International Journal of Chemical Sciences

Research Article | Vol 20 Iss 3

Extraction of Sapodilla Oil from Sapodilla Seed for Hair Oil

Nagul Dev S*, Divya Vellaichamy, Jabathersini Palanisamy and Saranya V

Department of Chemical Engineering, Sethu Institute of Technology, Virudhunagar, Tamil Nadu, India

***Corresponding author:** Nagul Dev S, Department of Chemical Engineering, Sethu Institute of Technology, Virudhunagar, Tamil Nadu, India, Tel: 9842023028; E-mail: naguldev@sethu.ac.in

Received: April 28, 2022, Manuscript No. tsijcs-22-62107; **Editor assigned:** May 02, 2022, PreQC No.tsijcs-22-62107;
Reviewed: May 16, 2022, QC No. tsijcs-22-62107; **Revised:** June 27, 2022, Manuscript No. tsijcs-22-62107;
Published: July 04, 2022, DOI: 10.37532/ 0972-768X.22.20(3).432

Abstract

Sapodilla is a fruit which is indigenous to the Indian subcontinent, belonging to the genus Manilkara, are a family of flowering plants belonging to the order Eric ales. The family includes about 800 species of evergreen trees and shrubs in around 65 genera. This project aims at the process development of sapodilla seed oil production. Solvent methanol was used to extract Sapodilla seed oil from the Sapodilla seed using Soxhlet apparatus. The operating temperature was between 60-64.7^{0}C. This process requires low production cost.

Keywords:* *Sapodilla seed oil; Sapodilla seed; Soxhlet apparatus; Extraction; Required solvent

Introduction

The extensive family sapodilla is divided into five tribes with 53 genera and about 1250 species distributed worldwide, mainly in the tropical and subtropical region of Asia and Mesoamerica [1]. The Pouteria genus comprises 325 species. Many of them produce quality wood and edible fruit of high economic value; in addition, several of these species have been used in traditional medicine for various purposes [2-4]. Sapodilla family is a diverse and ecologically important family of 700 species and 35 or 40 poorly defined genera. These shrubs and trees are widely distributed pantropically [5]. This family is easily recognized by the combination of milky latex and alternate (spiral) leathery leaves with parallel secondary and tertiary veins (Table 1). The genus Manilkara includes 30 new World and 32 old World species, several of which are economically important as sources of latex, fruit and timber. Sapodilla is also sometimes known as Sapote, are about the most confusing of all the fruits [6]. The name is derived from the Aztec "tzapotl", which means soft, and gives rise to a seemingly inexhaustible realm of terms for sapote fruits, as well as for those not even remotely related. Some fruits are seedless [7], but normally there may be from 3 to 12 seeds (frequently 5) which are easily removed as they are loosely held in a whorl of slots in the centre of the fruit. They are brown or black, with one white margin; hard, glossy; long-oval, flat, with usually a distinct curved hook on one margin. The seeds contain sapotin, saponin, achras saponin, an alkaloid, fixed-oil (16-23%) and the bitter principle sapotinine (0.08%) [8]. They also contain hydrocyanic acid and should be removed before eating the fruit (Figure 1 and Table 2) [9]. It is an insect pollinated species. Sapodilla is a cultivated because the fruits are so tasty [10-12]. It is grown on a commercial scale in India, Thailand, Philippines, Malaysia, Mexico, Venezuela, Vietnam, Guatemala, and some other Central American countries. In fact, India is one of the largest producers of sapodilla [13].

Materials and Methods

TABLE 1. **Properties of methanol.**

Properties	Methanol

Citation: Dev SN. Extraction of Sapodilla oil from Sapodilla Seed for Hair oil. Int J Chem Sci. 20(3):432

Boiling Point	64.7^0C
Melting Point	-97.6^0C
Vapour pressure	13.02 kpa
Molecular point	32.04 g/mol
Nature	Highly flammable

