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Research Article

PHARMACOGNOSTICAL STUDIES ON THE BARK OF *ODINA WODIER,* ROXB., (ANACARDIACEAE)

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ABSTRACT

In the present study, an attempt was made to investigate pharmacognostiacal studies on the bark of *Odina wodier,* roxb.(Anacardiaceae). The Macroscopical, microscopical and chemomicroscopical studies have been carried out on the bark. Characteristic pharmacognostic features of the plant observed were presence of abundant stone cells which are in groups and in alternate patches of 8 to 10 in cortex region, abundant reddish tannin content in the parenchymatous region, prism shaped crystals in the cortex region, obliterated parenchymatous cells in the middle region of the bark, rough surface of the outer bark and fibrous bark in the innermost region of the bark. This could be used as indices for identification of the plant. Quantitative evaluations were also carried out. The moisture content, alcohol soluble extractive value, water soluble extractive value, total ash value and acid insoluble ash. These can serve in qualifying and differentiating the plant.

Keywords: *Odina wodier,* microscopy, tannin content and prenchymatous cells.

INTRODUCTION

The plant *Odina Wodier,*Roxb., (Syn. *Lannea grandis*, Englr.) is a moderate-sized or large deciduous tree, with thick soft branchlets belonging to the family Anacardiaceae. This tree occurs in hotter parts of India[1].

Decoction of bark is used as astringent, in cases of atonic dyspepsia and general debility. It is also used as a gargle in aphthous conditions of the mouth and also for tooth ache and as a lotion for skin eruptions. Fresh juice of the bark is used to sore of eyes and obstinate ulcer. Powdered bark mixed with neem oil is an application for chronic ulcers and skin diseases and also used as a paste for leprous ulcers. Gum of the tree made into an ointment with coconut milk or into liniment with brandy is a good application to sprains and bruises. Internally, gum is given in asthma and as a cordial to women during lactation. Leaves boiled in oil are also applied to sprains and bruises, to local swellings and pains of the body. For rheumatism a paste of the leaves mixed with black pepper is a useful application[2].

As there is no scientific data on *Odina Wodier* barks, here in the present study plant was taken for macroscopical, microscopical, chemomicroscopical studies and quantitative evaluations were also carried out. In microscopical studies, anatomical sections, powder drug analysis and maceration of bark were carried out. In quantitative evaluations, moisture content, alcohol soluble extractive value, water soluble extractive value, total ash value and acid insoluble ash values were carried out for crude dried powdered drug.

MATERIALS AND METHODS

Collection of plant material: The stem bark *Odina Wodier* used for the present studies was collected by incision and peeling from the mature plants in Dharmapuri district of TamilNadu. The plant was identified and authenticated Botanist Dr. TR Shanta from NADRI, Bangalore (Specimen no: 1043). Just

after collection the bark was washed thoroughly with running tap water, cut into small pieces and shade dried. The dried material was then pulverized separately into coarse powder by a mechanical grinder. The resulting powder was preserved in the department for further study.

Macroscopical Examination: The macroscopical features observations of the bark were carried out as per Wallis[3].

Microscopical Examinations: The powder, transverse section and macerate of the bark were used for this study. Both qualitative and quantitative studies were carried out. Chemo-microscopical examinations were also carried out to detect the presence or absence of various chemical constituents such as tannins, lignin, starch, fats and oils, mucilage, cellulose, cutin, protein and calcium oxalate crystals following Trease and Evans[4].

Quantitative Evaluations: The moisture content was determined following *Indian Pharmacopoeia*[5]. The ash value, acid insoluble ash and extractive values (water and alcohol) were determined using methods described by Kokate, Brain and Turner[6,7].

