

## Effect of 12-hydroxystearic acid on the structuration of blends with a high content of renewable raw materials

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### Abstract

The substitution of mineral waxes by renewable raw materials is possible by the use of organogel, via the incorporation of an organogelator, 12-hydroxystearic acid (12-HSA). However, the physico-chemical characteristics of renewable vegetable raw materials differ from those of mineral waxes. The structure of the blends in which they are used is modified. The addition of 12-HSA promotes the creation of weak bonds, as hydrogen bonds with the liquid fraction, particularly rapeseed oil; thus, allowing the gelling of 12-HSA-rapeseed oil blend. This was shown by infrared spectroscopy. The study of the microstructure of blends containing 12-HSA by polarized light microscopy shows that the addition of 12-HSA also results in a modification of the crystal microstructure: the crystal lattice is denser and the crystal size is reduced. This modification of the crystal lattice has an impact on the phase transition of the blends. The addition of 12-HSA causes a change in the thermal behavior of the blends, as measured by differential scanning calorimetry. The enthalpies of crystallization and melting are divided by two with respect to the referent blend, containing a majority of petrochemical paraffins. In addition, the higher the 12-HSA content, the higher the values of the enthalpies of crystallization and melting. Thus, these results show an improvement of the strength of the interactions between the 12-HSA molecules and between 12-HSA and rapeseed oil. To conclude, the incorporation of an organogel makes it possible to obtain a solid texture with a high content of liquid vegetable oil.

### Biography

Marie Caroline Agogue is a third year PhD student at the University of Nantes, France, in the Department of Engineering Sciences, specializing in Process Engineering. She obtained an engineer's degree in food sciences from the Graduate School of Chemistry, Biology and Physics (ENSCBP) in Bordeaux, France. She is interested in the science of fats and oils (food, cosmetics) from the formulation to their micro and macroscopic structure and their oxidative stability.



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