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PHYSIOCHEMICAL ANALYSIS OF *PTEROCARPUS SANTALINUS* L. EXTRACTS

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ABSTRACT

Raktachandan (*Pterocarpus santalinus* L., Family: Leguminaceae) is an important medicinal tree grows on dry, hilly, often rocky ground of India. It has been used in almost all the traditional system of medicine, ayurveda, unani, and sidha from the ancient time. It serves as a folk medicine in traditional uses. In present study, the aqueous extracts wood of *Pterocarpus santalinus* L. was screened. The Physio-Chemical Parameters of *Pterocarpus santalinus* L. like determination of Moisture Content, Total Ash Content, Acid Insoluble Ash Content, Water Soluble Ash Content and Solvent Extractive Values were done. Qualitative phytochemicals revealed the presence of alkaloids, saponins, flavonoids and glycosides in each extract. In *Pterocarpus santalinus* L. extract the moisture content, total ash content, insoluble ash content in wood were studied. Identity, purity & strength of drug were total ash was recorded not more than 2 percent, acid insoluble ash was noted not more than 0.3 percent, alcohol soluble extractive was observed not less than 3 percent and water soluble extractive was noted not less than 1 percent. For high performance liquid chromatography finger printing different major spot seen at R_f (Blue) was 0.18, R_f (White) was 0.72, R_f (light Blue) was 0.72, R_f (light Blue) was 0.84, R_f (Yellow) was 0.34 and R_f (brown) was 0.52.

Key Words: Folk Medicine, Phytochemicals, High Performance Liquid Chromatography.

Herbal medicine also called botanical medicine or phytomedicine -- refers to using a plant's seeds, berries, roots, leaves, bark, or flowers for medicinal purposes. Herbalism has a long tradition of use outside of conventional medicine. It is becoming more main stream as improvements in analysis and quality control along with advances in clinical research show the value of herbal medicine in the treating and preventing disease. These resources relate mainly to Western traditions of herbal medicine (also referred to as photon medicine, herbal medicine or botanical medicine) that rely primarily on the use of single herbs. Other traditional systems of medicine, particularly Asian traditions, use many herbs in synergistic mixtures or blends. Examples are Traditional Chinese Medicine, Ayurveda, and Tibetan.

In order to effectively research whether herbal medicine is effective or even safe, we need to detect all the active chemicals that exist in a medicinal plant, but also evaluate their effects on humans individually and together.

Plants have been used in traditional medicine for several thousand years. The secondary metabolites of the plants are the major sources of pharmaceutical, food additives and fragrances. Although it has many medicinal properties, it is particularly contain numerous active constituents of immense therapeutic value. In the present era of drug development and discovery of newer drug molecules many plant products are evaluated on the basis of their traditional uses. One of the many plants which are being evaluated for their therapeutic efficacies is *Pterocarpus santalinus* L. which is commonly known as Raktchandan. Tree, 10-11 m high; bark blackish brown, leaves imparipinnate, leaflets 3 rarely 5. Flowers yellow in racemes. Pods winged, 5 cm dia. Seeds coriaceous, reddish brown.

It is a very important plant for its large number of medicinal properties (Agharkar *et al.,* 1991) as well as medicinally important chemicals like ecdysterone (Basu *et al.,* 2007), achyranthine (Neogi and Srivastiva 2011), betaine, pentatriaontane, 6-pentatriacontanone, hexatriacontane and tritriacontane. The plant shows many pharmacological activities (Zafar *et al.,* 2009) like, wood is used as astringent, tonic, plant remained unexplored for many of its claimed as external application for wounds, cuts and inflammations, pharmacological activities.

In the present study, an effort has in treating headache, skin diseases, fever, boils, scorpion sting and to improve sight. The red wood

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yields a natural dye *Pterocarpus santalinus* L. santalin which is used as a coloring agent in pharmaceutical materials and methods preparations, food stuffs; fruit extract is used as astringent, diaphoretic, in inflammations, headache, skin diseases, bilious Plant material infections and chronic dysentery.

