

Cocoa butter substitute (CBS) produced from palm mid-fraction/palm kernel oil/palm stearin for confectionery fillings

ABSTRACT

This study investigated the physicochemical properties of ternary mixtures of palm mid-fraction (PMF):refined bleached deodorized palm kernel oil (RBDPKO):refined bleached deodorized palm stearin (RBDPS) for cocoa butter substitute (CBS). Fatty acid constituents, triacylglycerol constituents, solid fat contents (SFCs), melting behavior, polymorphism and crystal morphology were determined using gas chromatography (GC), high-performance liquid chromatography (HPLC), differential scanning calorimetry (DSC), pulsed nuclear magnetic resonance (p-NMR), X-ray diffraction (XRD) and polarized light microscopy (PLM), respectively. Eight blends of various ratios of ternary mixtures were investigated based on the previously studied binary fat mixtures. The composition of palmitic (P) and oleic (O), POP, and crystal morphology (size and shape) of the PMF/RBDPKO/RBDPS [14.9/59.6/25.5 (%w/w)] mixture were comparable to cocoa butter (CB), while its melting profile (18.5 and 37 °C), SFC at 20 °C and polymorphism were different from CB. The iso-solid diagrams of the mixture displayed a monotectic effect at 20–25 °C. Therefore, the 14.9/59.6/25.5 PMF/RBDPKO/RBDPS mixture could be used as a CBS in confectionery fillings because of the crystal morphology and monotectic behaviors comparable to those of CB.

Keyword: Ternary; Crystal; Cocoa butter; Iso-solid diagram; Polarize