

Calculation of the solid fat content of vegetable fats using the Hildebrand equation

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¹Affiliation not available

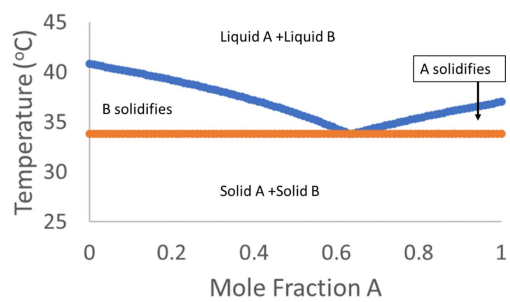
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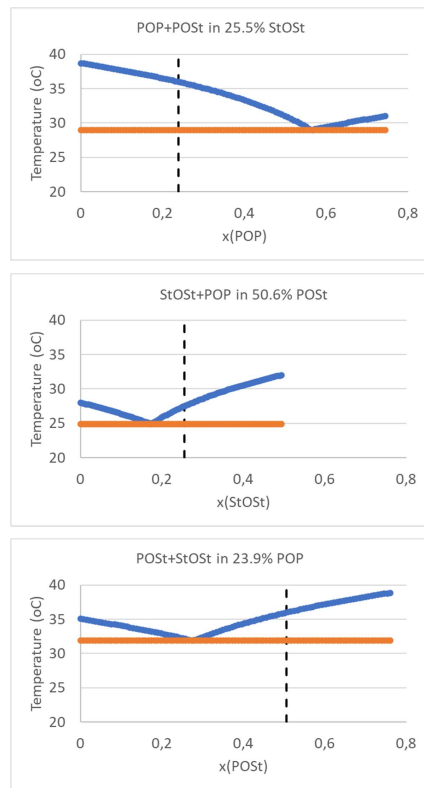
Abstract

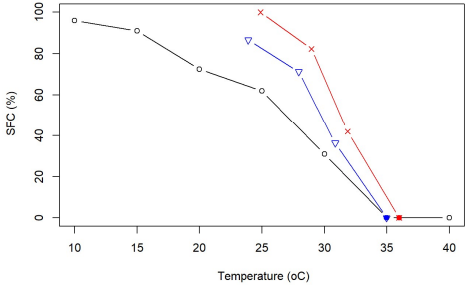
Vegetable fats are complex multi-component mixtures of triglycerides. Here, the solidification behavior of a few vegetable fats is calculated using the Hildebrand equation. This calculation assumes, in the liquid phase, ideal mixing of the different components, in combination with literature data about the temperatures and enthalpies of fusion of the individual triglycerides. It further assumes a decomposition of the triglyceride blend into binary blends dissolved in an inert solvent. The solid fat content is calculated as function of the temperature, assuming that all triglycerides solidify in a single crystal habit (all α or all β or all β'). The minor triglyceride components are explicitly taken into account. The calculated solid fat contents for cocoa butter, palm oil, inter-esterified palm oil and palm kernel olein oil are compared to pNMR data, reported in the literature. Temperature ranges are found, in which specific crystal modifications match to the pNMR data for the solid fat content. These temperature ranges are found to be consistent with literature data obtained using X-ray diffraction. As a by-product, the calculation presented here, enables the construction of scenarios that describe which triglyceride solidifies in which temperature interval.

