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Association Méditerranéenne des Industries Agro-Alimenatires (AMIAA)

Physicochemical properties and thermal behaviour of African wild mango (*Irvingia gabonensis*) seed oil.

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Introduction

Irvingia gabonensis (Africa Mango) is a plant which produces seeds rich in fat (around 70% on dry matter basis), traditionally used as a soup thickener in central and western Africa.

The aim of this work was to improve knowledge regarding melting and crystallization properties on *Irvingia gabonensis* seeds oil (IGO) before its possible utilisation at an industrial scale.

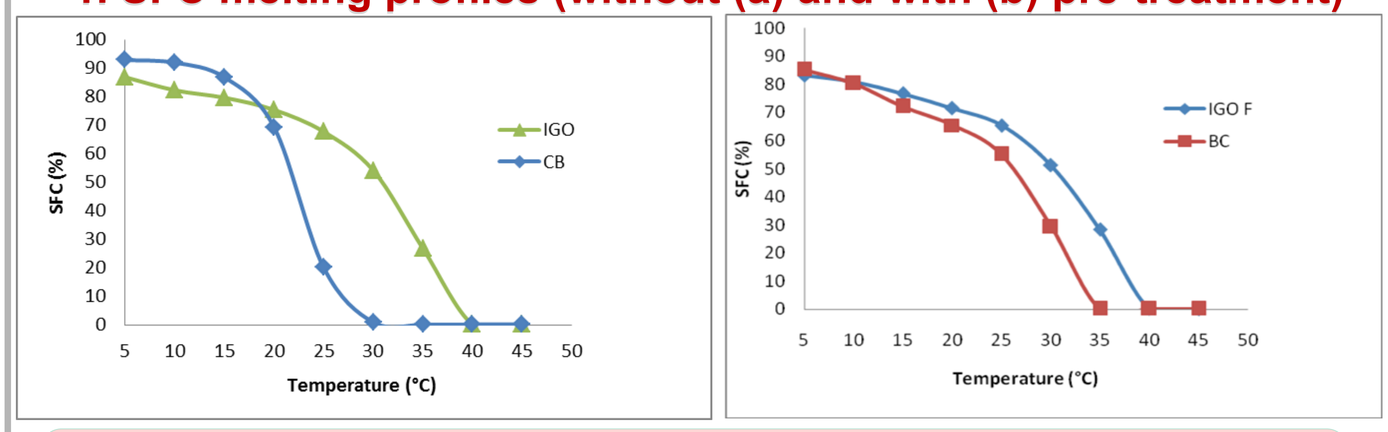
Material and Methods

Cold extraction oil method: using chloroform/methanol 2:1 V/V
pNMR: IUPAC 2.150 tempered and non tempered serial methods
DSC melting profiles using a Q1000 DSC (TA Instruments, USA) according to AOCS method (Cj 1-94) .
Polymorphism by XRD using a Bruker D8-Advance Diffractometer (Bruker, Germany) with two methods:

- ✓ *Dynamic method:* first heated at 80°C and thereafter rapidly cooled to -35°C as in the DSC experiments. Measurements were carried out in the short-spacing region, during cooling and heating from −30 °C to the melting point of the samples.
- ✓ *Isothermal crystallization:* holding for 10 min at 80°C, cooling to the isothermal crystallization temperature: 10 or 20°C and holding for 4 hours at this temperature. Measurements were performed every 30 seconds during the isothermal period, in the short-spacing region.