RESULT AND DISCUSSION

The fig.1 shows Macroscopical characters of *Odina Wodier*. Stem bark is grey or whitish, smooth, exfoliating in irregular rounded plates. Outer surface shows prominent irregular striations. Bark pieces measures 8 to 10 cm in length and 5 to 8 cm in width. Inner most region of the bark is fibrous, easily pedable and fracture is fibrous. Outer surface is rough to touch. Taste slightly sweetish and smell agreeable. In transfer section of the bark Fig.2 shows the, outermost tissue present in the stem bark as a thickness of about 1mm. the cork consist of 5 to10 rows of almost rectangular cell having reddish brown walls with reddish to orange cell contents. Inner to this, there are 2 rows of narrow rectangular clean or colorless cells representing the phellogen (cork cambium). The phelloderm cells which are slightly smaller than the cortical cells are thin walled little compactly arranged, reddish brown celled with reddish/orange content, smaller strew grains which are simple and some of cells are filled with prism shaped crystals. The cortical cells are thin walled, reddish brown with bright orange red content. Almost all cells are filled with orange red contents.in the cortex region, number of large stone cell groups are scattered and these form an almost continuous band at the inner region of the middle bark. The inner bark which forms the major portion of the bark consists of several rows of phloem fibers, phloem cells, and reddish orange content cells prominently. These phloem fibers, phloem cells are inter separated by uniseriate medullary rays, filled with reddish cell contents.

In the most recently formed phloem which forms the inner most part of the bark. The cells are slightly smaller than those in middle bark and thin walled. Small sized crystals which are prism shaped occur in few cells of phloem. No mechanical elements are found in this region but cut ends are found.

Medullary rays are long, they are uni to biseriate, extend from the innermost part of the bark up to the cortex region. All the rays are thin walled, radially elongated and contain reddish orange tannin content. The ray cells in the phloem region are smaller in size, where the cells gradually enlarge towards the distal end of the rays and their reddish content also increases. The cells of phloem parenchyma in between the rows of phloem fibers through not uniform in size, are small thin walled and almost polygonal with very small intercellular spaces. Most of them filled with reddish orange tannin content. In between the cortex and phloem fibers, that is in the middle bark region, cells of phloem are obliterated and most of the cells shows abundant reddish tannin contents.

Powder analysis of bark shows in fig.3. Powder was dark brown in color, rough to touch with more of fibers, taste slightly sweetish, and smell agreeable. When it was treated with chloral hydrate and water observed under the microscope following fragmented elements were observed. Different fragments of tissues showing , fragments of parenchymatous cells with abundant parenchymatous cells with reddish orange tannin content, Fragments of tissues like phloem fibers, parenchymatous cells with prism shaped crystals, elongated fibers. Groups of different types of stone cells which are polygonal elongated with narrow and broad lumen, with and without pits inside the lumen.

Macerate of bark contain fig.4, abundant different kinds of stone cells with different shapes. Stone cells are polygonal with broad and narrow lumen and pits inside the lumen. Some of the stone cells are elongated with narrow lumen without pits inside the lumen. Phloem fibers are elongated, they are in groups or in singles. Some of the parenchymatous are

thin walled filled with prism shaped crystals. Cork cells are in groups in surface view and some of the cork cells are narrow. Chemomicroscopical tests carried out revealed the presence of starch, tannin content and crystals shown in table.1. Quantitative evaluation results were reported in table.2.The moisture content of the drug (7.20%) is not high thus it would discourage bacterial, fungal or yeast growth, as the general requirement for moisture content in crude drug should not exceed 14%. Equally important in the evaluation of crude drugs is the total ash value. The total ash is particularly important in the evaluation of purity of crude drugs, i.e. the presence or absence of foreign inorganic matter such as metallic salts and/or silica [8]. The ethanol and water extractive value was found to be 20.3% and 32.2% respectively. Since the water extractive value was greater than that of alcohol, it means that water is a suitable extractive solvent than alcohol in the extraction of the bark powder of *odina wodier*. The alcohol and water soluble extractives were indicators of the total solvent soluble component[9].

Table 1: Showing results for Chemomicroscopical tests of the Odina *Wodier.*

Sl no	Section	Reagent	Change of colour	Test for	Present/Absent
1	Section	Iodine solution	Blue	Starch	Present
2	Section	10% Ferric chloride solution	Black	Tannin	Present
3	Section	Sudan III Solution	No change in colour	Oil globules.	Absent.
4	Section	Chloral hydrate solution // Dil Hcl solution	Effervescence reaction	Crystals	Present.