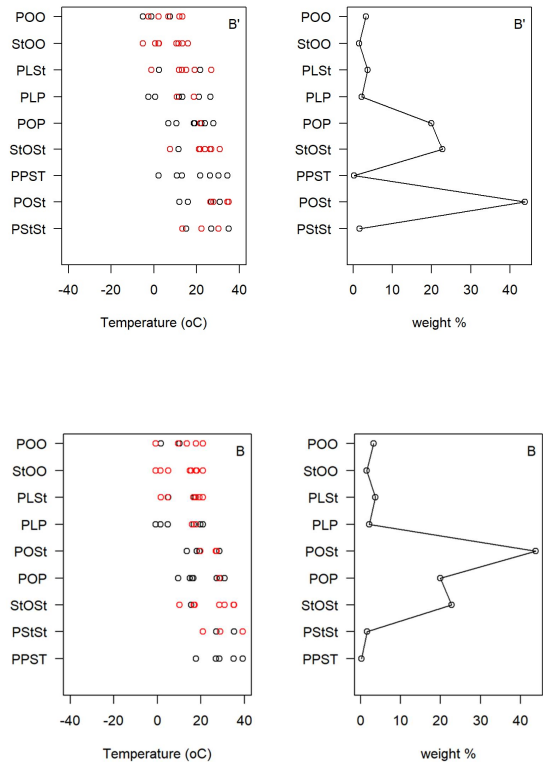
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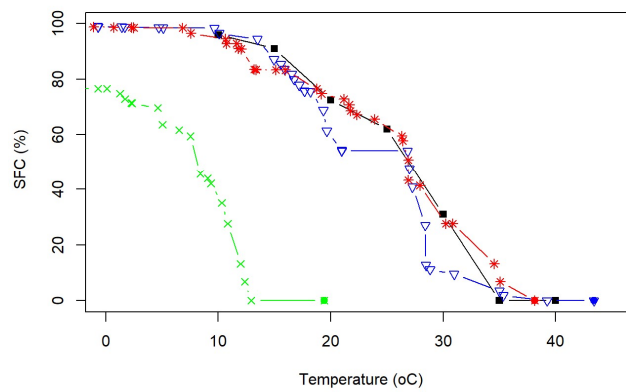
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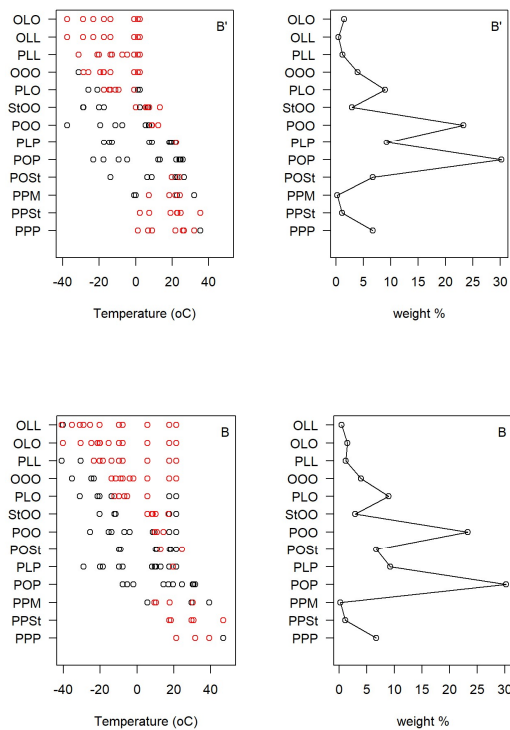


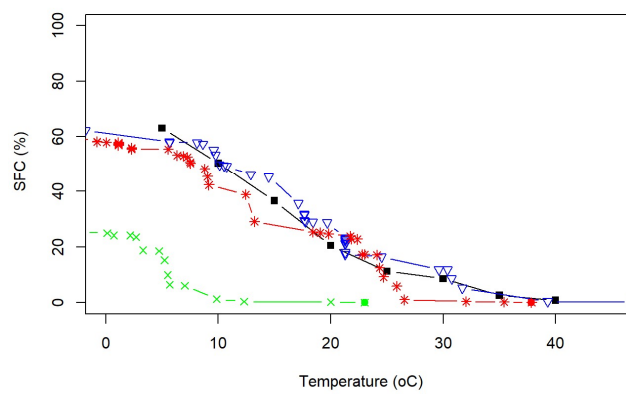


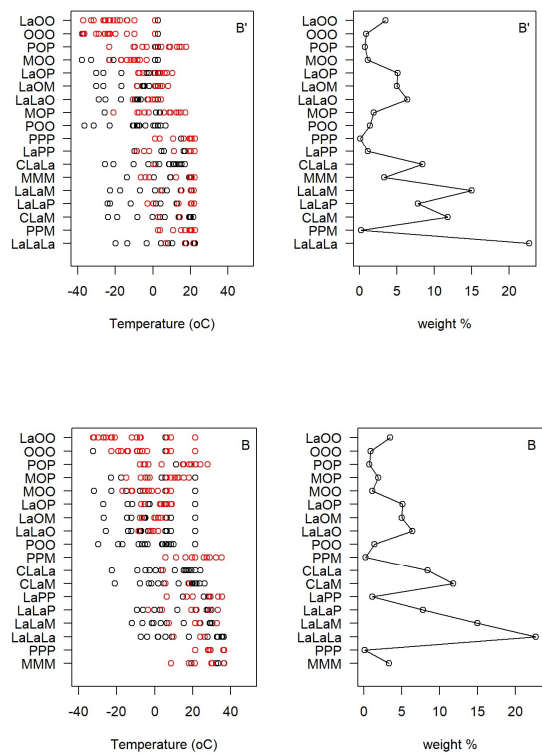


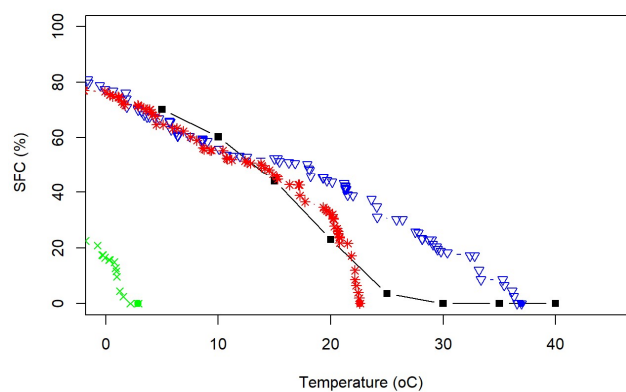












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