OBJECTIVES

To determine the physiological and physiochemical parameters of *Pterocarpus santalinus* L. and to prepare extracts of the plant parts for detection of the presence or absence of phytochemicals.

MATERIALS AND METHODS

Physio-Chemical Parameters of *Pterocarpus santalinus* L.,

Physio-chemical parameters of the powdered drug such as different ash content, extractive values, moisture content were performed.

1. **Determination of Moisture Content**

- 2 g of each sample were placed in pre-weighed flat porcelain dish, dry in the oven at 100° C ±5◦C till the constant weight was obtained. The loss of weight was calculated with reference to air dried material.

2. **Determination of Total Ash Content**

- 2 gm of air dried powder was placed as a uniform layer in crucible silica and ignite gradually up to 500-600°C until it was white indicating the absence of carbon, allowed to cool and weighed to determine the percentage of ash with reference to air-dried respective samples.

3. **Determination of Acid Insoluble Ash Content**

- The ash was boiled with dilute HCL for 5 minutes and insoluble matter was collected in a sintered glass crucible washed, ignited, and cooled finally it was weighed to calculate the percentage of acid-insoluble ash with reference to the bone dried material.

4. **Determination of Water Soluble Ash Content**

- Total ash was boiled with water for 5 minutes and insoluble ash was collected in a sintered glass crucible washed ignited at a temperature not exceeding 45^{0}C. Cool and weighed for the determination of water soluble ash with reference to the bone dried drug.

Determination of Solvent Extractive Values

5gm of the air dried, powdered macerated with 100 ml of solvent for 24 hours, shaken frequently and allowed to stand for 24 hours. Thereafter, filtered, evaporated the filtrate to dried and weight was taken. The percentage of solvent soluble extractive with reference to bone dried sample has to be calculated.

Preparation of Extract by Sequential Extraction Method

Preparation of Aqueous Extracts: The filtrate of aquous extract was shade dried and with this filtrate the aqueous extract is prepared in distilled water.

Preliminary Phytochemical Screening of Extracts of *Pterocarpus santalinus* L.,

Plants contain different compounds like alkaloid, glycoside, volatile oils, tannins, saponins, flavonoids etc. To check the presence or absence of primary and secondary metabolites, all the extract were subjected to chemical tests.

Test for Saponins

Foam test- Samples were dissolved in distill water and shaken vigorously. A layer of foam on top layer was formed which is stable, indicates the presence of saponins in the sample.

Test for Flavonoids

NaOH Test- Taken 1ml of the sample with 10ml of 1% NaOH solution and gently shaken the sample, yellow colour was observed denoting the presence of flavonoids.

Test for Glycosides

Hansch Test- In aqueous extract conc. H_2SO_4 was added from the side walls and formation of a brown ring suggested the presence of carbohydrates.

Test for Proteins

Xanthoprotein Test- Mix 3 ml extracts solution with 1 ml conc. H_2SO_4 and boiled it by which yellow precipitate was obtained indicating the presence of proteins in it.

Test solution for HPTLC:

2 gm of coarsely powered drug of each batch taken in 100 ml of distilled water & alcohol respectively. Extracted for 24 hours by cold extraction technique with occasional shaking. The extract was decanted and makes up to 100 ml in a volumetric flask. It was concentrated to 5-10 ml in a water bath & subjected to Chromatography.

Stationary phase : HPTLC Silica gel 60 plate (Alluminium Sheets, 20×20cm) Merck Pvt.

Ltd, of 0.2 mm thickness

Solvent system : Toluene: Ethyl Acetate (7:3)

Volume of test solution applied: 4µl

Distance traveled by solvent system: 8 cm

Development chamber : Twin trough chamber with SS lid ranged from (5×5- 20×20 cm)

OBSERVATIONS AND RESULTS

Physio-Chemical Parameters of *Pterocarpus santalinus* L.: In physio-chemical parameters moisture content, total ash content, acid soluble ash content, water soluble ash content and solvent extractive value was observed and the result are shown in Table 1.