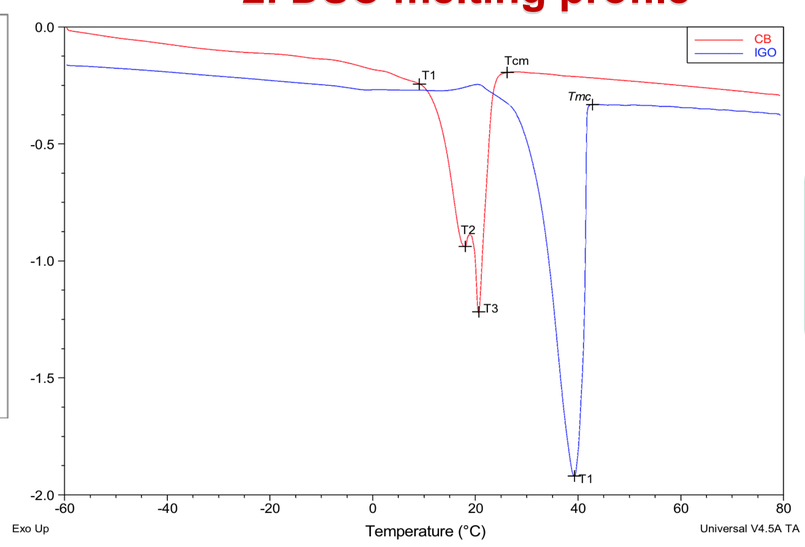
Results & Discussion

1. SFC melting profiles (without (a) and with (b) pre-treatment)



SFC of IGO remained high at the elevated temperature. Tempering did not really affect its SFC profile contrarily to Cocoa butter(CB).

2. DSC melting profile

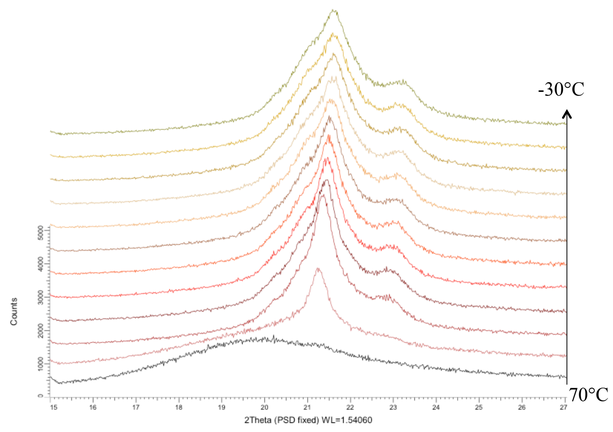


Complete melting of IGO observed around 43°C.

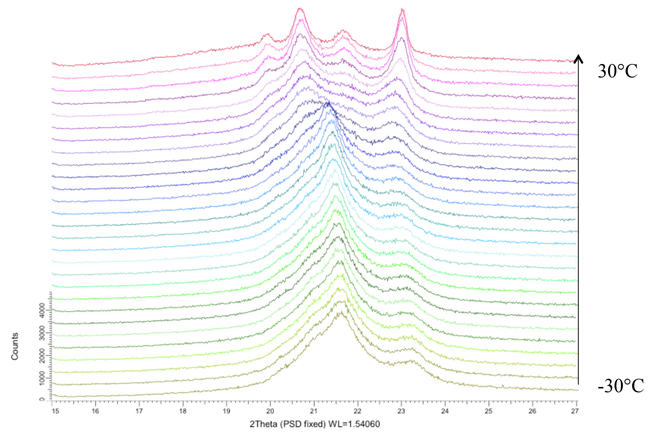
3. Polymorphism by XRD

Dynamic method:

