

## SOXHLET ALCOHOLIC EXTRACTION OF VARUNA (CRATAEVA NURVALA) AND ITS PHYTOCHEMICAL ANALYSIS

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### ABSTRACT

The medicinal value of the medicinal plants resides in the chemical substances that produce a definite physiological action on the human body and these chemical substances are called phytochemicals.<sup>1</sup> Various analytical techniques have been developed for quality control of drugs from plant origin. Therefore it is the need of the hour to undertake phytochemical investigations along with biological screening to understand therapeutic dynamics of medicinal plants. Extraction may be defined as the process in which the animal or plant tissues are treated with specific solvents whereby the medicinally active constituents are dissolved out, cell tissues and most of inactive or inert components remain undissolved.<sup>2</sup> In the present study 25 gram coarse powder of *Varuna* stem bark was subjected to alcoholic extraction with 250 ml of ethanol, yielded 0.80 gram of alcoholic extract, which when subjected to phytochemical analysis revealed the presence of alkaloids, saponins and anthraquinone glycosides.

**Keywords:** Phytochemicals, Extraction, Phytochemical analysis.

### INTRODUCTION

The medicinal value of the medicinal plants resides in the chemical substances that produce a definite physiological action on the human body and these chemical substances are called phytochemicals.<sup>3</sup> They are the bioactive compounds which are present in the medicinal plants and non-nutritive chemicals which possess protective or disease preventive properties. Since herbal medicines are prepared from materials of plant origin they are prone to contamination, deterioration and variation in composition. Various analytical techniques have been developed for quality control of drugs from plant

origin. Therefore it is the need of the hour to undertake phytochemical investigations along with biological screening to understand therapeutic dynamics of medicinal plants.<sup>4</sup> Extraction may be defined as the process in which the animal or plant tissues are treated with specific solvents whereby the medicinally active constituents are dissolved out, cell tissues and most of inactive or inert components remain undissolved. Residue left after extracting the desired constituents is known as marc and solvent used for extraction is known as menstrum.<sup>188</sup> most commonly, water is used as an extrac-

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tive medium apart from water, alcohol, ether and other solvents are also used. The products obtained by extraction are infusions, decoctions, tinctures, liquid extracts, semi-solid extracts and powdered extracts. In the present paper phytochemical analysis of alcoholic extraction of dry coarse powder of stem bark of *Varuna* is dealt.

### TAXONOMICAL CLASSIFICATION OF VARUNA<sup>5</sup>

*Varuna* belongs to the Kingdom plantae, division Magnoliophyta, class magnoliopsida, order parietales, family Capparidaceae, genus *crataeva* and species *nurvala*.

### PHARMACOGNOSY<sup>6</sup>

#### Macroscopic character

**Habit** – A small tree with much branched head

**Stem bark**- The bark occurs in pieces, 6-15 cm long, 3-10 cm wide and 5-12 mm thick. Outer surface is ash colored and rough due to the presence of lenticels. Inner surface is smooth, whitish brown or buff coloured.

**HABITAT**<sup>7</sup>It grows all over India, but usually cultivated in the vicinity of temples of central India, Bengal, Assam and also found near Malabar. In the current study south Indian grown *Varuna* (*Crataeva nurvala*) was selected.

#### Alcoholic extraction

**Principles and mechanisms:** Classical techniques for the solvent extraction of nutraceuticals from plant matrices are based on the choice of solvent coupled with the use of heat and/or agitation. Soxhlet extraction<sup>8</sup> is a general and well-established technique, which surpasses in performance other conventional extraction techniques except for, in limited field of applications, the extraction of thermo labile compounds.<sup>9</sup> When the liquid reaches the overflow level, a siphon aspirates the solution of the thimble-holder

and unloads it back into the distillation flask, carrying extracted solutes into the bulk liquid. In the solvent flask, solute is separated from the solvent using distillation. Solute is left in the flask and fresh solvent passes back into the plant solid bed. The operation is repeated until complete extraction is achieved.

**Operating conditions:** During Soxhlet extraction, the solvent is usually recovered by evaporation. The extraction and evaporation temperatures have a significant effect on the quality of final products.

#### Drug collection

- *Varuna* stem bark is collected from an authenticated shop. It is cleaned, dried and a coarse powder is prepared. It is stored in a clean and air tight container.

#### Authentication of the drug

- The authentication of *Varuna* stem bark was done in the Department of Dravyaguna, in Shri Dharmasthala Manjunatheshwara College of Ayurveda and hospital, Hassan.

### METHODOLOGY

#### Preparation of alcoholic extract of *Varuna*

- Instrument: Soxhlet apparatus
- Requirements:

For alcoholic extraction of *Varuna* stem bark

- a) *Varuna* bark coarse powder - 25 gm
- b) Ethanol - 250ml

#### PROCEDURE

- Coarse powder of *Varuna* stem bark is placed inside a thimble on a filter paper, which is loaded into the main chamber of the Soxhlet extractor.
- The Soxhlet extractor is placed on a flask containing the extraction solvent (Ethanol).

