



PHYTOCHEMICAL SCREENING OF *OLDENLANDIA* *UMBELLATE*

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ABSTRACT

Plants play very important role in medicinal field from which various chemical constituents can be extracted. They have much usefulness compared to synthetic drugs. Because of their natural occurrence, they can be cultivated according to our requirement and also by applying various methods to gain more advantages. The active principles of different plants possess various pharmacological actions.

The leaves and roots of *Oldenlandia umbellata* linn., are considered to possess strong expectorant property and are prescribed in case of bronchial catarrh, bronchitis and asthma. A decoction of the root was given in doses of ½ to 1 ounce a day to cases of bronchitis and asthma. In former diseases, the patients got cured after few days use of decoction, but in latter, the drug gave only temporary relief. Later, this is used as anti inflammatory and for antitussive activity, where the drug shows better effect than many other drugs.

Now the present research includes the first step in complete study of this plant i. e., phytochemical screening, which includes extraction of the plant, qualitative chemical examination for total extract and later on isolating the required chemical constituent.

Key words: *Oldenlandia umbellata*, Phytochemical screening, Chemical examination, Isolation of chemical constituents.

INTRODUCTION

Herbal medicine continues to grow in popularity as consumers adopt more natural approaches for staying healthy and these have been used since ancient times. Herbal remedies use the whole plant as powder so it can be swallowed, drunk as a tincture, decoction or infusion or mixed with an oil based carrier to form an ointment. The following selection criteria are suggested as a guide to select a drug:

Selection based on traditional usage.

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- (i) Poisonous plants
- (ii) Selection based on chemical composition.
- (iii) Screening for a specific biological activity.
- (iv) Combination of criteria.

The flavonoids are a category of natural substances belonging to the family of polyphenols. Their main function seems to be the coloration of plants (just like chlorophyll and carotenoids). Their presence in the plant is sometimes concealed under their "leuco" shape (white shape), which explains their commercial interest in the food industry. The pioneer research of Albert Szent-Györgyi, who won the Nobel Prize of physiology and medicine in 1937, revealed some pharmacological properties notably the efficient particularities of the flavonoids for the reduction of permeability of the blood vessels. The great interest in flavonoids today is because of their antioxidant property. The flavonoids also possess other important pharmacological properties and they been recognized to have antiinflammatory, anti-coagulant and aphrodisiac properties.

EXPERIMENTAL

Material and method

Extraction and phytochemical screening

The plant may be considered as a biosynthetic laboratory not only for the chemical compounds such as carbohydrates but also for other compounds like glycosides that exert physiological effect. The compounds that are responsible for therapeutic effect are usually the secondary metabolites. A systemic study of crude drug makes thorough consideration of both primary and secondary metabolites derived as a result of plant metabolism. The plant material may be subjected to preliminary phytochemical screening for detection of various plant constitutes.

The leaves and stems were washed under a continuous water current for 15 min. These were dried separately at steam temperature of 70°C for two weeks or at shade for four weeks. The dry organ was pulverized to powder by a grinder (RETSCH marks SM 100). The powder was then extracted according to their polarities. The phytochemicals analyzed are glycosides. Flavonoidal glycosides and the phenolic glycosides were extracted and quantified.

Extraction

Alcohol extraction: The dried defatted drug powder was subjected to alcohol extraction.

Method: Continuous solvent extraction using Soxhlet apparatus.

Concentration: The alcoholic extract of powdered drug was concentrated by distillation under vacuum. Then the extract was dried. The dried extract was used for the biological studies and phytochemical studies.

Benzene extract: The dried defatted drug powder was subjected to benzene extraction.

Method: Continuous solvent extraction using Soxhlet apparatus.

Concentration: The alcoholic extract of powdered drug was concentrated by distillation under vacuum. Then the extract was dried. The dried extract was used for the biological studies and phytochemical studies.

Petroleum ether extraction: The dried defatted drug powder was subjected to petroleum ether extraction.

Method: Continuous solvent extraction using Soxhlet apparatus.

