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Research Article

Pharmacognostic Evaluation of *Manilkara hexandra* (Roxb.) Dubard Seeds

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ABSTRACT

Manilkara hexandra (Roxb.) Dubard belongs to family Sapotaceae. It is commonly called as Rayan /Khirni. The local people and aboriginals use the oil extracted from the seeds for cooking purpose. The seed has several therapeutic uses too. They are used in spermicidal activity, besides it is recommended for leprosy, ophthalmic, ulcers and in the opacity of the cornea. The oil from the seed is considered to be demulcent and emollient, used in piles. Although seeds and oil are in use; deliberate attempt to study them has lacked. Pharmacognosy can be the first step in deciding the status of a plant organ as a crude medicine. Hence comprehensive Pharmacognostic study of *Manilkara hexandra* seed was done. In the present investigation various aspects of pharmacognosy like macroscopy, microscopy, histochemical analysis, powder study, preliminary phytochemical screening, fluorescence analysis, and physicochemical constants were laid down.

Keywords: Pharmacognosy, Khirni, Rayan, Manilkara *hexandra*, seed.

INTRODUCTION

Herbal preparations have always been the principle form of medicine in India and presently becoming popular throughout the developed world. Hence it is necessary to identify and characterize the crude drugs well before the use. This can be easily and reliably done by the pharmacognostic study. Pharmacognosy is the developing science that deals with complete and systematic knowledge of a crude drug of herbal, animal or mineral origin.

Manilkara hexandra (Roxb.) Dubard a tall tree commonly known as Rayan /Khirni. It is an evergreen tree of Western Ghat (Maharashtra) India. It belongs to family Sapotaceae[1,2,3]. The fruit is edible and also known for its medicinal values. The seeds are used as emollient, demulcent, piles, ulcers, and spermicidal activity by the aboriginals [4, 5, 6, 7, 8]. However, the said plant part is studied for the first time. The present study is intended to bring the salient; morphological characters of these seeds so as to lay down the standards which are of utmost important to authentify a crude drug.

MATERIAL AND METHODS

The seed samples were collected from wild with prior permission from various places within Mumbai. The sample was authenticated for its botanical identity from Blatter Herbaria (Mumbai). A voucher specimen has been deposited in Botany Research Laboratory of K.V. Pendharkar College, Thane, Maharashtra, India (KVP/BOT/0073). The fresh mature seeds were used for macroscopic, microscopic and histochemical studies. Remaining seeds were dried and ground to powder.

Macroscopic study was performed for various parameters[9,10]. For microscopic inspection hand cut transverse sections of seeds were taken and made permanent with suitable stains[11,12]. The histochemical analysis for the cell contents were performed using various reagents[13]. In powder study, the drug was treated with aqueous solution of chloral hydrate and mounted in 50% glycerin for microscopic studies[14]. The fluorescence response of powdered drugs exposed to U.V. radiations was studied using the standard procedure[15,16]. For physicochemical analysis, determination of ash values and extractive values were done[17,18]. In qualitative phytochemical screening, a known quantity of dried powder was extracted with chloroform, alcohol and water. These extracts were tested for different constituents[19,20].

RESULTS

Macroscopic study of seed

The fruit is a berry usually one seeded, rarely with two seeds. The seeds are albuminous and exarillate. It is oblique to ovoid in shape, slightly compressed, reddish brown and shining, 1mm-2.5mm x 2mm-2.5mm. Hilum laterally placed and elongated. The testa is hard, reddish brown, shining, 1mm-1.5mm in thickness. The seed tegmen is light brown with impression of perisperm. Perisperm is thin layered, light brown with striations more appraised to the tegmen when matured. Endosperm is thick and fleshy with impression of perisperm, 1.1mm-1.5mm in thickness.