(a) during cooling



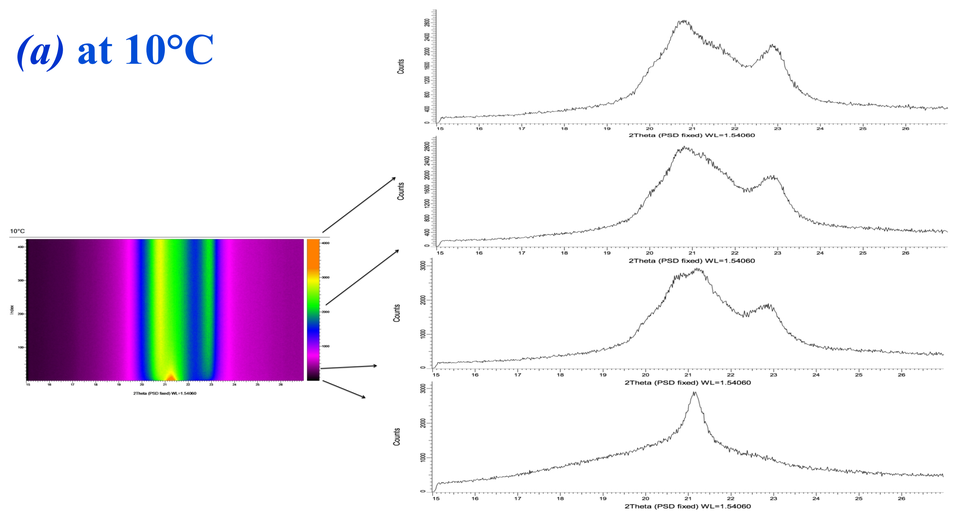
(b) during re-heating



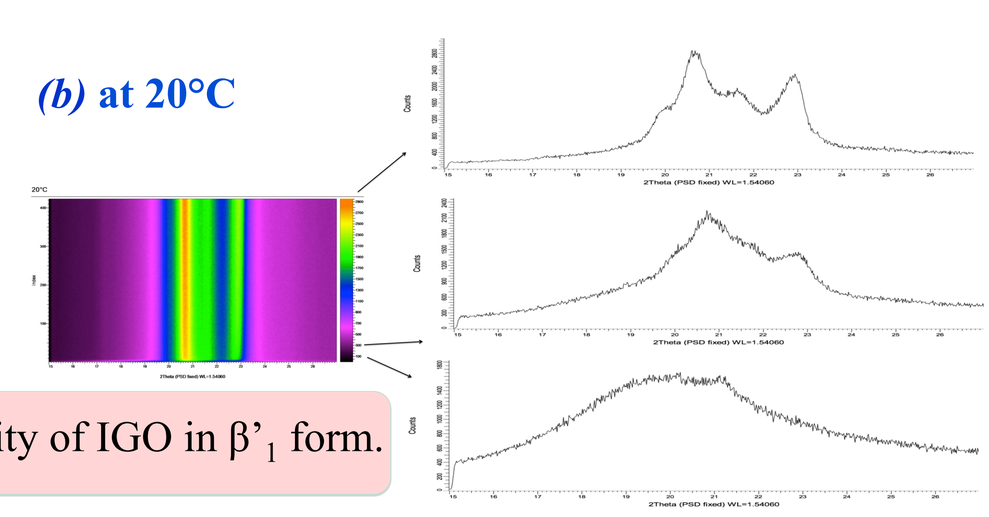
First crystallized under α form then transformation into $\beta'_2 \longrightarrow \beta'_1$ form.

Isothermal crystallization:

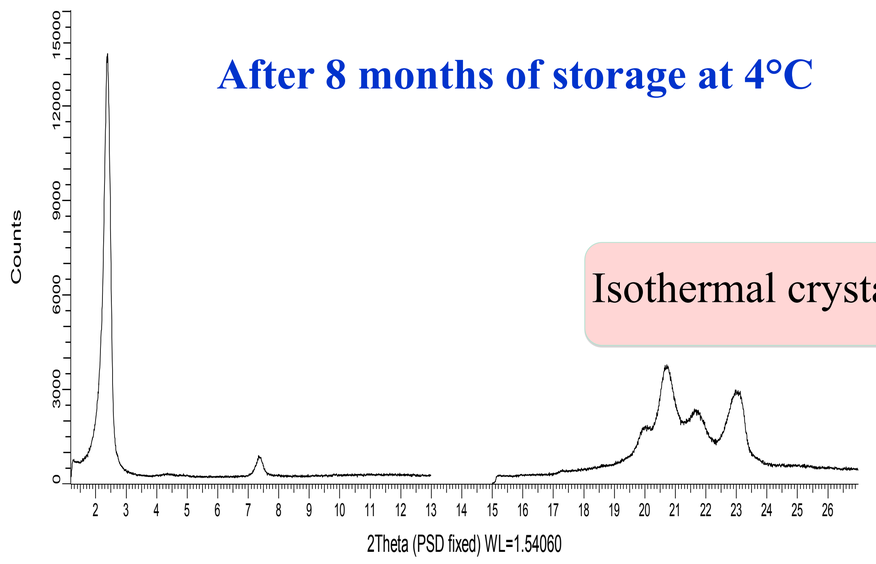
(a) at 10°C



(b) at 20°C



After 8 months of storage at 4°C



Isothermal crystallization confirming the stability of IGO in β'_1 form.

Conclusions

The melting profiles of IGO (obtained by SFC and DSC) can be compared to that of cocoa butter, but the melting point of IGO is higher, even after tempering. The polymorphic behaviour of IGO shows a β'_1-form stable during its heating and a transition to liquid state without any transformation into β. The most stable form of IGO is β'_1-form, not β, even after tempering and storage, contrarily to cocoa butter. All those results suggest its potentiality to be used in cosmetic and pharmaceutical, rather than food industries.

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