

## **A comparison of the thermo-physical behavior of Engkabang (*Shorea macrophylla*) seed fat-canola oil blends and lard**

### **ABSTRACT**

A study was carried out to compare the thermo-physical behaviors of canola and Engkabang fat blends with those of lard (LD). Four blends were prepared by mixing canola oil with Engkabang fat (CaO/EF) in different ratios: EF-1, 75:25; EF-2, 70:30; EF-3, 65:35; EF-4, 60:40. The fat blends and LD were compared in terms of their basic physicochemical parameters, fatty acid and triacylglycerol (TAG) compositions, melting, solidification, hardness, and polymorphic properties. The slip melting points (SMP) of the fat blends were found to range from 24.8 to 31.2 °C; EF-2 was found to display an SMP value closer to that of LD. With respect to the melting curve of CaO, the melting curves of all fat blends were found to display an additional high-melting thermal transition in the temperature region above 10 °C. The peak maximum of the high-melting thermal transition of EF-3 was the closest to that of LD. The solid fat content (SFC) value of EF-3 was equal to that of LD at 25 °C, whereas the SFC values of EF-2 and LD were similar at 30 to 40 °C. According to textural analysis, EF-2 was found to display a hardness value somewhat closer to that of LD. X-ray diffraction analysis showed that LD and fat blends EF-1, EF-2, and EF-3 display polymorphic forms.

**Keyword:** Canola oil; Engkabang fat; Fat blending; Lard alternative; Thermal behavior