

Polymorphic Crystallization and Kinetic Pathways of Triacylglycerols

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The kinetic properties of crystallization and structural transformation are important, particularly for the application of polymorphic crystal systems in pharmaceutical, biomedical, food technology, and other applications.

Triacylglycerols (TAGs) are the main components of alimentary fats and oils. Fat structures and compositions determine their physical properties (e.g., rheology, morphology, and texture), where polymorphism exerts a strong influence. There are different polymorphic forms of TAGs: the most general ones (in increasing stability) are: α form, which crystallizes in the hexagonal system, β' form (orthorhombic system) and β form (triclinic system).

In this study, several techniques, like Synchrotron Radiation X-Ray Diffraction, Thermal Analysis and Thermo-optical Microscopy, were used in order to characterize the polymorphism under the kinetic point of view of some TAGs present in edible oils and fats. Therefore, the role of some kinetic parameters (e.g. cooling and heating rates) is highlighted.

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