

# **Effect of Sorbitan Monoesters Addition on the Crystallization and Polymorphic Behavior of Cocoa Butter**

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Crystallization behavior of fats and oils is an important structuration characteristic when developing products with desirable and stable microstructure, texture and quality during processing and storage. Depending on the lipid matrix composition and on the production process, different crystalline network will be formed, with specific physicochemical properties. Therefore, the crystallization study of cocoa butter can help to enhance the quality of chocolates by decreasing or even avoiding common problems related to this product, such as oil exudation, polymorphic transitions and undesirable development of fat bloom. A possible alternative tool to modify and control the crystallization of cocoa butter for chocolate production is the incorporation of specific emulsifiers in the product formulation. This project has the objective of evaluate the effect of adding sorbitan monoester in the crystallization behavior of cocoa butter. Cocoa butter samples were prepared, containing three different concentrations (0.5, 1.0 and 1.5% w/w) of the following four sorbitan monoester emulsifiers: monolaurate, monopalmitate, monostearate and monooleate. The influence of the emulsifier addition in cocoa butter was measured and evaluated by analyzing parameters such as melting point, consistency, solid fat content, crystallization kinetics, thermal behavior and polymorphism. The equipments used were magnetic nuclear resonance, differential scanning calorimetric, texture analyzer and X-ray diffractometer. The cocoa butter samples containing different emulsifiers at different concentrations presented alterations in the crystallization behavior and consistency. For instance, samples added with 1.5% of sorbitan monopalmitate and with 1.5% of sorbitan monostearate showed an increase in the initial crystallization temperature to 22.4 and 23.5°C, respectively, compared to 18.8°C obtained for pure cocoa butter. Sorbitan monolaurate and sorbitan monooleate did not alter this parameter.