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EVALUATION OF HYGIENIC CONDITION AND METHODOLOGIES USED TO OBTAIN THE DIFFERENTS KINDS OF SHEA BUTTER FOUND IN KORHOGO MARKETS

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ABSTRACT

Shea butter is a product made in Africa by using different methods depending on the region. The aim of this work was to assess the different methods used to make shea butter in Korhogo in order to make the best recommendations which could improve its quality. For this purpose, a survey was conducted on the manner of making shea butter inside the Korhogo region. Our investigations led us to believe that making shea butter is exclusively women work. The methods used to prepare shea butter are traditional with the utilization of some mechanical tools. Two kinds of shea butter are obtained: «the whitish» obtained without adding during the preparation a decoction of the roots of *Cochlospermum* sp or «the yellowish» obtained when this decoction is added during a period of the preparation. In any case, the shea butter obtained has several beneficial properties. But, these properties can be raised by the bad hygienic conditions and by the use of high temperature process during the preparation. Also, it is a necessity to sensitize women about the danger of dirtiness and to make quality control during the different stages of making shea butter.

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INTRODUCTION

Shea butter is obtained from shea nut. Shea nuts are obtained from shea tree (*Vitellaria paradoxa* C.F.Gaertn), a tree which grows spontaneously in Sudanese regions (ARBONIER, 2002). In Côte d'Ivoire, this tree is found in the North of the country. Shea butter is highly prized because of its various uses such as in the alimentary domain as lipidic sources, in the cosmetic domain as ointment and cream, and in the pharmaceutical domain when it is applied in the treatment of sprain (LOUPPE, 1994). Korhogo, the biggest town located in the North of Côte d'Ivoire, is one of the main towns where shea butter is highly made. In fact, since I am working in the University located in Korhogo, everytime I go to Abidjan, the capital city of Côte d'Ivoire, my friends ask me to bring them some shea butter. Either, the trade of shea butter between Korhogo and Abidjan has become a lucrative activity. It falls to me, because I am a nutritionist, to think about the quality of the butter. Various manufacturing processes are used in Korhogo.

These various methods could have an impact on the production of shea butter and on the quality of the butter obtained. The aim of this work was to apprehend the different methods used to make shea butter in Korhogo and to show the assets and the inadequacies of these methods. Then, we will be able to make recommendations in order to improve shea butter quality.

MATERIALS AND METHODS

Questioning: Using questions, we make an inquiry which permitted us to explain the different methods utilized for producing shea butters found in Korhogo and also to give the assets and the inadequacies of the different processes. Then, materials used to collect information are a pen, a pencil, a notebook, a camera in order to take photos, a desktop computer in order to write the final results.

Preliminary study: A preliminary inquiry was made, in December month in the year 2017, on Korhogo markets such as the biggest market, the small market of « Ahoussabougou », the small market of « Cocody » and the small market of « Sinistré ». « Ahoussabougou », « Cocody » and « Sinistré »

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are neighbourhood of Korhogo town. The objective of this preliminary inquiry was to identify the different shea butters found at Korhogo markets and to know where these shea butters have been produced.

RESULTS OF THE PRELIMINARY STUDY

Two sites were identified. One was located in the quarter call Tchekelezo and the other one in the quarter call Natiokobadara. The preliminary inquiry permitted to know that the shea production is exclusively women work. So, women working on the two sites were asked about the different methods used to make their shea butter.

Shea butter preparation: According to the exploring done at the three markets, two kinds of shea butter are sold on Korhogo markets. They are the whitish shea and the yellowish shea. When shea-maker women were questioned, they show us the different processes used to make shea butter. Whatever the site of making the shea, Tchekelezo or Natiokobadara, methodology used is the same. It is the traditional method, with the use of modern tool in order to relieve women work, which is used to make shea butter. In fact, when the fruits become ripe, shea nuts fall down are gathered up and are sorted out by women.



A



B

Figure 1. Different kinds of shea butter prepared in Korhogo
A: whitish shea butter; B: yellowish shea butter

After that, the pulp of the fruits selected are removed from the nuts. Nuts are then prepared and amands are extracted and crushed using a crusher. Amands are afterwards toasted and pounded in a grinder. The powder obtained are dried on the sun. The sundried powder obtained are mixed with water. It can be introduced or not in the mixture, roots of a tree call «Djoumbélgué» in Senoufo the region language. The mixtures

are then prepared during a long time (5 to 7 hours) in cooking pots until the oil float on the surface and then it is collected and put in bowl. During the cooking process of the butter, impurities which appeared on surface are continuously removed. When this oil gets cold, it becomes the shea butter, the final product which is whitish or yellowish. Figure 1 is shown the two kinds of shea butter prepared in Korhogo.

