Polymorphic behavior of mixtures of saturated triacylglycerols typical from lauric fats.

The crystallization, melting and polymorphic behavior of fats is of great importance for food and non-food products. One recognized approach to understand the behavior of complex fats systems is to emphasize only their main triacylglycerol (TAG) components. We previously demonstrated that the polymorphic behavior of different lauric fats (even those sold under the same commercial description) were strongly dependent on their TAG composition [Anhiouvi et al.]. In this context, the kinetic phase behavior of binary and ternary mixtures of saturated TAG typical from lauric fats were systematically explored. They were all obtained in the same conditions (fast cooling, reheating at 5°Cmin^{-1}), thanks to DSC combined with variable temperature powder-XRD. It was shown that the investigated kinetics binary phase diagrams presented a eutectic behavior, and that most of the blends were B-stable. Introducing mixed saturated TAG in the blends led to a shift in the position of the eutectic. It was shifted from X_{LaLaLa}=0.7 in the LaLaLa–MMM system, to X_{LaLaLa}=0.5 for the LaLaLa–MMLa mixture, and to X_{LaLaLa}=0.25 for the LaLaLa–LaLaM blend. Moreover, the presence of MMLa drastically modified the polymorphic behavior of the blends thereof. These results allow clarification of phenomena observed during crystallization of different lauric fats.