# Polymorphism, textural and crystallization properties of winged bean *(Psophocarpus tetragonolobus*, D.C) oil-based trans-fatty acids free ternary margarine blends


## ABSTRACT

Most margarine and bakery fats are produced from hydrogenated oils making the ingestion of large amounts of trans-fatty acids inevitable with consequential health hazards. Taking advantage of its high solid fat content (15%), winged bean oil-based margarine blends (F320 & F322) were prepared from wing bean oil (WBO), palm stearin (PS) and palm olein (PO) as follows (w/w): F320 (48.5%PS:1.5%PO:50%WBO) and F322 (1.5%PS:48.5% PO: 50%WBO). The blends were tested for textural, thermal properties and crystal growth pattern and polymorphic characteristics. Results showed F320 exhibited harder texture, had crystal morphology with size ranges of 1.0–1.60 μm (50%), 1.61–2.20 μm (23.38%), 2.21–3.40 μm (16.50%) and 3.41–5.20 μm (6.18%), evenly distributed resembling β′ polymorphs, whereas F322 exhibited soft texture, and polymorphs with protruding needle-like crystals with size ranges of 1–1.60 μm (48.25%), 1.61–2.20 μm (23.96%), 2.21–3.40 μm (16.84%) and 3.41–5.20 μm (6.39%), unevenly distributed. Blend F320 thus showed good physicochemical properties as multi-purpose for use as table and bakery margarine especially in tropical climates. Both blends showed low atherogenic and thrombogenic indexes and thus low risk of CHD. This study further offer insight into the potential use of underutilized oilseed crop resources for making specialty and structured fats for the betterment of human life



**Keyword:** Winged bean oil; *Trans*-fat free; Crystallization; Fat crystals; Solid fat content; Fat polymorphism