EXTRACTION, CHARACTERIZATION AND COSMETIC EMULSION USE OF MANGO BUTTER FROM MEXICAN VARIETIES.

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Introduction

Mango processing generates products like peel, fats and seeds, which are around 40 to 50 % of total weight. The solid lipid components in seeds can be used as a potential cosmetic ingredient, due to their emollient and antioxidant properties. This main aim of this project was the extraction and physical characterization of mangos butter by two different methods to optimize the best conditions from different varieties of mango seeds (Keitt, Manila, and Tommy) and their use as a cosmetic ingredient in emulsion formulations. Physicochemical properties were tested (color, smell, appearance, pH, density, stability, type of emulsion, and viscosity). A sensorial panel of 50 untrained volunteers was used to analyze the two cream formulations.

Materials & Methods

1.- Pressed mango seed butter was extracted from mango seeds using a cold-press extractor at a different feed flow rate of samples, rotation speed of the nozzle, and inlet temperature of oil flowing from extractor (outlet temperature was not exceeding 50°C)

2.- The mango seed samples (approximately 4 g) were placed in a paper thimble. The thimble was then placed into a Soxhlet glass sample tube, and the sample tube was transferred to an extraction chamber in the Soxhlet apparatus. A mixture of Ethanol/Acetone (1:1) was used as extraction solvent and was transferred into a solvent cup and placed on heating plates. After the extraction process, the solvent was removed in the rotary film evaporator. The obtained crude oil extract was collected and weighed

3.- For the physicochemical characterization of mango butter. Specifications were tested according USP 43–NF specifications as: Free fatty acids, Saponification, Peroxide, and Iodine value and melting range.

4.- Once the mangos butter were analized Keitt variety was selected to be formulated for a cream to study their properties once its applied into the skin (Figure1).

5.- For the determination of the sensorial properties two formulations of an emollient-moisturizinng cream were evaluated for a panel sensorial analysis. 30 people whose half of them were males and the other half women were trained for the sensorial properties. Statistical analysis was performed by Microsoft Excel 2019.

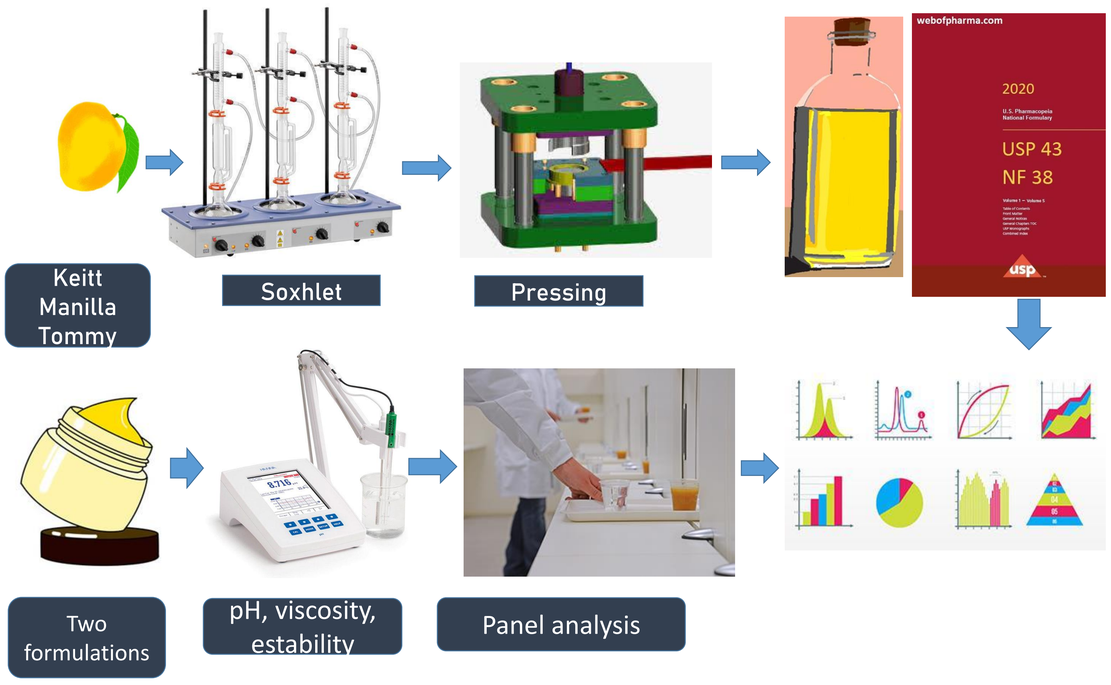

Figure 1. Methodology of the process for the mangos butter yield and their sensoryal evaluations