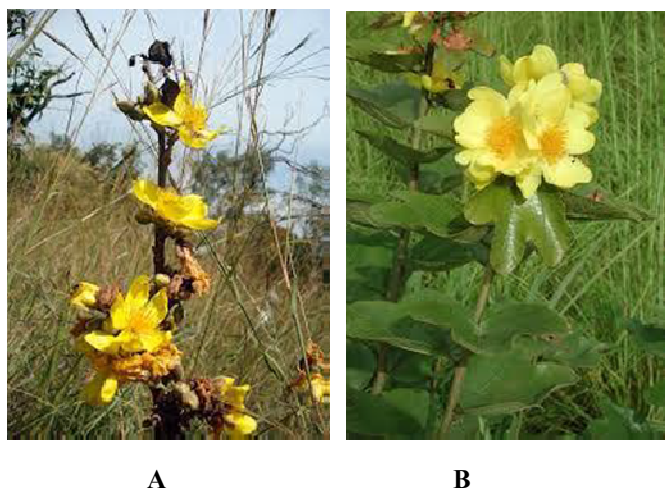
Identification of the plant which is used to obtain a yellowish shea butter: The identification of the plant used to obtain the yellowish shea butter has shown that it was the plant call in French « faux cottonnier » which can be translated into English by « false cotton plant » because fruits are comparable to ovoid capsule of cotton plant (MEAMP – APPEAR PROJECT, 2014). The scientific name of this plant could be *Cochlospermum planchonii* Hook.f. ex Planch, or *Cochlospermum tinctorium* Perrier ex A.Rich. When we shown in the literature, we have certified that the two species of *Cochlospermum* are originated from tropical Africa and are growing spontaneously in savannah from Senegal till Tchad (MEAMP – APPEAR PROJECT, 2014). While *Cochlospermum tinctorium* has come into flower during the raining season, *Cochlospermum planchonii* has come into flower during the dry season. The two species would be used indiscriminately according to their availability period.

Constituents found in *Cochlospermum* species roots: The literature indicated that *Cochlospermum tinctorium* roots are contained several chemical constituents. In fact, Researchers found in these roots tannins, flavonoids, saponins, anthraquinones, cardiac glycosids, carotenoids, triterpenes, benzenetriacyl, long-chain of ketone and carbohydrates (DIALLO *et al.*, 1988 ; 1992; COULIBALY, 1994 ; AKPEMI, 2012). Again, according to Researchers, *Cochlospermum planchonii* roots contain Carbohydrates, glycosides, anthraquinones, saponins, steroidal triterpenes, flavonoids, tannins, cardenolides, dienolides (NAFIU *et al.*, 2011; ISAH *et al.*, 2013). The decoctions obtained from tuberous roots of *Cochlospermum planchonii* and/or *Cochlospermum tinctorium* are commonly and differently used by traditional healers to treat malaria and fevers (BENOIT-VICAL *et al.*, 2003). The rhizomes are used in the treatment of jaundice, malaria, diabetes, diarrhoea, stomach disorders, typhoid fever and urinary tract infections (YAKUBU *et al.*, 2010; NAFIU *et al.*, 2011 and ISAH *et al.*, 2013). The roots of the two plants indifferently mixed with fresh stem bark of *Erythrina senegalensis*, as a concoction are used for the treatment of stomach disorder, typhoid fever and urinary tract infection (TOGOLA *et al.*, 2008). The figures 2 is shown the plant of *C. tinctorium* and *C. planchonii*.

Observation concerning the working environment of shea maker women: One of the first factors which can be noticed in the judgment of shea butter quality is the environment in which women are working. This environment is unsalubrious and then the hygienic conditions are not fulfilled. Also, management tools are often unclean and personal hygiene is not always good.

DISCUSSION

Traditional method is the only method used to make Shea Butter in Korhogo. This method reveals some assets and some insufficiencies.



