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EVALUATION OF BIOACTIVE CONSTITUENTS PRESENT IN *PSORALEA CORYLIFOLIA*

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Abstract

Plants produce a diverse range of bioactive molecules making them a rich source of different type of medicines. The active complementary components give the plant as a whole a safety and efficiency much superior in the field of medicine and health. *Psoralea corylifolia* as one of the medicinal herbs is used in the treatment of many diseases and in many medicinal formulations. In present investigation, the phytochemical content of *P.corylifolia* is studied using leaf and stem as source material in two different organic solvents i.e. petroleum ether and methanol extracts.

Keywords: *P.corylifolia*, phytochemical screening, organic solvents

Introduction:

Nature is the biggest source of wonderful gifts to the human welfare. The importance of herbs in the management of human ailments cannot be overemphasized. The active components of herbal remedies have the advantage of being combined with many other substances that appear to be inactive(1). However, these complementary components give the plant as a whole a safety and efficiency much superior to that of its isolated and pure active components (2).*Psoralea corylifolia* as one of the medicinal herbs is used in the treatment of many diseases and in many medicinal formulations (3).*Psoralea corylifolia* L. [Indian breadroot] commonly known as Babachi is reported as a rare and endangered plant species which is available in tropical and subtropical regions of the world.(4) Numerous studies have identified compounds within herbal plants that are effective antibiotics(5). The screening of plant extracts and plant products for antimicrobial activity has shown that higher plants represent a potential source of novel antibiotic prototypes(6).

Psoralea is one of the main herbs in traditional Indian and Chinese herbal medicine for the treatment of skin disorders. It has been used in the treatment of eczema and hair loss. Roots of the plant are useful in dental caries, fruits are laxative, aphrodisiac, and are used for the treatment of leucoderma, leprosy and in inflammatory diseases of the skin and leaves are good for the treatment of diarrhoea. The plant has been used in Ayurvedic medicinal system as a cardiac tonic, vasodilator and pigmentor. (7). The 250,000-300,000 species of higher plants were the main sources of drug for the world population. Much attention have been focused on phytochemicals as potential sources of functional substances (8) such as antioxidants(9), antiplague substances (10), antimutagenicities (11), enzyme inhibitors (12) and antimicrobial substances (13-15).

Aqueous and alcoholic extracts from *Psoralea corylifolia* leaves were screened and revealed the presence of saponins, tannins, flavonoids, glycosides, carbohydrates, tannins and phenolic compounds, gums and mucilages, fixed oils and fats. *P. corylifolia* leaves in respect to their antimicrobial activity and the broad spectrum of activity makes it a promising indigenous drug (16).Screening of babchi oil showed that the essential oil contain most of the phytochemicals including tannins, glycosides, saponins, flavonoids, steroids, terpenoids and flavonosides. (7). *Psoralea corylifolia* is a major contributor in the field of health science. A lot of research work is being carried on it due to aspects of its phytochemical contents.

Materials and Methods:

Plant materials:

Leaves and tender stem of *Psoralea corylifolia* were obtained from the plants grown in the college garden. Seeds were purchased from the local medicinal plant agency in Nagpur city. Leaves, tender stem and seeds were washed, air dried and then powdered in mixed grinder and stored in air tight bottles.

Preparation of solvent extracts:

Solvent extracts of *P. corylifolia* were prepared by using leaves and stem as a plant material. Two different solvent extracts used for phytochemical study were methanol and

petroleum ether prepared in cold and hot extraction method. Standard protocols were followed for studying phytochemical content of test material as given in Table no.1. Solvent extraction was prepared by taking 25grams of powder in 200ml of solvent in a conical flask. For best extraction, a soxhlet extractor was used for 48 hours. After this, extracts was concentrated through rotator evaporator which was then stored at 4^{o}C (8).

Phytochemical screening of plant extracts:

A standard protocol is followed to detect the presence of various contents present in different parts (leaf and stem) of *P.corylifolia* as given in Table no.1.

Result and Discussion:

In present investigation, the phytochemical content of *P.corylifolia* is studied using leaf and stem as source material. Among fifteen different contents tested with their standard phytochemical methods given in Table no.1.

Aucubins and iriodoids, coumarins and fatty acids/lipids were detected in both the solvent extracts (methanol and petroleum ether). Table no.2 depicts the presence and absence of different bioactive compounds detected using their respective methods.

Babchi oil dissolved in methanol was evaluated for the presence of different phytochemicals to ascertain the presence of metabolites such as reducing sugars, alkaloids, anthraquinones, glycosides, flavonoids, tannins, steroids, saponins, triterpenoids and phlobatanins. However, anthraquinone, phlobatanins and reducing sugars were not observed in babchi oil. Somasundaram *et al*., 2010 reported the presence of saponins, tannins, flavonoids, glycosides, carbohydrates, tannins and phenolic compounds, gums and mucilages, fixed oils and fats in *Psoralea corylifolia* leaf extracts. Alcoholic extract is better than that of aqueous extract of *P. corylifolia* leaves in respect to their antimicrobial activity and the broad spectrum of activity makes it a promising indigenous drug.

Conclusion:

Plants produce a diverse range of bioactive molecules making them a rich source of different type of medicines. There is a great need to focus on the phytochemical study of plants to use them for more and more therapeutic purposes. In the present study, the approach is done to study the phytochemical evaluation of *P. corylifolia* in two different extracts.

