Research Paper Botany

# Screening for Secondary Metabolites of Some Important Medicinal Plants

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**ABSTRACT**

At present, the world is used to synthetic drugs, which has very quick effect, but they have side effects, which leads to many human organs failure, but as natural drugs are very potent and they are free from side effects. Present work was carried out on seven medicinally important plants from Aurangabad region of Maharashtra viz. Holarrhena pubescens (Buch-Ham.)Wall.ex G. Don.; Acorus calamus L.; Dolichandrone falcata (Wall ex DC.)Seem.; Erythrina variegata L.; Santalum album L.; Sapindus emargiantus Vahl. and Calotropis procera (Ait.) R.Br. Phytochemical studies indicate that the plant part contain broad spectrum of secondary metabolites. In phytochemical screening out of two extracts (Methanol and Ethanol) Ethanolic extracts showed highest number of metabolites in selected plant parts extracts. Plant parts were subjected to primary phytochemical screening for the metabolite detection. Phytochemical studies recorded the plant part contain broad spectrum of secondary metabolites. This study was carried out to reveal the scope and utility of selected plants in pharmaceutical industry. Further exploration for the isolation of phytochemical constituents of selected plants parts has to be done in order to reveal its potential application in the field of drugs and medicine which is the urge of common man.

**KEYWORDS** Medicinal plant, phytochemical constituents.

**INTRODUCTION:**

Medicinal plants have been extensively studied, due to they are richest resource of drugs. Medicinal plants are a source of great economical value all over the world. Nature has conferred as gift to us a very rich botanical value number of diverse type of plants grow in different parts of the country as well world. Numerous plants parts due to phyto-chemical constituent screening have been proved by chemical analysis and approved by authorized agencies such as Food and Drugs Authority (FDA) in India.

In Aurangabad numbers of species are known to have medicinal value and the use of different parts of several medicinal plant parts to cure specific aliments since long back. The drugs which are extracted from plants use to treat infectious diseases is of concern because, drug safety remains, an enormous global issue. The plant parts that are undertaken are mainly used by the people for various medicinal purposes. (Nair et al.,(2005), Abdullah et al.,2011, Bishnu Joshi *et al.* 2011,Timothy,S.Y. *et al.* 2011)

**MATERIALS AND METHODS:**

Different parts of plants were collected for the present work as Bark of *Holarrhena pubescens* (Pandhar kuda); stem of *Acorus calamus* (Wekhand); fruit of *Dolichandrone falcata* (Kakad shingi), Bark of *Erythrina variegata* (Pangari); leaf of *Santalum album (*Chandan); fruit of *Sapindus emargiantus* (Ritha); *latex of Calotropis procera* (Rui).

**Preparation of the plant part extracts:**

The fresh plants parts collected dried then, grounded into powder using metallic mortal and pestle. The powdered material was weighed using digital weighing balance. Five grams of powdered material added to 100 ml, 80% Ethanol and 100 ml, 80% methanol separately. The mixture was kept on shaker for 24 hours to obtain homogenate. This homogenate were filtered by whatmann filter paper, the filtrates collected are Ethanolic and Methanolic extracts of plants parts. The extracts stored in bottles at $10^0$ C for phytochemical tests.

**Qualitative Phytochemical (Secondary Metabolites) analysis:**

**Test for alkaloids**

1 ml plant extract was treated with a few drops of Mayer's reagent. White–yellowish precipitate produced immediately which indicated the presence of alkaloids (Siddiqui and Ali, 1997). Alkaloids are precipitated from neutral or slightly acidic solution by Mayer's reagent (Evans, 2002).

**Test for steroid and terpenoid**

4 ml extracts was treated with 0.5 ml acetic anhydride and 0.5 ml chloroform, then concentrated $H_2SO_4$ added slowly. Steroid solution shows green blue colour and terpenoid solution shows red violet colour.

**Test for flavonoids and flavones**

4 ml extracts was treated with 1.5 ml of 50% Methanol solution , solution was warmed and metal magnesium was added, then 5-6 drops of concentrated hydrochloric acid was added. Flavonoid solution show red colour and flavones solution show orange colour (Siddiqui and Ali, 1997).

**Test for tannins**

1 ml distilled water added to 0.5 ml extract solution, then 1-2 drops of ferric chloride solution added. Gallic tannin solution show blue colour and catecholic tannin solution shows green black colour.

**Test for reducing sugar**

1ml distilled water added to 0.5 ml extract solution, then 5-8 drops Fehling's solution –A and B was added at hot respectively. Reducing sugar shows brick red precipitate.

**Test for carbohydrates (Molish's test)**

1 ml extract was treated with 2 drops of α–napthol solution, carefully incline the tube and pour drop wise concentrated $H_2SO_4$ using droper along the side to tube. Presence of carbohydrate shows violet colour at the junction of two liquids.

