Evaluation of some quality parameters of crude shea butter produced in Burkina Faso

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INTRODUCTION

Gross composition and physicochemical properties of shea butter widely vary depending on geographical origin, cultivars and extraction process. In this context, this study aims at characterizing the gross composition of crude shea butter samples collected in Burkina Faso, with a particular interest for the unsaponifiable. Indeed, beside glycerides, the unsaponifiable from shea butter is of great interest for the cosmetic industry.

Burkina Faso shea sector

Conventional butter (Others shea kernels) | **Organic butter** (Kernels from protected areas)

Extraction modes
(Artisanal or traditional; semi-industrial; industrial)

Regional variability

Non-standardization of production
(Variability of physicochemical composition)

Fig 1*: Burkina Faso shea butter variability*

OBJECTIVES

- Contribute to the improvement of physico-chemical properties related to the extraction method of shea butter produced in Burkina Faso, by multivariate analysis ;
- Establish a comparative analysis; by IR and FT-Raman spectroscopy using chemometric tools; physico-chemical parameters of shea butter in relation to extraction processes and geographical production areas in Burkina Faso;
- Investigate the UV-A and UV-B absorbent properties of unsaponifiable products as a parameter of cosmetic and pharmaceutical interest.

1. MATERIAL AND METHODS

1.1. Material

The material consists of raw shea butter collected in Burkina Faso

Fig 2*: Shea fruits*

Fig 3: *Crude shea butter*

1.2. Methods

Prospective study:

Consists of the random sampling of 5 types of raw butter, collected in Ouagadougou (Burkina Faso).

Experimental study:

- Index chemistry: Acidity, Iodine (IV) and Peroxide values (PV), and unsaponifiable matter were determined by titration;
- Physical methods: Color was assessed using an colorflex colorimeter; and the thermal properties of crude shea butter, wre determined by differential scanning calorimetry;
- Fatty acids analysis by GC/FID in capillary column optimized method.

2. RESULTS

2.1. Gross composition

- The free fatty acids content ranged from 2,27 to 4,17%; the IV from 60,6 to 63,5 and the peroxide values from 6,23 to 9,31 meqO_2/kg.
- The unsaponifiable matter was found between 7,24 and 13,50 %.
- As expected, the main esterified fatty acids (EFA mean values) were: C18:1 (cis-9) (42.07%); C18:0 (40.38%) and (C18:2) n6 (5.61%).
- The main non esterified fatty acids (NEFA mean values) were: C18:1 (cis-9) (38.33%); C18:0 (30%) and (C18:2) n6 (6.22%).

2. RESULTS

2.2. Thermal properties

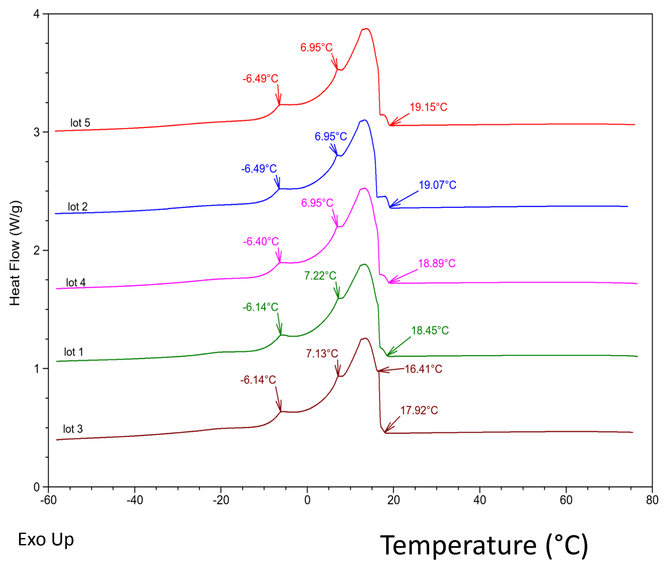

Fig 4*: DSC crystallization curves*

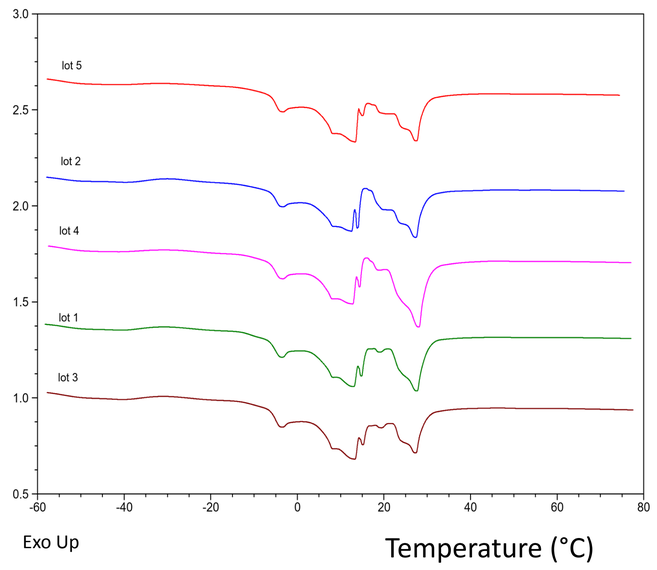

Fig 5: *DSC melting curves*

2.3. Color

Samples		Crude shea butter			Liquid shea butter		
CIE System L* a* b*		L*	a*	b*	L*	a*	b*
Assay number		3	3	3	3	3	3
Cell		Cuve HunterLab 04.7209-00; h= 25mm-45mm					
Min-Max values	Mean	73,74 - 77,89	-2,32; -0,03	24,85-27,42	52,15-60,20	-4,27; 0,77	50,65-62,44
	dE*	80,54			80,50		

3. CONCLUSION AND PERSPECTIVES

- All the five butter were within the admitted limits of the *Codex Alimentarius 2017*.

In this preliminary study, a great homogeneity was found among the 5 butter samples. The crystallization and melting curves of the samples are slightly different.

- The next step of this study will be on one hand, an investigation of some absorbent properties of unsaponifiables using HPLC, UV, IR and FT-Raman spectroscopy and on the other hand investigation of a large range of shea butter samples in order to determine relationships existing between extraction processes and quality parameter of shea butter, with a particular interest to the unsaponifiable matter.

4. REFERENCES

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