIR spectroscopy

K. M. R. U. Gunarathne¹, J. M. N. Marikkar^{1*}, L. Jayarathna¹, C. Yalgama²,
B. E. P. Mendis³

¹National Institute of Fundamental Studies, Kandy, Sri Lanka

²Coconut Research Institute, Lunuwila, Sri Lanka

³Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya,
Sri Lanka

Coconut testa which is the thin brown outer layer of coconut kernel is a by-product of the coconut industry. The oil extraction from it would yield coconut testa oil (CTO) and partially defatted coconut testa flour (CTF). The mid infrared characterization of CTF and CTO would be useful to acquire vital information to establish their identity characteristics. In this study, CTF and CTO from five different cultivars; Gon Thembili (GT), Ran Thembili (RT), San Raman Tall (SR), Tall x Tall (TT) and Commercial (COM) hybrid were subjected to Fourier transmission infrared (FTIR) analysis within the range of 4,000–650 cm⁻¹. Result showed that the spectral pattern of CTF and CTO were remarkably different with respect to several frequency regions. Dissimilarities between CTO and CTF observed in spectral regions were due to differences in the constituent functional groups present in them. The spectral bands appearing for CTF resulted from absorption peaks corresponding to major organic functional groups present in carbohydrates (3331 cm⁻¹), protein (1655 cm⁻¹ for amide I and 1551 cm⁻¹ for amide II), fat (1745 cm⁻¹), and moisture (3500 cm⁻¹). Based on the intensities of the absorption peaks, carbohydrates are the most dominant component of the flour samples followed by proteins and fat. The spectra of CTO samples showed characteristic vibrations of functional groups such as methyl (2953 cm⁻¹), methylene (2921 cm⁻¹ for asymmetrical stretch and 2852 cm⁻¹ for symmetrical stretch), ester-carbonyl (1745 cm⁻¹) etc. present in tri acyl glycerol moieties. Moreover, the peak intensities in certain regions of the spectra indicated the high degree of saturation of CTO. In conclusion, this study showed that mid IR spectral pattern of both CTF and CTO was helpful to provide a uniform method to differentiate them.

Keywords: Byproduct utilization; Coconut testa flour; Coconut Testa Oil; FTIR spectroscopy

*Corresponding author. National Institute of Fundamental Studies, Kandy, Sri Lanka.
Email address: nazrim.ma@nifs.ac.lk