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Evaluation of phytochemical content of Coconut Shell Oil

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Abstract
Cocos nucifera, (L.) Arecaceae is a commercially important tree called as coconut tree. It has long been used in Ayurvedhic system of medicine. Coconut water, coconut milk and oil extracted from coconut are commonly used in various traditional healing practices. But the less common used is the coconut shell oil that is extracted from the woody endocarp of the drupe or commonly called as coconut shell. The coconut shell oil is subjected to preliminary phytochemical screening with ethanol, chloroform, acetone, petroleum ether and aqueous extracts. This investigation shows the presence of alkaloids, carbohydrates, phenols, tannins, flavanoids, aminoacids, quinones, terpenoids, proteins, oxalate and carboxylic acid. The review reveals that various phytochemical constituents have been isolated from the Coconut shell oil which is used in treatment of wounds and skin diseases.

Keywords: coconut shell oil, phytochemical contents, pharmacological activities

1. Introduction
Cocos nucifera is a member of the family Arecaceae (palm family) Subfamily Cocoideae and the monospecific genus Cocos. The plant is originally from Southeast Asia (Malaysia, Indonesia and the Philippines) and the islands between Pacific and Indian Ocean [1]. The term coconut can refer to the whole coconut palm or the seed, or the fruit, which botanically, is a drupe. Every part is being used by mankind, hence the plant is known as "Kalpa vriksha" in India, which means the tree that provides all the necessities of life [2]. Variety of products of coconut include tender coconut water, copra, coconut oil, raw kernel, coconut cake, coconut toddy, coconut shell and wood based products, leaves, coir pith etc., are used in the daily life of the people in the traditional coconut areas [3].
Cocos nucifera is used for its several beneficial health effects due to the presence of active constituents like tocopherol, palmitoleyl alcohol, cycloartanol sitosterol and more bioactive components. The phytochemicals are responsible for the activities of antimicrobial [4], antimalarial [5], antiparasitic [6], antivirus [7], antipyretic [8], antileishmania [9], anti-inflammatory [10], antineoplastic [11], anticonvulsant [12], antihypertensive and cardio-protective [13].

2. Materials and methods
The coconut shells were collected from the local market in Thiruvallur, Tamilnadu. The coconut shells were sundried, broken into small pieces and ground into course powder. Ground coconut shells (250g) were heated in the earthern pot for a span of 3 hours giving a yield of 25 cc of oil. The oil was extracted with [1:3 v/v] ethanol, chloroform, acetone, petroleum ether and aqueous separately [14] and were subjected to qualitative tests for the identification of various biochemical constituents.

3. Qualitative analysis of phytochemicals
The presence of phytochemicals was done by standard methods of Harbourne [15]. The alkaloids were determined by Wagner's test, carbohydrates by Benedict's test, Saponin by foam test, phenol by ferric chloride test, flavonoids by lead acetate test, diterpenes by copper acetate test, terpenoids by ferric Salkowski's test, aminoacids by Ninhydrin test, protein by biuret test, tannin by ferric chloride test and oxalate by Glacial acetic acid. Further detection of steroids, coumarin and quinones by conc.H_2SO_4. xanthoproteins by conc.HNO_3 test, cardiac glycosides by kellerkillani synthesis, anthocyanin by HCl and NH_3, Leucoanthocyanin by isoamyl alcohol, carboxylic acid by effervescence and Glycosides by modified Borntrager's test.

4. Results and discussion
The phytochemical analysis of coconut shell oil (Table - 1) extract using ethanol, chloroform, acetone, petroleum ether and aqueous solvents contained alkaloids, carbohydrates, phenols, flavanoids, aminoacids, Tannins, terpenoids, proteins, oxalate, carboxylic acid and quinones. Petroleum ether and aqueous extracts showed less number of the secondary metabolites, compared to all other solvent extracts. Ethanolic extract of oil had higher number of secondary metabolites. These secondary metabolites are reported to have many biological and therapeutic properties.

5. Conclusion
The present study shows that, the crude ethanolic extract of *Cocos nucifera* shell oil contains phytochemicals which confer medicinal properties to the plant. The oil could be used as an alternate source of energy. In Ayurvedhic system of medicine it is used to treat ringworm infections, eczema, plantar warts and chronic skin diseases [16]. The powdered coconut shell charcoal used as medicine to certain ailments in the soft tissues like breast cyst, stomach problems and some cases of dog bites and wounds [17]. The information obtained from phytochemical screening will be useful in finding out the reality of drugs.

Table 1: Phytochemical content of Coconut shell oil

S. No	Name of the Compounds	Name of the solvents				
		Ethanol	chloroform	Acetone	Petroleum ether	Aqueous
1.	Alkaloids	+	+	+	+	+
2.	Carbohydrates	+	+	-	-	+
3.	Saponins	+	+	+	+	+
4.	Phenols	+	+	+	+	+
5.	Flavanoids	+	+	+	+	-
6.	Aminoacids	+	+	+	+	-
7.	Diterpenes	-	-	-	-	-
8.	Tannins	+	+	+	+	+
9.	Terpenoids	+	+	+	+	+
10.	Proteins	+	+	+	-	+
11.	Steroids	-	-	-	-	-
12.	Oxalate	+	+	+	-	+
13.	Cardiac glycosides	-	-	-	-	-
14.	Anthocyanin	-	-	-	-	-
15.	Leucoanthocyanin	-	-	-	-	-
16.	Carboxylic acid	+	+	+	+	+
17.	Xanthoproteins	-	-	-	-	-
18.	Coumarin	-	-	-	-	-
19.	Quinones	+	-	+	+	+
20.	Glycosides	+	+	+	+	+

'+' indicates present and '–' indicates absent

6. References

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