**Test for glycosides**

1ml glacial acetic acid added to 1 ml extract, and then few drops of $FeCl_3$ added. Appearance of brown colour ring at top indicates presence of glycosides.

**Test for saponins (foam test)**
1 ml of the extract was added to 2 ml of distilled water and shaken for few minutes in a test tube. 1 cm layer of foam for 10 minutes indicates the presence of saponins.

**Test for phenols (Ferric chloride Test)**
1 ml extract is dissolved in 1 ml distilled water or ethanol, and then add few drops of ferric chlorides solution. Phenolic solution show Red, Blue, green, Purple coloration.

**Test for amino acids and proteins (Xanthoprotic test)**
1 ml extract was added 2-6 drops in concentrated $HNO_3$, this solution was neutralized with alkali. Protein and Amino acid solution shows yellow or orange colour.

**Table 1:** Qualitative determination of phyto-chemical groups of *Holarrhena pubescens* (Pandhar kuda), *Acorus calamus* (Wekhand), *Dolichandrone falcata* (Kakad shingi), *Erythrina variegata* (Pangari)

| Phyto-chemical groups | Holarrhena pubescens | | Acorus calamus | | Dolichandrone falcata | | Erythrina variegata | |
|---|---|---|---|---|---|---|---|---|
| | Methanol | Ethanol | Methanol | Ethanol | Methanol | Ethanol | Methanol | Ethanol |
| Alkoloids | ++ | + | + | + | +++ | ++ | + | ++ |
| Steroid | + | - | - | - | ++ | - | - | - |
| Terpenoid | - | + | - | - | - | - | - | - |
| Flavonoid | - | - | - | - | - | - | - | - |
| Flavones | ++ | ++ | - | - | ++ | ++ | - | - |
| Gallic Tannins | - | - | - | - | +++ | +++ | - | - |
| Catecholic Tannin | ++ | ++ | - | - | - | - | - | - |
| Reducing Sugar | +++ | + | ++ | +++ | +++ | +++ | - | - |
| Carbohydrates | - | + | + | + | ++ | ++ | - | ++ |
| Glycosides | ++ | + | - | - | +++ | +++ | +++ | + |
| Saponins | - | - | - | - | + | + | - | - |
| Phenols | ++ | ++ | - | - | +++ | ++ | -R.Brra us emarginon ical-ll c | - |
| Protein and Amino acid | ++ | ++ | + | ++ | +++ | +++ | +++ | + |

- = Not detected; + = Low concentration; ++ = Moderate concentration; +++ = High concentration

Table 2: Qualitative determination of phyto-chemical groups of Santalum album (Chandan), Sapindus emargiantus (Ritha), Calotropis procera (Rui)

| Phytochemical groups | Santalum album | | Sapindus emargiantus | | Calotropis procera | |
|---|---|---|---|---|---|---|
| | Methanol | Ethanol | Methanol | Ethanol | Methanol | Ethanol |
| Alkoloids | + | + | + | ++ | - | - |
| Steroid | ++ | ++ | + | - | - | - |
| Terpenoid | - | - | - | - | - | - |
| Flavonoid | - | - | - | - | - | - |
| Flavones | - | - | + | + | - | - |
| Gallic Tannins | - | - | - | - | - | - |
| Catecholic Tannin | ++ | ++ | - | - | - | - |
| Reducing Sugar | - | - | + | ++ | - | - |
| Carbohydrates | + | - | ++ | ++ | ++ | ++ |
| Glycosides | +++ | ++ | ++ | + | +++ | ++ |
| Saponins | - | - | +++ | +++ | - | - |
| Phenols | ++ | +++ | ++ | + | - | + |
| Protein and Amino acid | - | +++ | +++ | ++ | - | + |

- = Not detected; + = Low concentration; ++ = Moderate concentration; +++ = High concentration

**CONCLUSION:**
From this study it can be concluded that, both organic solvent (80% methanol and 80% ethanol) contain different dissolving capacity of same phyto-chemical groups. But Ethanolic extracts showed highest number of secondary metabolites/ phyto-chemical groups in selected plants parts extracts, it is concluded that Ethanolic solvent is good solvent for extraction /screening of secondary metabolites/phytochemical groups for its utilization and study.

From selected plant parts fruit of *Dolichandrone falcata* (Kakad shingi) contain maximum number of secondary metabolites compared to other selected plant parts and latex of *Calotropis procera* (Rui) does not contain sufficient secondary metabolites it contain only carbohydrates in moderates concentration, glycosides in high concentration ,phenol and protein in low concentration rest are absent in *Calotropis procera* (Rui). This study proved the presence of the secondary metabolites / phytochemical groups which explain its diverse distribution within plants parts. Therefore, further pharmacological as well as toxicological studies are hereby encouraged with view to isolates and characterized the specific secondary metabolites/photochemical groups of plants responsible for its therapeutic effects.

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