

## **Thermal properties, triglycerides and crystal morphology of bambangan (*Mangifera pajang*) kernel fat and palm stearin blends as cocoa butter alternatives**

### **ABSTRACT**

The aim of this study was to investigate the thermal properties of bambangan kernel fat (BKF) and palm stearin (PS) blends and their possibility as cocoa butter alternatives. The triglycerides, thermal behaviors, and crystal morphology of the BKF and PS blends were determined using high performance liquid chromatography (HPLC), differential scanning calorimetry (DSC), and polarized light microscope (PLM). All the blends had three main triglycerides; namely, 1,3-dipalmitoyl-2-oleoyl-glycerol, 1-palmitoyl-2-oleoyl-3-stearoyl-glycerol, and 1,3-distearoyl-2-oleoyl-glycerol. The melting onset temperatures decreased for both non-stabilized ( $-8.81$  to  $-16.80$  °C) and stabilized fat blends ( $-14.04$  to  $-22.16$  °C), whereas the melting offset temperatures shifted toward high temperatures for both non-stabilized ( $35.94$ – $50.21$  °C) and stabilized fat blends ( $48.35$ – $53.16$  °C) with PS. The crystallization onset temperatures increased for both non-stabilized ( $14.66$ – $23.78$  °C) and stabilized fat blends ( $15.46$ – $26.89$  °C), whereas the offset temperatures decreased with the addition of PS for non-stabilized ( $-15.68$  to  $-22.02$  °C) and stabilized fat blends ( $-15.73$  to  $-22.38$  °C). The stabilized fat blends showed higher melting and crystallization peak temperatures than non-stabilized fat blends. In the study of crystal morphology, the fat blends showed small spherulites with the diameter of  $10$ – $100$   $\mu\text{m}$ .

**Keyword:** Differential scanning calorimetry; Melting; Crystallization; Enthalpy; HPLC; Crystallinity