Aknowledgments

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Results & Discussion

A screening experiment of Keitt mango butter was carried out to study the yield by pressing method at two different pressures (2 and 4 tons) respectively (Table 1).

Table 1 Extraction yields of mango butter by different pressure (ton).

Pressure	2 tons	4 tons
Yield (%)	2.875	4.267
	2.829	5.397
	2.502	4.561
Average (%)	2.735%	4.741

According to the results it was demonstrated that the best condition to obtain the mango butter were at 4 tons for both mango varieties. Once the pressing method was evaluated it was compared with another conventional technique for oils (Soxhlet) to determine the best yield (Figure 2).

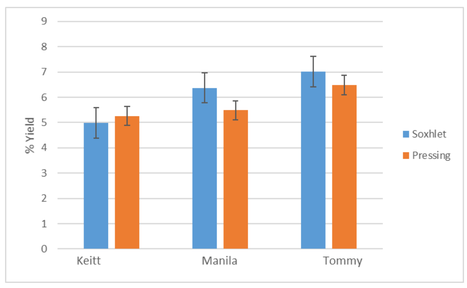

Figure 2. Mango butter yield my pressing and Soxhlet methods.

The best method to extract mango butter was Soxhlet extraction due the yield around 4.63-7.35% comparing with pressing which yields were lower, an ANOVA analysis demonstrated that there is not statistical difference in the yield between both techniques. For industrial applications, its prefered to use the pressing method due to its economical, solvents free and a very fast technique. Physical analysis was determinate based in the color and the smelling properties between both techniques in both mango varieties (Figure 3).

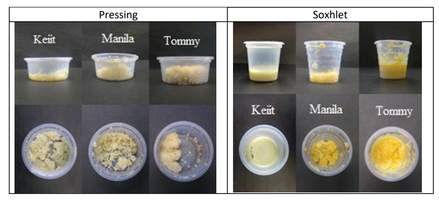

Figure 3. Physical properties of Mango butter by different techniques.

For the physicochemical properties of mango butter analysis were determinate according to USP 43–NF specifications. (Figure 4).

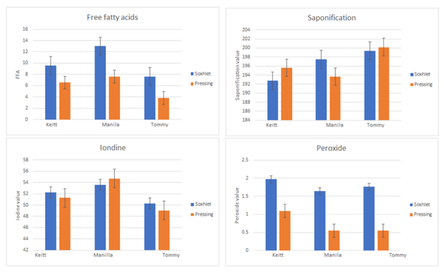

Figure 4 Mango butter values according USP 43-NF.

The O/W creams prepared were stable with a pseudoplastic behavior, a neutral pH (7.5) and a specific gravity of 0.975. Both creams show similar properties. Panel analysis show significant difference in both formulations. (Figure 5).

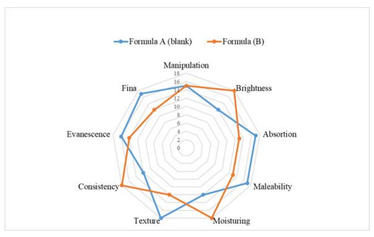

Figure 5. Radar chart array analysis of panel studies of a moisturing cream

Conclusions

The best method for extracting mango seed varieties is pressing since it does not use solvents and the time of extraction is lower. Otherwise, the extracted butter had good quality parameters (acidity index, saponification index, iodine index, and peroxide index) being Tommy whose got lower values.

The best values were for Manila whose was suitable for being formulated into a cream which moisturing capacity is higher than conventional creams, so its demonstrated the potential use of this butter in cosmetics.

Sensory analysis indicated that the formulation containing mango butter has better brightness odor, emollience, consistency, feeling, being more functional for people with dry skin.