Cotyledons are thin, papery, 15mm x7mm with prominent reticulate venation, accumbent. Radicle and

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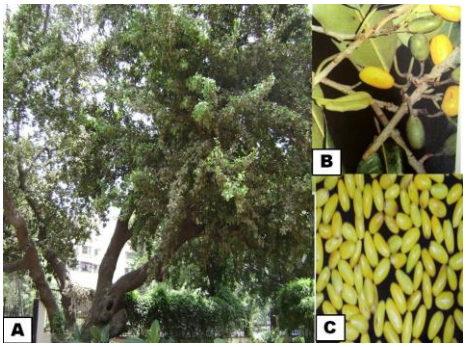
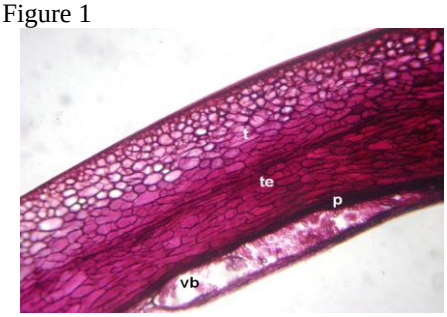


Figure 1

Figure 2

Figure 3



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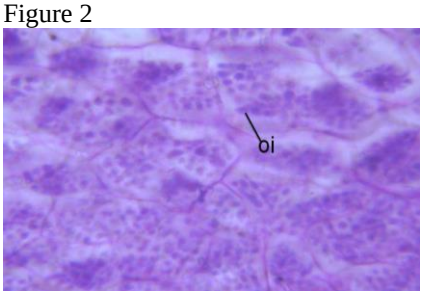

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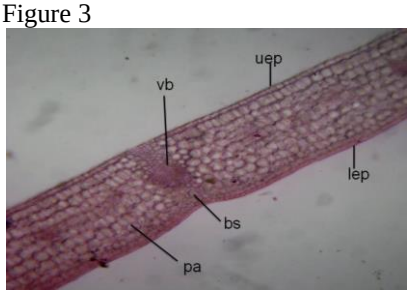

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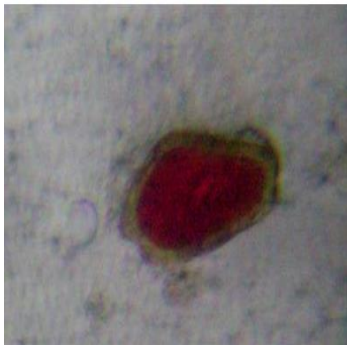

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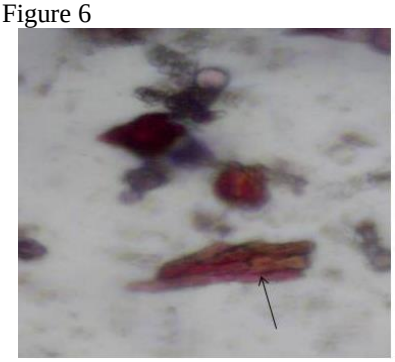

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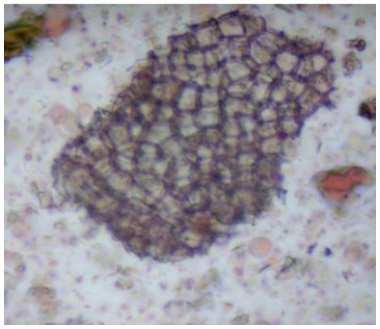
Figure 10



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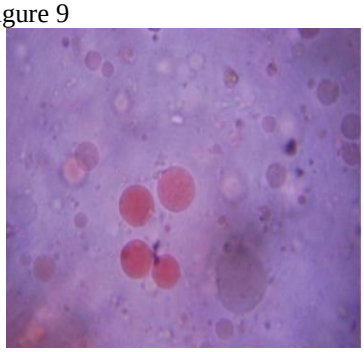

Figure 12

Figure 1: A-tree, B- branches with fruit, C- fruit, Figure 2 & 3: Entire seeds, Figure 4: T.S. of seed showing t-testa, te-tegmen, p-perisperm, vb-vascular bundle.x450, Figure 5: T.S. of seed passing through endosperm, oi- oil globules x450, Figure 6: T.S. of seed passing through cotyledon, uep-upper epidermis, pa-parenchymatous cell, vb-vascular bundle, bs-bundle sheath cells, lep-lower epidermis x450, Figure 7 – 12: Powder study of seeds;, Figure 7: cells of testa x450, Figure 8: cells of tegmen x 675, Figure 9: cells of nucellus x675, Figure 10: parenchymatous cells of endosperm with oil globules x675, Figure 11: parenchymatous cells of cotyledon with starch grains x 675, Figure 12oil globules x225

plumule short. The seed has slight characteristic odour and is bitter to taste. (Figs: 1, 2, 3)

Microscopic study of seeds

T.S of *Manilkara hexandra* seed shows the following parts:

The seed coat has two layers, an outer testa and inner tegmen

Testa: is the outer part of the seed coat, with lignified sclerids which are more or less isodimateric, light brown, the lumen is filled with latex content. The

Table 1: Histochemical Analysis of *Manilkara hexandra* seeds.