Table 2: Showing results for Quantitative evaluation of the bark of Odina Wodier

Evaluation parameters(%w/w)	Stem bark (%w/w)
Moisture content	7.20
Ash-value	9.04
Acid insoluble ash-value	3.6
Alcohol soluble extractive values	20.3
Water soluble extractive values	32.2

Outer Bark/External surface **Inner bark /internal surface**

Fig.1: Macroscopical characters of Odina Wodier. Stem bark

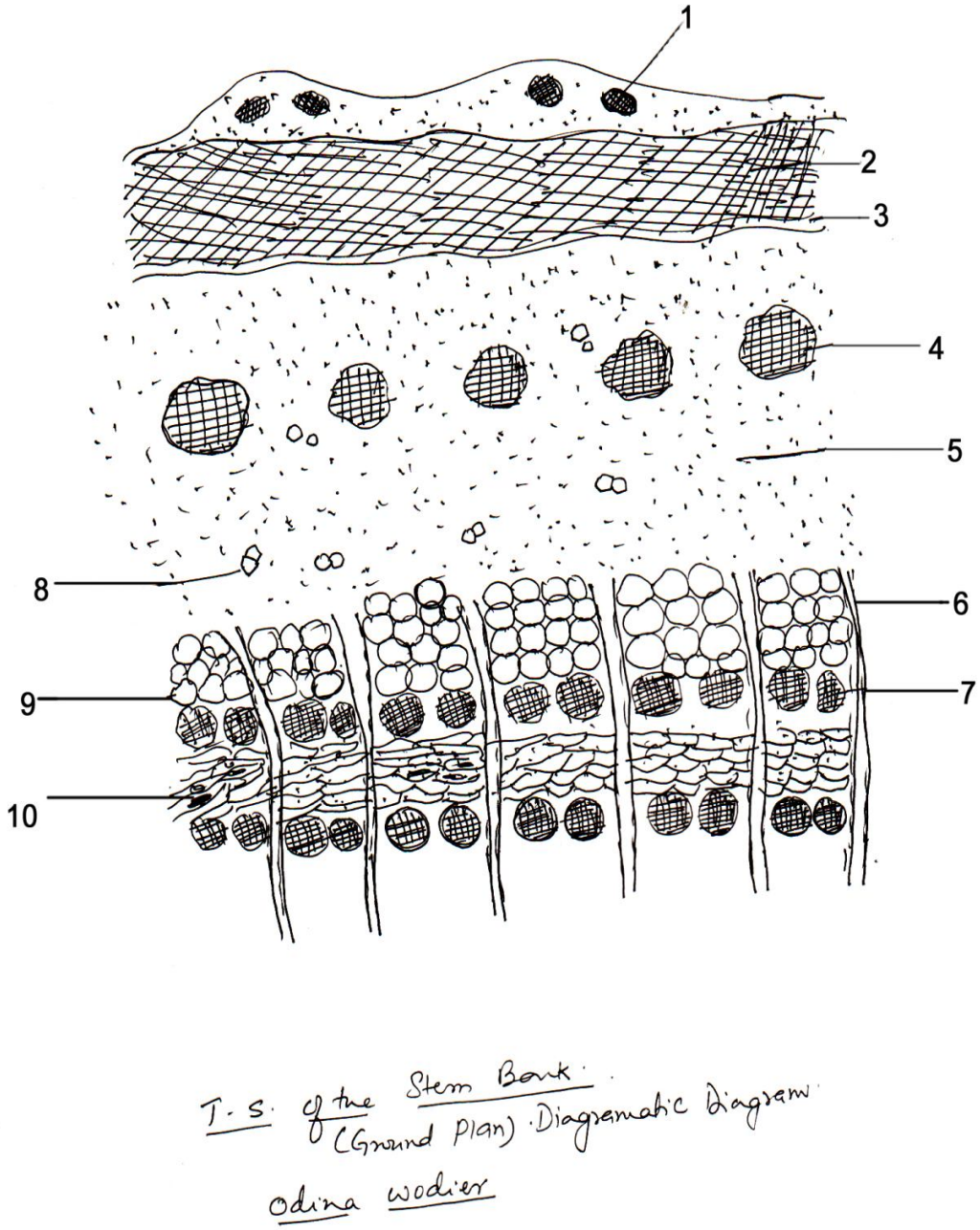
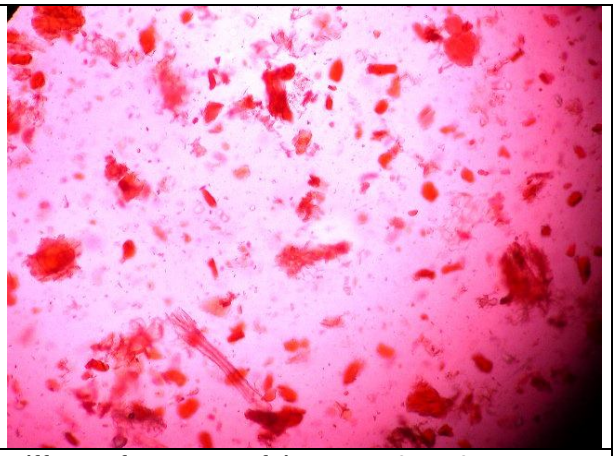
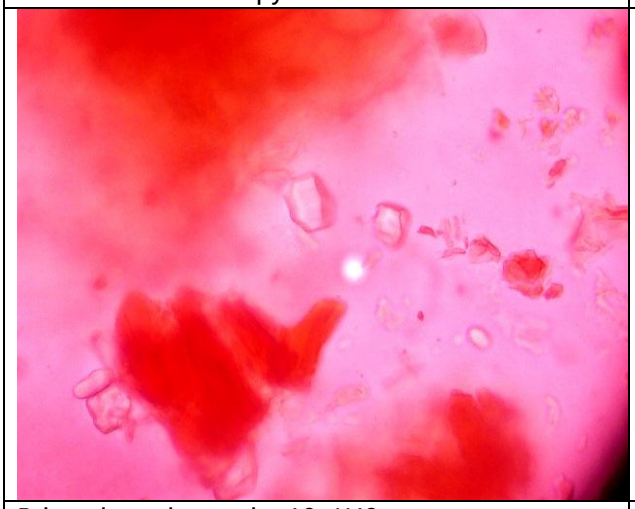
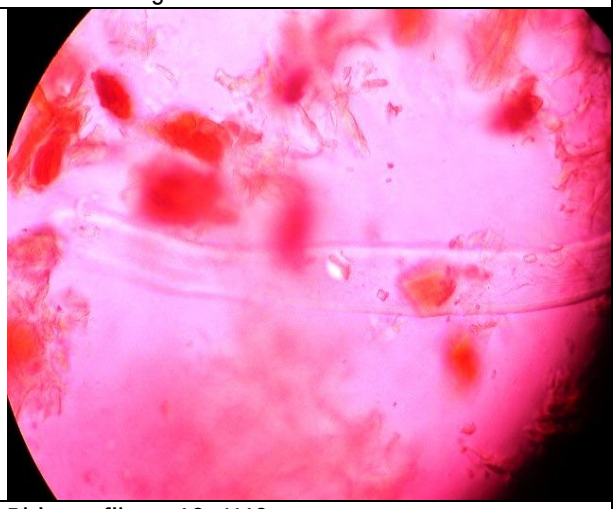
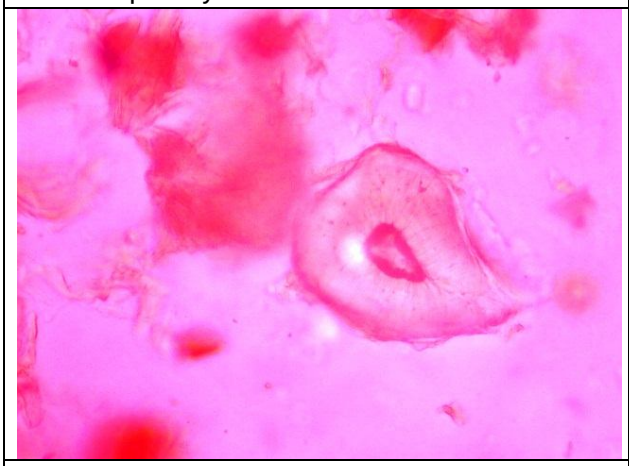
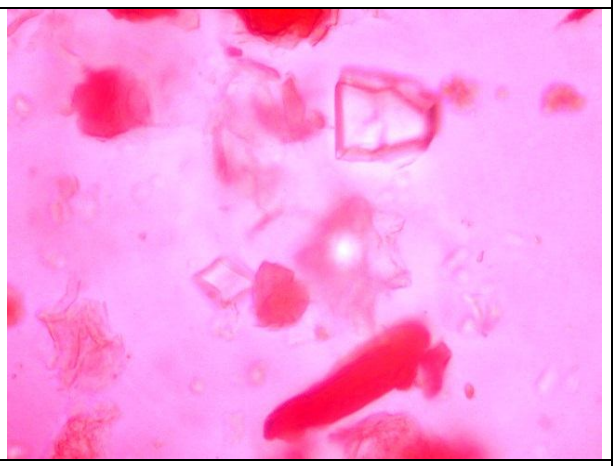