- The Soxhlet is then equipped with a condenser.
- The solvent is heated and the solvent vapour travels up a distillation arm, and floods into the chamber housing the thimble of solid. The condenser ensures that any solvent vapour cools, and drips back down into the chamber housing the solid material.
- The chamber containing the solid material slowly fills with warm solvent. Some of the desired compound will then dissolve in the warm solvent. When

the Soxhlet chamber is almost full, the chamber is automatically emptied by a siphon side arm, and the solvent will run back down to the distillation flask. This cycle was repeated for 4 days.

**RESULT**

**Preparation of Alcoholic extract of Varuna:** Coarse powder of 25 gram of Varunas-tem bark was taken and alcoholic extraction was done with 250 ml of ethanol in Soxhlet apparatus as follows as per above procedure.

**Table 1: Preparation of Alcoholic extract of Varuna**

Day	Content	Time	Temperature
(28/7/2015)	Ethanol -250 ml Varuna - 25 gm (coarse powder)	9:30 pm to 5:00 pm	60 °C
(29/07/2015)		9:00 am to 5:00 pm	55 °C
(30/07/2015)		8:30 am to 5:25 pm	60 °C
(31/07/2015)		9:00 am to 4:45 pm	60 °C
(01/08/2015)	Alcoholic Extract – 240 ml Evaporation on water bath	9:45am to 5:30 pm	60 °C

**Table-2: Weight of alcoholic extract of Varuna stem bark**

Alcoholic Extraction	Weight
Weight of empty vial	15.75 gm
Weight with extract	16.55 gm
Alcoholic extract of Varuna bark	0.80 gm

The distillation process was completed on fourth day. The residue obtained after evaporation of the alcoholic extract was 0.80gm. It was solid in nature. The total process of extraction took 5 days. The final product obtained was 0.80 gram of alcoholic

extract of Varuna

**Phytochemical analysis<sup>10</sup>**

Solid residue of the alcoholic extract of Varuna bark was then subjected to phytochemical analysis.

Phytochemical	Test	Procedure	Observations	Results
Alkaloids  (To the extract add dilute HCL	Mayer's test	Take 2- 3 ml of filtrate in a test tube and add few drops of mayer's reagent	Cream precipitate indicates presence of alkaloids	Present

shake well and filter. With filtrate perform the following tests)	Dragendorff's test	Take 2-3ml filtrate in a test tube and add few drops of Dragendorff's reagent	Orange brown precipitate indicates presence of alkaloids	Present
	Wagner's test	Take 2-3ml filtrate in a test tube and add few drops of Wagner's reagent	Reddish brown precipitate indicates presence of alkaloids	Present
Saponins	Foam test	Shake the drug extract vigorously with distilled water	Presence of persistent foam	Present
Tannins		Take 2-3ml of extract in a test tube and add few drops of lead acetate solution	Absence of white precipitate	Absent
Anthraquinone glycosides	Modified Borntrager's test	To 5 ml extract, add 5 ml 5 % FeCl <sub>3</sub> and 5 ml dilute HCL. Heat for 5 minutes in boiling water bath. Cool, add benzene and shake well. Separate the organic layer. Add equal volume dilute ammonia.	Presence of pinkish red colour.	Present

## DISCUSSION

The active chemical constituents of the plants are contained within the cells of the plant. Alcohol provides a particularly effective way of maximizing the bioavailability of the active principles extracted from the plant. Ethanol is a molecule with both a polar and a non-polar end. Many taste molecules are polar whereas most aroma molecules are non-polar, and the good thing is that ethanol can be used to extract both groups of compounds. The advantages of

conventional Soxhlet extraction include the displacement of transfer equilibrium by repeatedly bringing fresh solvent into contact with the solid matrix, maintaining a relatively high extraction temperature with heat from the distillation flask and no filtration requirement after leaching. Soxhlet method is very simple and cheap. Hence Soxhlet apparatus was used for extraction. Pharmaceutical processing is a technique which converts natural products into therapeutically potent dosage form, which is

easily absorbable in the biological system. It also helps increasing potency of drugs and to make acceptable to the patients. Phytochemical analysis conducted on the alcoholic extract of *Varuna* bark revealed the presence of constituents which are known to exhibit medicinal as well as physiological activities. Analysis of the plant extracts revealed the presence of Alkaloids, Anthraquinone glycosides and Saponins.

### CONCLUSION

In the present study 25 gram coarse powder of *Varuna* bark was subjected to alcoholic extraction with 250 ml of ethanol, yielded 0.80 gram of alcoholic extract, which when subjected to phytochemical analysis revealed the presence of alkaloids by positive reaction with Mayer's test, Dragendorff's test and Wagner's test. Anthraquinone glycosides were also positive evident from Modified Borntrager's test and saponins showed positive reaction with Foam test.

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