Sr. No.	Plant constituent Tests	Observations
1	Test for starch	Present
2	Test for Lipids	Present
3	Test for Proteins	Present
4	Test for Tannins	Present
5	Test for Alkaloids	Absent
6	Test for Saponins	Present
7	Test for Glucosides	Present
8	Test for Mucilage	Present
9	Test for Calcium oxalate crystals	Absent

Table 2: Physicochemical evaluation of *Manilkara hexandra* seeds.

Ash values	Total ash	Not more than 0.65%
	Acid insoluble ash	Not more than 0.5%
	Water soluble ash	Not more than 5.95%
Extractive values	Ethanol	Not less than 23.04%
	Water	Not less than 17.76 %
	Chloroform	Not less than 12.3%

Table 3: Fluorescence analysis *Manilkara hexandra* seeds.

Test	i	ii	iii	iv	v	vi	vii	viii	ix
Fluorescence	3yG	9y	2G	2yG	3G	1G	2G	3G	1G

Keys to the letters and numbers used-

Predominant colours:	Modifying colours:	Quality of colours:
G- Green	y- Yellowish	1 Very light
		2 Light
		3 Dark

Table 4: Preliminary Phytochemical Screening *Manilkara hexandra* seeds.

Test for phytoconstituents	W	C	E
Test for Starch	+	+	+
Test for Terpenoids	+	+	+
Test for Proteins	+	+	+
Test for Amino acid	+	+	+
Test for Mucilage	+	+	+
Test for Alkaloids	_	_	_
Test for Anthraquinone glycoside	+	+	+
Test for Cardiac glycoside	+	+	+
Test for Saponin	+	+	+
Test for Tannins	+	+	+
Test for Steroids	_	_	_
Test for Flavonoids	_	_	_

Key: W- water extract, C- Chloroform extract, E- Ethanol extract, + Present, _ Absent

sclerids are smaller in diameter towards the periphery, larger towards the centre.

Tegmen: dark brown, sclerenchymatous with vascular bundle. Nucellus is in the form of collapsed cells, leading to the formation of perisperm.

Perisperm: thin layered

Endosperm: large zone of thin walled parenchymatous, with oil globules, few simple and compound starch grains.

Cotyledons: with outer and inner epidermis, compactly arranged parenchymatous cells. The thickness is more in the centre 20-22 cell thick, which gradually decreases on the lateral sides, 10-12 cell. The ends are rounded and broader with larger cells. The poorly developed vascular bundles larger at the centre and smaller ones laterally. Oil globules present. (Figs: 4, 5, 6)

Histochemical analysis: The seed section were stained with various reagents The results obtained are given in table 1.

Powder study of seeds

The seed powder is light brown in colour, coarse and oily in texture. It has a characteristic odour and bitter taste. Microscopically the powder shows presence of sclerenchymatous cells of testa filled with brown content, 33.3-44.2µm in diameter; parenchymsatous oval cells of tegmen with brown content, 6-8µm in diameter; simple type of starch grains 3.3 -6.9µm in diameter; abundant oil globules 39.9-78.54µm in diameter, elongated cells of nucellus 0.66 -3.33µm in length and 49.95 – 53.28µm in breadth; patches of endospermic cells 16.66 – 35.6µm in diameter and parenchymatous contyledonary cells 16.66 – 26.66µm in diameter. (Figs.7 – 12)

Physicochemical evaluation: The parameters like ash values and extractive values for the seed are summarized in table 2.

Fluorescence analysis: The seed powder was treated with various reagents and the results obtained are mentioned in table 3.

Preliminary phytochemical analysis: The qualitative phytochemical analysis of *Manilkara hexandra* seed

reveals the presence of various primary and secondary biomolecules. Table 4

DISCUSSION

The seed of *Manilkara hexandra* (Roxb.) Dubard are of therapeutic value. The above pharmacognostical parameters given for the seeds are of importance in correct identification of the material. The qualitative phytochemical investigation revealed the presence of various phytoconstituents in the seeds. Further detailed phytochemical and pharmacological studies can lead *Manilkara hexandra* seed into the herbal market.

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