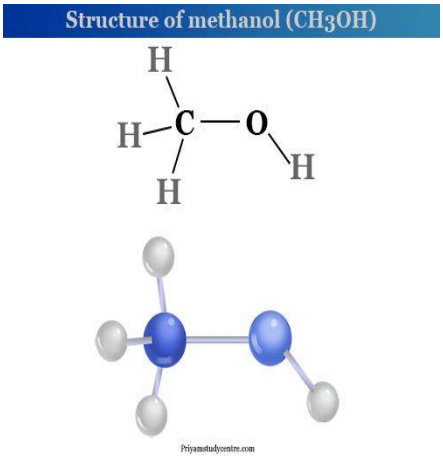


FIG. 1. **Chemical formula of methanol and structure of methanol.**

TABLE 2. **Physicochemical properties of sapodilla seed oil**.

Properties	**Methanol**
p^H	5.7
Viscosity(Centipoises)	26.92
Density(gm/ml)	0.858
Refractive index	1.527
Hydroxy value(mg/ml)	153
Acid Value	4.001
TLC	One dark spot and one light spot
Colour	Light yellow

Fruit materials

The fresh fruit *Manilkara zapota* were collected, the fruit collected was washed and seed taken out .The seeds taken out was washed and has dried using sunlight for 5 to 6 days. And then seeds were crushed [14].

Extraction process

The Extraction of *Manilkara zapota* oil was carried out using a Soxhlet apparatus and methanol as solvent. Two hundred (200 ml) of methanol was charged into round bottom flask of Soxhlet apparatus [15-17].The crushed seeds were weighed as 15 g, 20 g, 25 g, 30 g, 35 g. Later, 15 g of crushed zapota seeds was charged into the thimble and fitted into the Soxhlet extractor. The apparatus was assembled .The solvent in the set-up was heated and the vapour produced was subsequently condensed by water flowing in and out of the condenser (Figure 2). This process of heating and cooling continued until a sufficient quality of zapota seed oil was obtained (Figure 3). At the end of extraction [18], the thimble was removed while the remaining solvent is recharged

into the round bottom flask (Table 3) [19]. Finally, the set-up was then re-assembled and heated to recover the solvent from the oil (Figure 4). Then 20 g of crushed seed is carried out using above process and so on.

