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Real Time and *In situ* Monitoring of the Crystallisation of Palm Oil-based Products using Focused Beam Reflectance Measurement (FBRM)

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In the past several years, the focused beam reflectance measurement (FBRM) has gained increasing interest in the oils and fats field as a useful tool for online monitoring and characterisation of oils and fats crystallisation processes. FBRM is a non-destructive technique utilised for tracking *in situ* changes in particle characteristics such as particle size distribution, population and mechanisms in real time within particulate suspension systems. This presentation highlights recent advances in the area of online characterisation of the crystallisation of palm oil-based products using FBRM. Recent emerging studies have focused on examining the effect of operating parameters on the crystallisation behaviour of palm oil and its subproduct palm olein, as well as crystal behaviour analysis in blends of palm oil with other vegetable oils. The evolution of crystallisation mechanisms comprising primary and secondary nucleation, agglomeration and attrition were successfully characterised using FBRM. The crystal size distributions were determined for each matrix in study and results were further corroborated with offline image analysis via optical microscopy and compositional analysis by gas chromatography (GC) and high performance liquid chromatography (HPLC). These studies have demonstrated that the application of FBRM for studying the crystallisation of palm oil-based products enables one to obtain valuable information on how processing conditions affect crystal characteristics and behaviour and gain insight into what truly occurs within the crystalliser. This will further aid inproper control and optimisation of the crystallisation stage and subsequently allows improvement in the separation efficiency during filtration, thereby ensuring consistent product quality is achieved.

Biography

Elina Hishamuddin obtained her B.Eng in Chemical Engineering from UniversitiTeknologi Malaysia in 2002 and PhD in Chemical Engineering from Loughborough University, UK in 2009. She is currently a senior research officer in the Protein and Food Technology Unit of the Product Development and Advisory Services Division at the Malaysian Palm Oil Board, Malaysia. Her research interests primarily focus on the crystallisation and fractionation of palm-based products, application of Focused Beam Reflectance Measurement (FBRM) in palm-based crystallisation processes and the development of palm-based reference materials.

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