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Characterization of High-and Low-Melting Fractions of Avocado Fat

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Fractional crystallization is a process applied to semi-solid fats to obtain fat products with new functional properties. Fractionation is generally performed through either a dry or a solvent-assisted process. In this study, avocado fat was sequentially crystallized in acetone at 5°C (2h), 0°C (24h), and -20°C (24h) until the mother liquor becomes devoid of any crystal formation. The high-melting stearin isolated at 5°C and low-melting olein isolated at -20°C were compared with the original sample in terms of fatty acid composition using GLC and thermal profiling by DSC. The high-melting stearin and low-melting olein were found to display distinctly different DSC thermal profiles from that of the original sample. These differences were mainly due to changes taking place in the chemical compositions of the fractions. With respect to the original sample, low-melting olein is possessed with higher proportions of diunsaturated and triunsaturated triacylglycerol (TAG) while high-melting stearin was found to become enriched with disaturated and trisaturated TAG molecules. This study concluded that high-melting stearin fraction could be useful as a ingredient in hard-melt products while low-melting olein fraction could be useful in the formulation of products those required to be ease in melt.

Development and Evaluation of a Particulate Matter Dispersion Model for Power Plants Based on the Geographical Significances

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Particulate Matter (PM) in the troposphere is a complex mixture of inorganic and organic components with particle aerodynamic diameters ranging from a few nanometers to tens of micrometers. PM has been linked to multiple detrimental public health outcomes and plays important roles in climatic processes including cloud formation, precipitation, and the solar radiation budget. PM 10 and PM 2.5 are the most health damaging considered to other pollutant in atmosphere thus people with heart or lung diseases are the most likely to be affected. This paper elaborates the protracted modeling of well-known Gaussian Plume Dispersion model used in forecasting of dispersion and behavior patterns of PM emitted from Sri Lankan power plants emphasizing the significant functioning in urban and rural areas. Adiabatic and environmental lapse rates are analyzed specifically in identifying the atmospheric stability conditions based on geographical and topographical conditions. The type of the plume buoyant or momentum is initially detected in analyzing the PM dispersion. The PM emission rate is modified with particle interaction coefficient of 0.002 and the effective stack height is modified by adding the distance travelled by particles due to drift velocity. Stack tip downwash, dimensional and spatial coordination of the plume, building downwash & multiple stack effect are integrated in the model to characterize PM in both urban and rural areas. The model is validated with refinery emission data where the results depict that stable atmospheric condition is the most challenging. The model momentously highlights the significant differences in urban and rural PM dispersion reflecting the concentration contour lines, spatial point PM concentrations, PM dispersion pattern during emergency situations and the minimum ground level concentration with the relevant ground level distance through graphical representations and numerical figures.

Keywords: *Particulate matter, Dispersion, Urban, Rural, Gaussian plume*