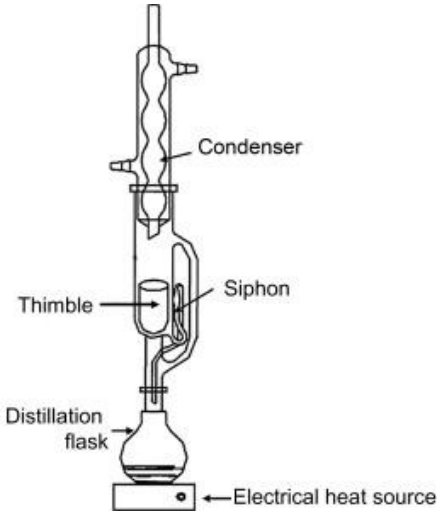


FIG. 2. **Image of soxhlet apparatus.**

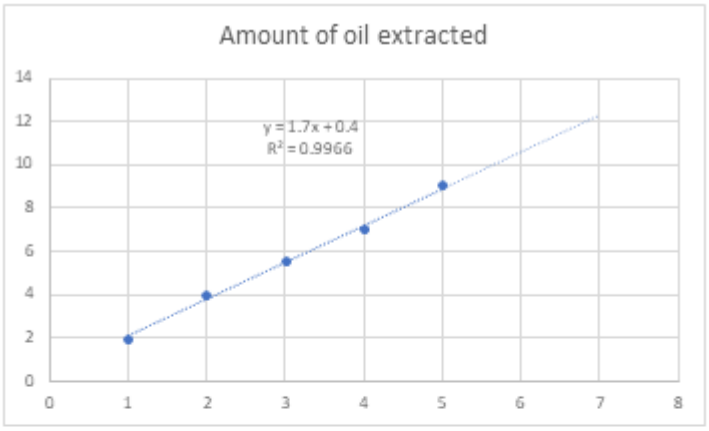
Results and Discussion

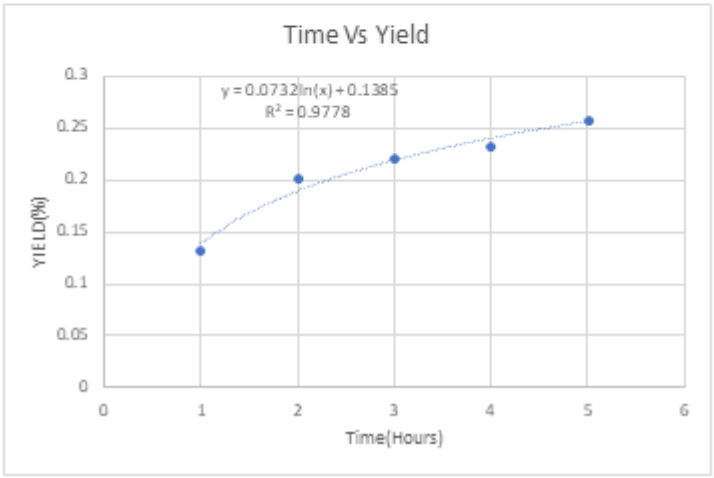
FIG. 3. **Sapodilla seed oil.**

TABLE 3. **Yield of oil from methanol extraction.**

No of hours	Amount of oil extracted	Yield (%)
1	2	0.133
2	4	0.2
3	5	0.5
4	7	0.233
5	9	0.257