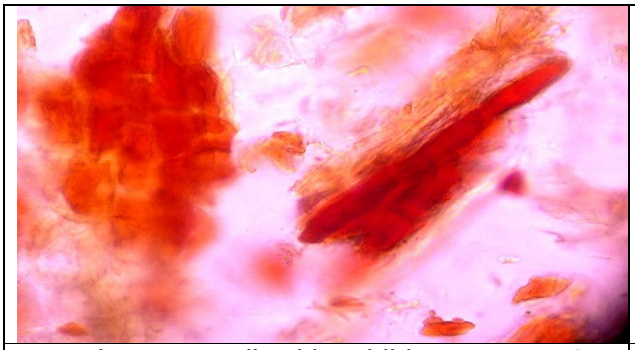
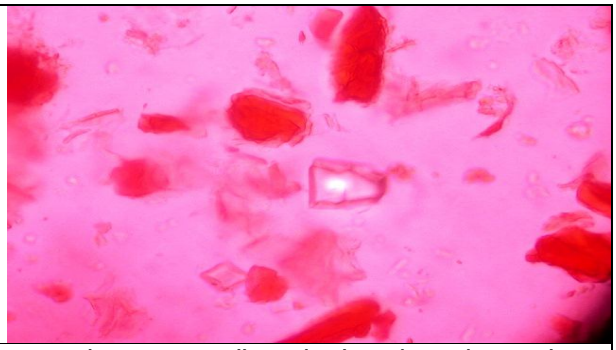
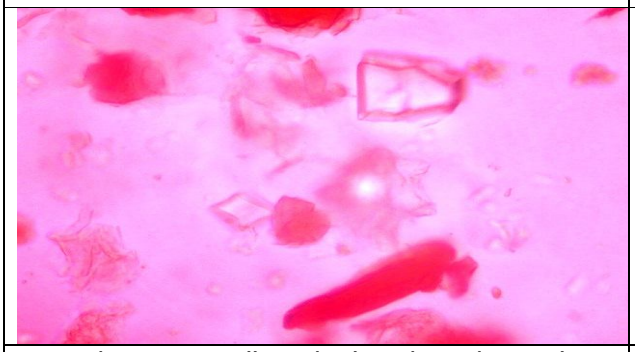
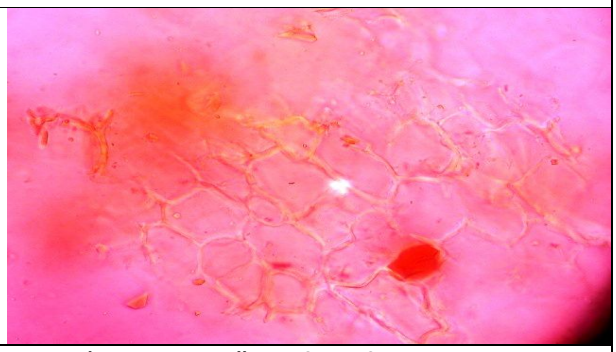
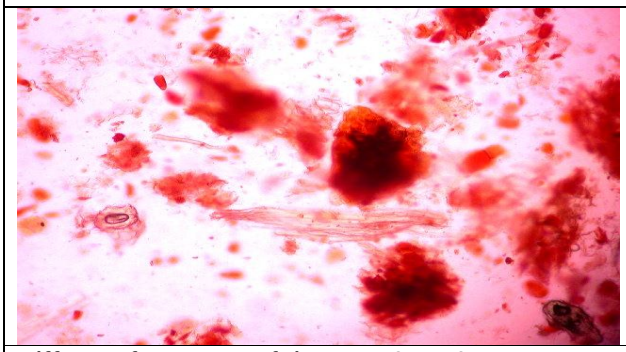
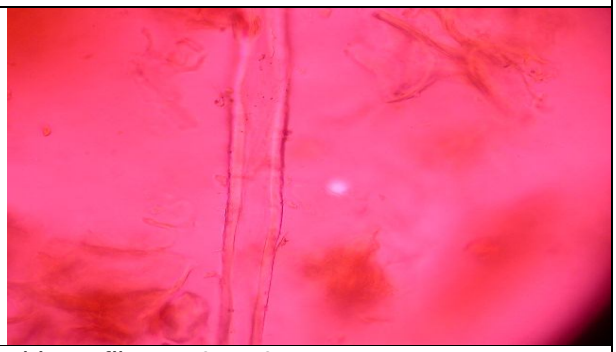
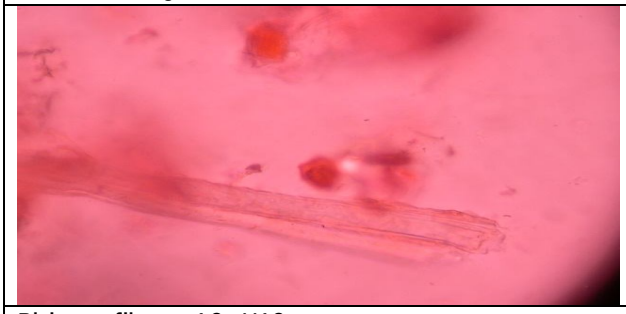
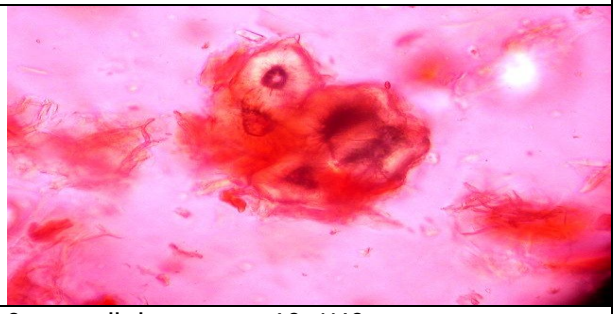