**Figure 2. The two kinds of *Cochlospermum* found in Côte d'Ivoire Savannah A :*Cochlospermum tinctorium*;
B :*Cochlospermum planchonii***

This traditional method may increase the production of Shea Butter than dry-extraction method and than moist-extraction method both used by women in the West and the North of Cameroun (MOLLARD, 2011; WOMENI *et al.*, 2011). The difference in butter productivity between the method used in Korhogo and the method used in the West and the North of Cameroun is certainly due to the equipments which do not have the same performance. In fact, in Korhogo region, to crush the nuts, it is used a crusher and to ground the seeds, it is used a grinder. However, in the West and the North of Cameroun, women are used stones for crushing the nuts and mortar for grounding the seeds. It is evident that in both methods, there are losses, but the production may be high decreased in the process used in Cameroun than those used in Côte d'Ivoire. When comparison is made between the method used in Korhogo region and the extraction made with mechanical press, we noticed that, a natural and all butter is obtained with the mechanical press. But, with the method used in Korhogo, a shea butter with lipid much oxidized is obtained seeing that the extraction is made at high temperature (up to 100°C). In fact, it is known that high temperature provokes lipid oxidation and then if this shea butter obtained with such method is used in alimentary domain, it can enhance cardiovascular disease and the risk of cancer because it is very oxidized (OLEASEA, 2012). In compensation, the method used in Korhogo allows the extraction of all butter in the seeds: this is not possible with a mechanical press (BERNATCHEZ, 2007; PODELA, 2011). Extraction of shea butter can be done with organic solvent such as hexane, ether of petroleum. Then, 100 % of shea butter is extracted from the seeds. Yet, this method is as well as costly and calls for knowledge in chemistry, it could not give shea butter good for using in alimentary domain.

We have noticed that, the hygienic conditions are not fulfilled. In fact, because the method used in Korhogo is traditional, women hygiene must be supervised. The environment of making the shea butter must be unsalubrious. Materials used in the preparation must be healthy in order to avoid the growth of microbes. That is why women must be sensitized about the danger of dirtiness. A quality control must be done which must concern the different stages of making the shea butter. Shea butters obtained, « whitish » or « yellowish », are both enjoyed by consumer. Both are used for alimentation, for hair care, for body care, for massage and for sprain. According to results of the enquiry, achieving a yellowish shea butter is not an accident

event, or the addition of a chemical colouring chosen at random: it is a matter of a decoction of the roots taken in African pharmacopoeia. Therefore, the molecules found in these roots could add an additional nutraceutical value to shea butter. Then, the yellowish shea butter could have some additional properties than the whitish shea butter. In fact, according to the literature, the decoction of roots obtained from the two species of *Cochlospermum*, *Cochlospermum tinctorium* or *Cochlospermum planchonii*, contain molecules such as Carbohydrates, glycosides, anthraquinones, saponins, triterpenes, flavonoids, tannins, glycosides, carotenoids and carbohydrates. These different molecules, isolated in roots decoction, are responsible for anti-tumour, anti-viral (DIALLO *et al.*, 1988), anti-bacteria, anti-fungic activities (NKIANI *et al.*, 1990), hepatoprotective effects, analgesic and anti-inflammatory activities (AHMAD *et al.*, 2011). Roots decoction of *cochlospermum* species is also endowed with a potential for pharmacological control of pain, inflammation and diabetes mellitus (ARUH *et al.*, 2009).

Conclusion

Methodology used to prepare shea butter in Korhogo is traditional. Two kinds of shea butter, « whitish » or « yellowish », can be obtained depending to the add or not, during a stage of the preparation, a decoction of *Cochlospermum* roots. When this decoction is added, a yellowish shea butter is obtained but when it is not added, a whitish shea butter is obtained. A yellowish shea butter is contained more healing properties than the whitish shea butter due to the decoction of *Cochlospermum* roots. The traditional method used in Korhogo region is better than the other one used in Cameroun because it makes the output of shea butter raised. However, this method used in Korhogo region, even if it enhances shea butter production, the quality of shea butter obtained is worse than the other one obtained when a mechanical press is used. The limit factor of shea butter made in Korhogo region is the fact of the hygienic condition which is not fulfilled and the use in this method of high temperature which provokes lipid oxidation. Women must be sensitized about the danger of dirtiness. A quality control must be done which must concern the different stages of making the shea butter.

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