Concentration: The alcoholic extract of powdered drug was concentrated by distillation under vacuum. Then the extract was dried. The dried extract was used for the biological studies and phytochemical studies.

Chloroform extraction: The dried defatted drug powder was subjected to chloroform extraction.

Method: Continuous solvent extraction using Soxhlet apparatus.

Concentration: The chloroform extract of powdered drug was concentrated by distillation under vacuum. Then the extract was dried. The dried extract was used for the biological studies and phytochemical studies.

- (i) Qualitative chemical examination
- (ii) Isolation of chemical constituents

RESULTS AND DISCUSSION

The results of the phytochemical screening of the extracts of the leaves and the stems of *O. umbellata* show the presence of some important phytochemicals.

Qualitative chemical examination -

The drug shows positive test for the presence of glycosides.

General tests of glycosides

- (i) Molisch test- This test is positive with soluble as well as insoluble carbohydrates. The extract is treated with α -naphthol and concentrated sulphuric acid, which gives purple colour.
- (ii) Reduction of Fehlings solution- To the solution of drug, equal quantities of Fehling's solution A and B were added. After heating, brick red precipitate was obtained.

Thus drug shows positive test for both; Molisch test and Fehling's test.

Flavonoidal glycosides: Flavonoids occur either as free molecule or as glycosides. They are occurring mainly as O-glycosides and some are C- glycosyl flavonoids. Chemically flavonoids show a fifteen carbon skeleton, which consists of two phenyl rings connected by a three carbon bridge. These flavonoids are derivatives of phenolic glycosides and of benzo- α - pyrones. The extract gives positive for-

- (iii) Ferric chloride test
- (iv) Shinoda test

Tests for phenolic glycosides

- (i) Litmus paper test- Blue litmus, when dipped in sample solution changes its colour, from blue to red, which indicates the presence of phenolic hydroxyl group.
- (ii) Ferric chloride test- To the sample, few drops of 5% ferric chloride solution were added. There is appearance of red colour, which indicates the presence of phenols.



Isolation of chemical constituents

Leaves, twigs and roots of *Oldenlandia umbellata* are collected and weighed to 640 g. These are soaked in methanol for 48 hrs. The solvent was removed under pressure to dark green mass of 30 g. Later the crude methanol extract was partitioned by using

chloroform and water.

Ursolic acid is isolated from crude chloroform extract of 3.5 g. This is subjected to column chromatography using chloroform with increasing amount of methanol. By this way, 25 fractions were collected.

Fractions 18-20 has the major compound with few minor constituents. These are combined and subjected to column chromatography using ethylacetate and chloroform in 10: 90 ratio as eluent.



Fig.1: *Oldenlandia umbellata* plant

Kaempferol-3-O-rutinoside from aqueous layer is extracted successively by using ethylacetate and butanol. The crude butanol extract was subjected to gradient polarity column chromatography using ethylacetate and methanol as eluent.

25 Fractions were collected of which 12-16 has major compound. All fractions were combined and subjected to another column chromatography using ethylacetate and methanol in 20: 80 ratio as eluent.

25 Fractions were collected of which 14-20 shows a single spot on TLC having same R_f values. These fractions were combined and recrystallised from methanol. The yellow crystals are obtained. The crystals possess melting point range of 186°- 189°C.

The present study includes collection of leaves, twigs and roots of *O. umbellata*. This was dried and extracted using various solvents such as alcohol, benzene, petroleum ether and chloroform. Later on the obtained extract was used for qualitative chemical examination to identify different types of constituents present in the extracts. Finally the required chemical constituent was isolated and then this constituent was further used for various pharmacological aspects.

Table 1: Specific tests for glycosides

| Extract | Alcohol extract |
|----------------------------|-----------------|
| Anthrocene glycosides | - |
| Sterol/ Cardiac glycosides | - |
| Saponin glycoside | - |
| Cyanop-horic glycosides | - |
| Flavonoid glycoside | + |
| Isothiocyanate glycosides | - |
| Furanocoumarin glycosides | - |
| Phenol glycosides | + |
| Steroidal glycosides | - |
| Aldehyde glycosides | - |

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