Fig. 2: T.s of Odina Wodier. Stem bark

1-Stone cells, 2-Cork, 3-Cork cambium, 4-patches of stone cells, 5-Secondary cortex, 6-Medullary rays, 7-Patches of phloem fibers, 8-prismatic crystals, 9-Phloem, 10-Obliterated phloem cells

	
Powder----Macroscopy	Different fragments of tissues. . 10x X10 x
	
Prism shaped crystals . 10x X40 x	Phloem fiber . 10x X40 x
	
Single stone cell. . 10x X40 x	Prism shaped crystals. . 10x X40 x

	
Parenchymatous cells with reddish contents. . 10x X40 x	Parenchymatous cells and prism shaped crystals. . 10x X40 x
	
Parenchymatous cells and prism shaped crystals. 10x X40 x	Parenchymatous cells. . 10x X40 x
	
Different fragments of tissues. 10x X10 x	Phloem fiber. . 10x X10 x
	
Phloem fiber. . 10x X10 x	Stone cells in groups. . 10x X40 x

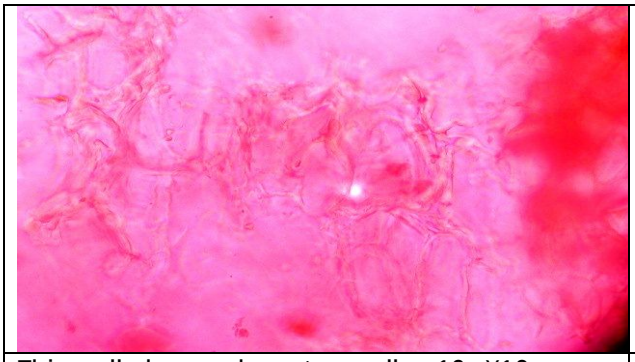
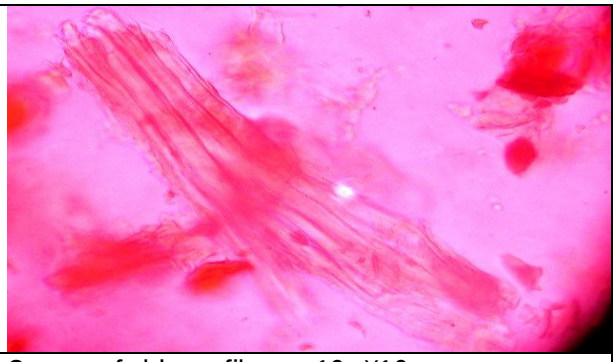
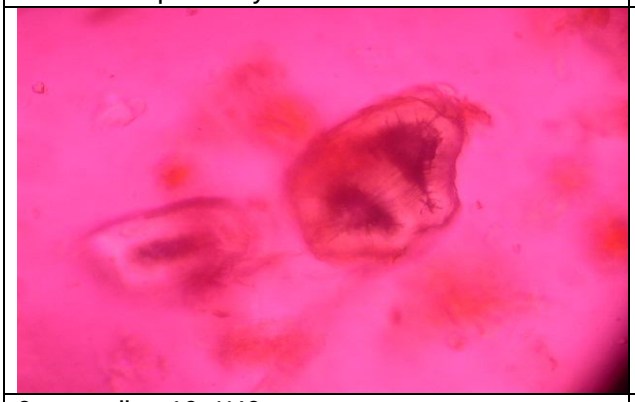
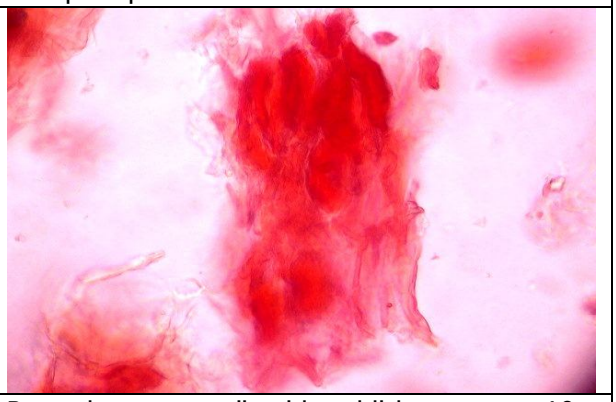
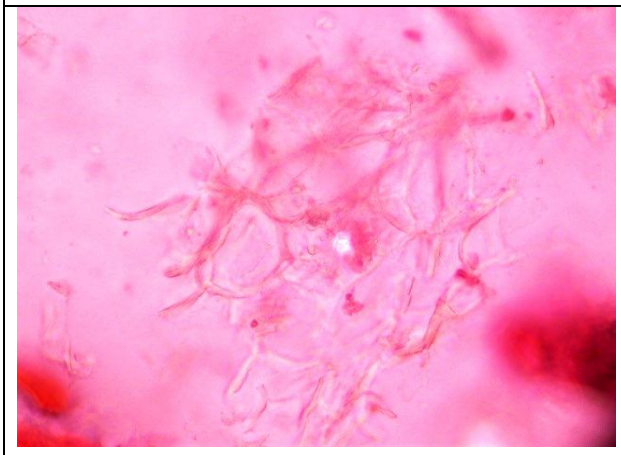
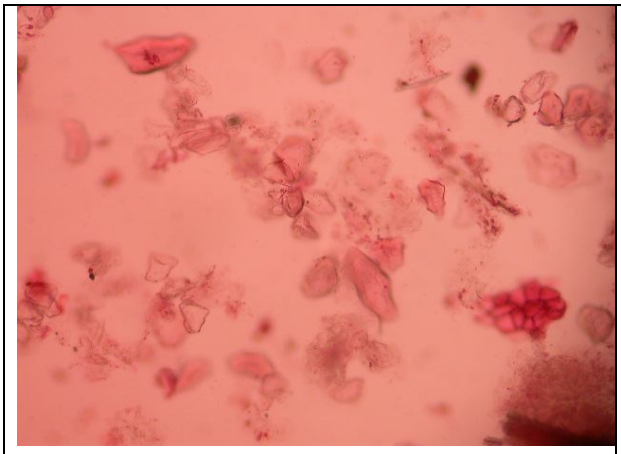
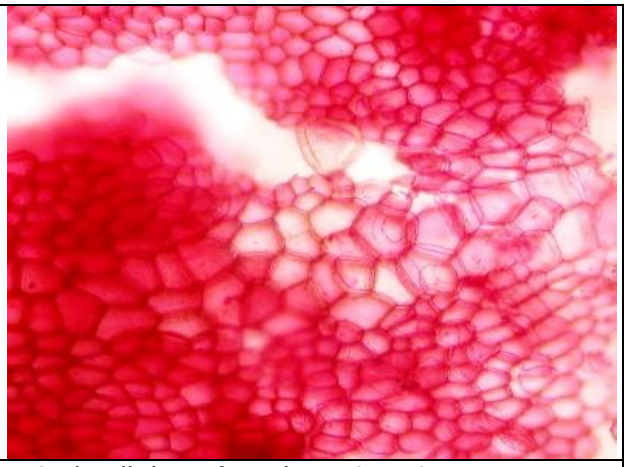
	
