Investigation of crystallization properties and polymorphic behavior of shea butter from different refining stages.

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Shea butter is an ivory or light brown-colored solid fat extracted from the nut of the African Shea tree (*Vitellaria paradoxa C*. F Gaertn, Sapotaceae family). In recent years, due to its specific composition, shea butter and its fractions have gained importance as ingredients for both food and cosmetic industries. Shea butter is rich in symmetrical di-saturated triacylglycerols containing stearic (S) and oleic (O) acids (S_2O); it can be fractionated to obtain a high melting fraction (shea stearin), which is enriched in S_2O, and is used to produce cocoa butter equivalent (CBE). On the other hand, as unique feature, shea butter contains a high unsaponifiable content (karitene, tri-terpenic alcohols, sterols, tocopherols,…) having a wide range of bioactive properties, which are interesting for the cosmetic industry.

The objective of the work reported here was to investigate the crystallization behavior and the polymorphic stability of different shea butter types. For that purpose, differential scanning calorimetry (DSC) was combined with real-time temperature controlled powder X-ray diffraction (XRD). In order to determine the impact of some of the minors components (kariten, FFA, pigments, DAG, …) on the crystallization behavior and polymorphic stability of shea butter, a comparison between the behavior of a crude shea butter and several products deriving from different refining steps was performed. It was namely found that the crystallization kinetics was impacted by the presence of minor components.