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Table no.1: Phyto-chemical screening test of *P.corylifolia*

Compound	Compound	Reagent	Colour observation
Alkaloids	P.ether, chloroform, acetone, Ethanol, water extract	5ml 15% HCL Wagners reagent Mayers reagent Dragendroff reagent	Brown flocculent ppt.,yellowish white ppt., orange ppt.
Aucubins/ Iriodoids	Fresh plant material	Trim Hill reagent	Blue color,green and red color
Cardiac glycosides	Water extract	Kedde,s test Legal test	Blue/violet color Pink color
Coumarins	P.ether chloroform, acetone, Ethanol, water extract	Residue+ P. ether Filterpaper moistened with 10% w/v aq.NaOH	Filter paper observed UV light shows yellow green flourescent
Tannins	Alcoholic and water extract	0.5ml extract+1ml H2O+2-3drops dilute 10% w/v aq. ferric chloride solution	Blue or green black color
Anthocyanins/ Anthocyanidines	Alcoholic and water extract	pH3-4 pH8-9	Red color changes after change in pH
Anthracene Glycosides	Alcoholic and water extract	Etheral solution+25%v/v aq.NH4OH	Red color
Carotenoids	P.ether	Conc.HCL+Phenol	Blue or green color
Cynogenic Glycosides	Fresh plant material	Few drops of chloroform filter paper moistened with Na picrate solution	Filter paper turns red
Steroids	P.ether chloroform, acetone, Ethanol, water extract	Salkowski reaction Burchard reaction	Red color chloroform layer and acidic lower layer gives yellow flourescence
Emodins	P.ether	Borntragers reaction+benzene +25%w/v aq.NH4OH	Red color
Fattyacids/ Lipids	P.ether	Filter paper	Translucent spot on filter paper
Flavonoids	P.ether chloroform, acetone, Ethanol, water extract	Shinodas reaction Residue of ethereal solution+ethanol+ Mg.powder+conc.HCL	Red color
Triterpenoids	P.ether chloroform, acetone, Ethanol, water extract	Libermann-Burchard reaction	Red or violet color
Anthraquinones	Fresh plant material	Extracted with .55%w/v KOH +1ml H2O2+1ml acetic acid +1ml benzene+equal volume of dilute NH4	Red color in ammonical layer

Table no.2: Presence (+) and absence (-) of active compounds in *P.corylifolia* in different solvents during phytochemical screening.

Compound	**Petroleum ether (HOT EXTRACT)**		**Petroleum ether (COLD EXTRACT)**		**Methanol (HOT EXTRACT)**		**Methanol (COLD EXTRACT)**	
	Leaf	**Stem**	**Leaf**	**Stem**	**Leaf**	**Stem**	**Leaf**	**Stem**
Alkaloids	-	-	-	-	+	-	+	-
Aucubins/ Iriodoids	+	+	+	+	+	+	+	+
Cardiac glycosides	-	-	-	-	-	-	-	-
Coumarins	+	+	+	+	+	+	+	+
Tannins	-	-	-	-	+	-	+	-
Anthocyanins/ Anthocyanidines	-	-	-	-	-	-	-	-
Anthracene Glycosides	-	-	-	-	-	-	-	-
Carotenoids	+	-	-	+	+	-	+	-
Cynogenic Glycosides	-	-	-	-	-	-	-	-
Steroids	+	-	+	-	-	-	-	-
Emodins	-	-	-	-	-	-	-	-
Fattyacids/ Lipids	+	+	+	+	+	+	+	+
Flavonoids	-	-	-	-	-	-	-	-
Triterpenoids	-	-	-	-	-	-	-	-
Anthraquinones	-	-	-	-	-	-	-	-

Psoralea corylifolia Linn. (P. corylifolia) is an important medicinal plant with thousands of years of clinical application. It has been widely used in many traditional Chinese medicine formulas for the treatment of various diseases such as leucoderma and other skin diseases, cardiovascular diseases, nephritis, osteoporosis, and cancer.Â This paper systematically summarized literatures on the chemical constituents and biological activities of P. corylifolia, which provided useful information for the further research and development toward this potent medicinal plant. Keywords: Biological Activities; Chemical Constituents; Coumarins; Flavovoids; Meroterpenes; Psoralea corylifolia L.. Present investigation highlights the evaluation of an important but less explored anticancerous bioactive compound, psoralen from Psoralea corylifolia. HPLC analysis of in vivo plant parts such as roots, nodes and leaves revealed that the quantity of psoralen was optimum in nodal parts. In vitro enhanced biosynthesis of psoralen was achieved in the nodal cultures (mature and juvenile) of Psoralea corylifolia, employing various elicitors (organic) including precursors of psoralen synthesis pathway. HPLC analysis of the crude extract of mature and juvenile nodal cultures revealed that the former Psoralea corylifolia Linn (P. corylifolia) commonly known as â€˜Bakuchiâ€™ belongs to Leguminosae family widely distributed in China and Southeastern Asian countries. Methods: Various electronic databases such as PubMed, Science Direct, Scopus and Google were searched to collect the data of the present review.Â Nineteen papers contained general informationâ€™s of P. corylifolia, Psoralens and psoralidin whereas thirty paper data were presented in the pharmacological activities sections and remaining in the Analytical tools and discussion section. From these databases, we can say that P. corylifolia possesses antibacterial, anti-inflammatory, antifungal, antioxidant, antiflarial, estrogenic, antitumour, and immunomodulatory activities.