Thin walled parenchymatous cells. . 10x X10 x	Groups of phloem fibers. . 10x X10 x
	
Stone cells. . 10x X40 x	Parenchymatous cells with reddish contents. . 10x X10 x
	
Thin walled parenchymatous cells . 10x X40 x	Rough powder with abundant fibers

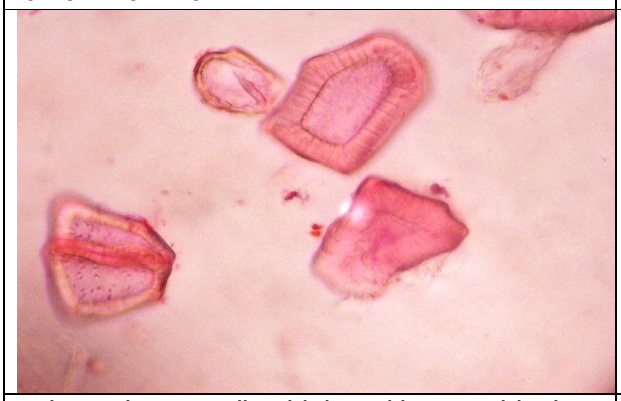
Fig. 3: shows different fragments of powder microscopy of *Odina Wodier*. bark

	
Stone cells, parenchymatous cells and crystals. . 10x X10 x	Groups of Phloem fibers. . 10x X10 x
	
Phloem fibers enlarged. . 10x X10 x	Stone cells with broad lumen. . 10x X10 x
	
Elongated stone cells with narrow lumen with pits inside. . 10x X40 x	Stone cells with broad lumen with pits inside the lumen. . 10x X40 x

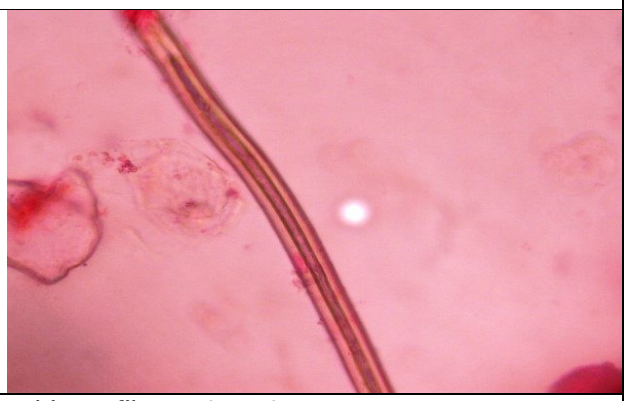
. Polygonal stone cells with broad and narrow lumen. 10x X40 x



. Cork cells in surface view. 10x X10 x



Polygonal stone cells with broad lumen with pits in side the lumen. . 10x X40 x



Phloem fiber . 10x X40 x

Fig. 4: Different fragments of the maceration of *Odina Wodier*. Stem bark

CONCLUSION

The pharmacognostical studies of the stem bark *Odina Wodier.,* indicated the presence of abundant stone cells which are in groups and in alternate patches of 8 to 10 in cortex region, abundant reddish tannin content in the parenchymatous region, prism shaped crystals in the cortex region, obliterated parenchymatous cells in the middle region of the bark, rough surface of the outer bark and fibrous bark in the innermost region of the bark. In Chemomicroscopical tests revealed the presence of starch, tannin content and crystals. In Quantitative evaluation, The moisture content of the drug (7.20%) is not high thus it would discourage bacterial, fungal or yeast growth, as the general requirement for moisture content in crude drug should not exceed 14%. Equally important in the evaluation of crude drugs is the total ash value. The total ash is particularly important in the evaluation of purity of crude drugs, i.e. the presence or absence of foreign inorganic matter such as metallic salts and/or silica. The ethanol and water extractive value were determined. Since the water extractive value was greater than that of alcohol, it means that water is a suitable extractive solvent than alcohol in the extraction of the bark powder of *odina wodier*. The alcohol and water soluble extractives were indicators of the total solvent soluble component.

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