Yield%= Weight of oil extracted/weight of powder used*100





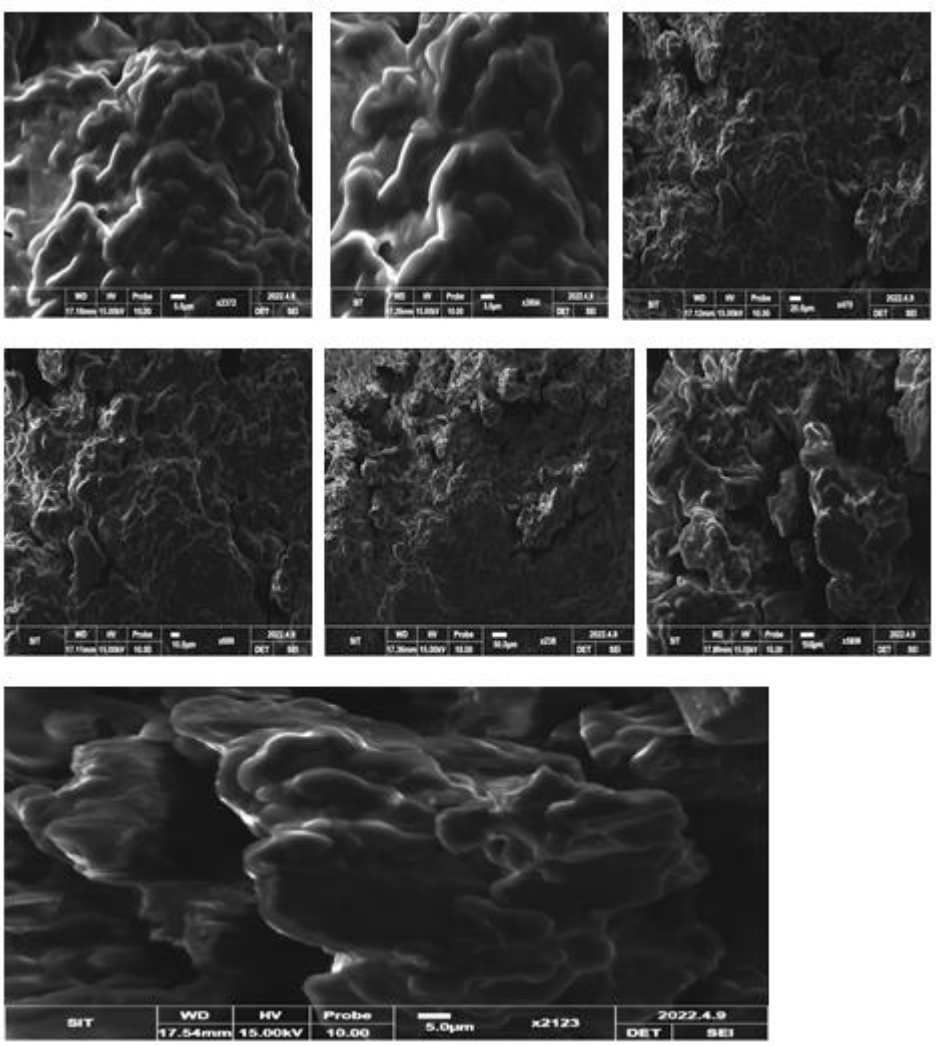


FIG. 4. **The sem analysis for sapodilla seed powder.**

Conclusion

The extraction of sapodilla oil was obtained from sapodilla seeds with the help of Soxhlet apparatus. The sapodilla seed oil has been help in moisturising scalp and softening hair. The sapodilla seed oil also helps in treating hair fall due to seborrheic dermatitis.

References

1. Dutta R, Sarkar U, Mukherjee A, et al. Soxhlet Extraction of Crotalaria Juncea Oil Using Cylindrical and Annular Packed Beds. Int J Chem Eng. 2015;6(2).
2. Karunanithi B, Bogeshwaran K, Manasa T, et al. "Extraction of Mango Seed Oil from Mango Kernel". Int J Eng Res Dev. 2015;32-41.
3. Naguldev S, Esther RR, Janani C, et al. Synthesis and characteristics of oil from orange rind. Int Res J Mod Eng Technol. 2021;3(12).

4. Naguldev S , Saranya V, Estherroselin R, et al. ”Production and Characterization of Activated Carbon to Eliminate the heavy metal from wastewater streams using peels of watermelon”. Int J Sci Eng Res. 2022;4:2582-5208.
5. Teh CL, MHI Baird. “Solvent Extraction”. Phys Sci Technol. 2004;341-362.
6. MA Jeannot. “Extraction - Liquid-Phase Microextraction”. J Sep Sci. 2007;1-5.
7. EW Hammond. “Vegetable oils - Types and Properties”. Encyclopedia Food Sci Nutr. 2003;5899-5904.
8. SN Vaghani. “Fruits of tropical climates - Fruits of the Sapotaceae”. Encyclopedia of Food Sci Nutr. 2003;2790-2800.
9. J Grassmann, EF Elstner. “Essential oils - Properties and Uses”. Food Sci Nutr. 2003;2177-2184.
10. Senthil Kumar P, Arun Kumar N, Sivakumar R, et al. “Experimentation on solvent extraction of Polyphenols from natural waste”. J Mater Sci. 2009;44:5894–5896.
11. MD Luque de Castro, F Priego-Capote. “Soxhlet extraction: Past and present panacea”. J Chromatogr. 2010;1217:2383-2389.
12. de Raynie. “Modern extraction techniques”. J Sep Sci. 2007;118-128.
13. Naguldev S, Saranya V, Divya V, et al. “Extraction of oil from Borasaus Flabellifer (Ice apple) seed and compared with coconut oil and palm oil”. 2022;6:1-5.
14. Naguldev S, Divya V, Jabathersini P, et al. “Production of Bioethanol from Papaya Peel”. J Biotechnol Bioproces. 2021;7:2395-1052.
15. Bicking MKL. “Extraction - Analytical Extractions”. J Sep Sci. 2007;371-1382.
16. de Castro MDL, García-Ayuso LE. Soxhlet extraction of solid materials: an outdated technique with a promising innovative future. Analytica Chimica Acta. 1998;369:1-10.
17. Abdalla AEM, Darwish SM, Ayad EHE, et al. “Egyptian mango by-product 2: Antioxidant and antimicrobial activities of extract and oil from mango seed kernel”. Food Chem. 2007;103:1141-1152.
18. Yehia G. Moharram A, Moustafa M, et al. ”Utilisation of mango seed kernel (Mangifera indica) as a source of oil”. Food Chem. 1982;8:269-276.
19. Luque de Castro MD, García Ayuso LE. “Environmental Applications – Soxhlet Extraction”. J Sep Sci. 2007;2701-2709.