In *Pterocarpus santalinus* L., extract the moisture content of wood (40%), total ash content in wood (7%) acid insoluble ash content was found (0.3), water soluble ash content was (6.4%), Alcohol soluble extract was (23.82%) and total ash was (2%).

Table 1: Physio-Chemical Parameters of ***Pterocarpus santalinus L.***

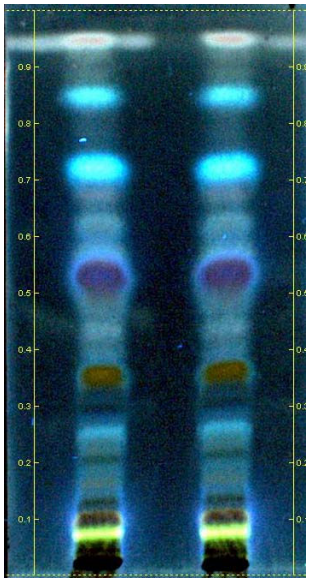
Parameter	Raktachandan Average value		
	Batch 1	**Batch 2**	**Batch 3**
LOD at 105^0	4.0	4.3	4.2
Water soluble extract	6.0	6.8	6.3
Alcohol soluble extract	21.25	26.4	22.35
Total ash	2.0	2.0	2.0
Acid insoluble ash	0.3	0.3	0.29

Table 2: Preliminary Phytochemical Screening of Extracts of *Pterocarpus santalinus L.*

S.N.	Constituent	Procedure	Observation	Result
1	Alkaloid	1ml Alcohol extract+1.5% Hcl (4drops)+Wagner solution	A yellow color ppt is formed.	Absent
2	Flavonoid	0.5ml alcohol extract +5 to 10 drops Hcl + Mg	Pink radish color is formed	Absent
3	Resin	1ml extract+2ml Acetone	Turbidity is Formed	Absent
4	Saponin	5ml aqueous solution + $NaHO_3$ (1 drops)	Honey comb like is formed	Present
5	Tannin	2ml extract + 5%$fecl_3$(3drops)	Brown color is obtained	Present
6	Carbohydrate	2ml aqueous +1ml $fecl_3$	Red or brick red ppt is formed	Absent

7	Protein	1ml aqueous extract + 10% w/v NaOH (5 drops) + 3% $CuSO_4$	A red or violet color is obtained	Absent

High performance Thin layer chromatography - Raktachandan



	Raktachandan		
R_f value	**A**	**B**	**C**
R_f 1 (yellow)	0.08	0.08	0.08
R_f 2 (black)	0.12	0.13	0.12
R_f 3 (light blue)	0.27	0.26	0.27
R_f 4 (navy blue)	0.31	0.31	0.30
R_f 5 (brick red)	0.36	0.36	0.36
R_f 6 (blue)	0.54	0.55	0.54
R_f 7 (Light blue)	0.72	0.72	0.71
R_f 8 (light blue)	0.84	0.84	0.84
R_f 9 (light yellow)	0.95	0.95	0.96

Fig. 1: HPTLC Finger prints in test solution of Raktachandan at 366nm after spray

RESULT

The preliminary phytochemicals tests (Table 2) showed the absence of alkaloid, flavonoids, resins, carbohydrates and proteins. They shows the presence of saponins and tannins.

The present work is for study of different parts of *Pterocarpus santalinus L.*. Physiochemical parameter such as loss of drying, ash value, acid soluble ash and water and methanol soluble extractive values, qualitative and quantitative test of *Pterocarpus santalinus L.* were determined. Physiological studies were carried out to determine basic characteristic of particular species and proves to be the standard for identification of the plant species. Preliminary phytochemicals screening of methanol extract and aqueous extracts showed the presence of saponins and tannins. HPTLC were done for standardization of the medicine.

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