



Physicochemical properties and thermal behavior of *Irvingia gabonensis* seeds oil.

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Introduction

Irvingia gabonensis (Africa Mango) is recognized for its numerous food and medicinal uses in Africa. This plant produces a seed rich in fat that is traditionally used as a soup thickener. In the present study *I. gabonensis* seed (IGO) oil has been solvent extracted. Some physicochemical and thermal properties of the oil were then characterised.

Object

The aim of this work is to improve knowledge on *Irvingia gabonensis* seed oil (IGO) before its possible utilisation at an industrial scale.

Material and Methods

Mature *I. gabonensis* fruits were collected from the botanic garden of Kisantu (D.R. Congo) during the fruiting period .

Cold extraction oil method: as described by Folch.

Fatty acid profile : determined by GC

TAG profile : determined by HPLC-ELSD

pNMR: IUPAC 2.150 using 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) ; method as for DSC, measurements carried out during the heating (from -30°C to the melting point of the sample).

Results & Discussion

1. Oil extraction



Fruit



Seeds



Solvent extraction

Oil

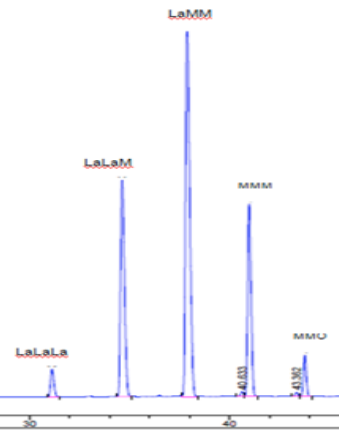
2. Oil content

	Present study	Zoué et al. (2013)	Malto et al. (2009)
Extraction technique	Oil content (g/100g)		
Soxhem	72.38 ± 1.34	69.76	62.67
Folch	72.95 ± 1.34		57.44

3. Fatty acid composition

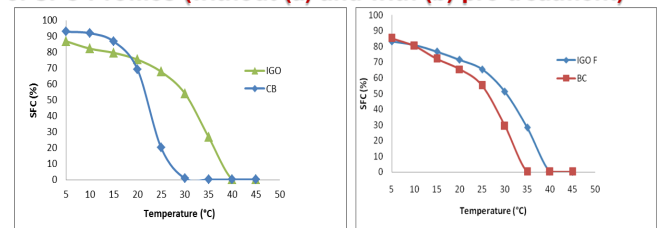
	Present study	Malto et al. (2009)	Zoué et al. (2013)	Ifeduba et al. (2013)
	Folch	Press	Soxhlet	Folch
C8:0			0.05	
C10:0	1.20 ± 0.03	1.34	0.25	1.7 - 2.1
C12:0	37.11 ± 0.33	39.37	39.35	39.8 - 46.8
C14:0	49.83 ± 0.17	50.92	20.54	41.4 - 48.9
C16:0	5.51 ± 0.02	4.97	10.39	4.8 - 5.3
C18:0	0.89 ± 0.03	0.73	11.46	0.9 - 1.0
C20:0			4.52	
SFA	94.54	97.33	86.56	96.1
C18:1 n-9	4.31 ± 0.17	1.97	6.99	2.9 - 3.0
C18:2 n-6	1.09 ± 0.05	0.48	0.01	0.5 - 0.9
C18:3 n-3			6.44	
UFA	5.4	2.45	13.44	3.9
C12:0+C14:0	86.94	90.29	59.89	88.2

4. TAG Profile



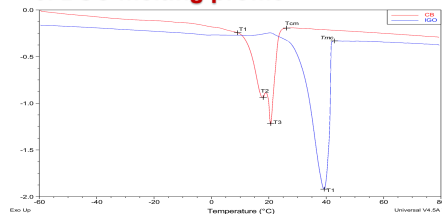
Very high proportion of SFA
High lauric acid content :
"lauric fat"
Predominant TAG: LaMM > LaLaM > MMM > MMO > LaLaLa.

5. SFC Profiles (without (a) and with (b) pre-treatment)



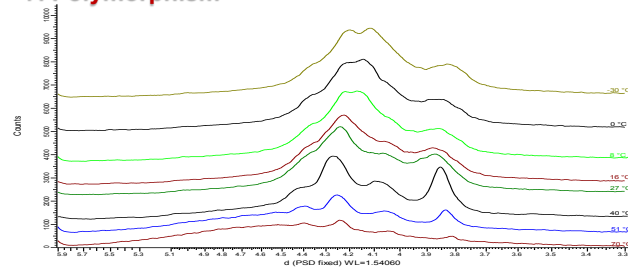
SFC of IGO remained high at the elevated temperature. Tempering did not affect its SFC profile contrarily to Cocoa butter (CB).

6. DSC melting profile



Complete melting of IGO around 43°C.

7. Polymorphism



First crystallized under α form then transformation into $\beta'_2 \rightarrow \beta'_1$ form. $\beta'_1 \rightarrow$ liquid state without going through the β form.

Conclusion

IG seeds could be viewed as lipid source. The amount of lauric acid ranks IGO among "lauric fats" and suggests its potentiality to be used in cosmetic industry. SFC and DSC melting profiles displayed by IGO can be compared to that of CB. The polymorphic behaviour of IGO shows a β'_1 form stable during its heating and a transition to liquid state without passage at β form. This investigation contributes to improve knowledge about properties of IGO and is useful for in agricultural, cosmetic or pharmaceutical industry.

Contacts

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