

Phytochemical analysis of medicinal plants for the investigation of secondary metabolites.

Gond Gopal S

Department of Biochemistry Guru Nanak College of Science, Ballarpur-442701

Email: gopalsgond@gmail.com

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ABSTRACT

In the present study, an attempt was made to investigate secondary metabolites of some folk medicinal plants. The crude drug powder extracts of various parts of the selected plants were taken for the study. The phytochemical screening of 21 plants for the investigation of secondary metabolites was undertaken. The preliminary qualitative analysis was carried out to investigate the presence of secondary metabolites such as Phenolic compounds, tannins, flavonoids, alkaloids, saponins, sterols, etc.

Keywords Folk medicinal plants, Phytochemical screening, Secondary metabolites, Phytomedicine, Antimicrobial compounds.

INTRODUCTION

Herbal medicine also known as phytomedicine-refers to using plants seeds, flowers, bark, aerial parts, roots for medicinal purpose. Herbal medicine has a long tradition of use; it is becoming more popular as improvements in analysis and quality control along with advances in clinical research show the value of herbal medicine in treating and preventing disease.

Phytochemical deals with a study of the biochemical compound which is naturally synthesized in plants. Preliminary phytochemical screening is the most important and significant aspect for establishing report of specified extract for its chemical compounds formed by the plant[1].

Plant biochemical compounds are a nonnutritive compound used to cure disease, these are not beneficial for nourishing plant but afford advanced health benefits, alongside pathogen sometimes they called as waste or secretary product of plant metabolism which has pharmaceutical importance[2].

The tribal people living in Chandrapur and Gadchiroli district of Maharashtra state have enormous knowledge about the medicinal plants present in their surroundings. Therefore, information about the medicinal plants which are used to cure common ailments was collected. The selection of plants for evaluation was based on traditional use for treatment of symptoms such as wound, cold, cough, diarrhea, dysenteries, skin infections etc.

Here in the present study twenty one plants were taken for phytochemical screening and plants extracts in the form of dried powdered material was taken and evaluated. The phytochemical constituents were studied by qualitative analysis by performing various chemical tests.

Phytochemical compounds:

Phenolic compound is a major part of a secondary compound which have one aromatic ring (C₆) with a hydroxyl group [3]. Some of phenolic compounds are soluble in organic solvent and some are water soluble. Shickmic acid pathway and phenylpropanoids two pathways are resulting from synthesis to phenol [4].

In studies, it has been detected that ecological and physiological stress such as pathogen insect attack, UV radiation and wounding meanwhile developed phenolic compound synthesized from phenylpropanoid metabolism. Phenolic compounds have antitumor, anti-HIV, antiseptic vasodilatory anti-inflammatory, analgesic, antiulcerogenic[5-7]. (Phenolic compounds are very well antioxidants, stay away from heart disease [8], decrease the frequency of cancers[9-10] and diabetics[11].

Flavonoids are low molecular weight synthesis aromatic amino acids i.e. phenylalanine and tyrosine also useful for plant pigmentation i.e. carotenoids and chlorophylls with their specific colors (orange, red, green, purple, yellow, blue) as well as UV protection.

Plant protection against pathogens and legume nodulation is important for human diet. Now day's peoples are influenced by the attractive properties of flavonoids due to the invention of their pharmacological activities [10].

Tannins are divided into major group's hydrolyzable tannin i.e. gallic acid and nonhydrolyzable such as polyhydroxy flavon 3-ol monomers [12]. Tannins are general toxin used for decrease the growth of many herbivores when supplementary to their diet according to study protection against microorganism [13].

Alkaloids are a heterogeneous group of secondary metabolites nitrogen-containing organic compounds found in 20% of plant species. Plant amines are mescaline, purine and pyramiding bases Harborn (1980). Alkaloids have major pharmaceutical activities such as analgesic (Morphin) anticancer, antimalarial, antispasmodic, insignificant alkaloids important for CNS.

METHODOLOGY

Plant material collection:

The plant material was collected from different parts of the districts. Only those species which were consistently used to treat the same illness in several villages were selected. The information was gathered by questioning local healers and knowledgeable villagers.

Preparation of extract:

Extracts of the selected plants were prepared by using Soxhlet Extraction method. The powdered material was extracted till it gave colorless extract. After completion of the extraction the extract was removed from the round bottom flask & the solvent was evaporated. Thick semisolid residue was left in the flask. This residue was removed from the flask & dried in desiccators and used for further work.

Preliminary phytochemical analysis:

Phytochemical analysis of the extract was undertaken using a slight modification of methods described by Odebiyi and Sofowora, Agu and Fadeyi et. al. The plant materials were screened for the presence of

biologically active compounds including Sterols, alkaloids, saponins, flavonoids, phenols, proteins and carbohydrates. The results obtained were recorded as --, +, ++, +++, +++++ signs, indicating their approximate concentrations. The results are given in Table

RESULTS AND DISCUSSION

The results of preliminary phytochemical analysis of the selected plant extracts showed that the plant extracts contains various important phytochemical compounds such as alkaloids, saponins, flavonoids, tannins, phenols and sterols. The results showed that alkaloids are present in good to moderate quantity in *Soyamida febrifuga*, *Andina cardifolia*,

Psoralea corylifolia. Saponins are present in good to moderate quantity in *Andrographis paniculata*, *Bridelai retusa*, *Soyamida febrifuga*, *Andina cardifolia*. Flavonoids and phenols are found to present in *Cardiospermum helicacabum* and *Flacourtia indica* in good quantity and in poor quantity in other plants.

Soyamida febrifuga, *Bombax ceiba*, *Elephantopus scaber*, *Bridelai retusa*, *Flacourtia indica*, *Nyctanthes arbortristis*, *Psoralea corylifolia* showed highest to moderate quantity of tannins. Steroids are found to be present in moderate to poor quantity in *Andina cardifolia*, *Schleichera oleosa*, *Pongamia pinnata*. The results showed that 80% of plant extracts contains tannins, 60% contains saponins and phenols, 50% contains alkaloids, 40% contains flavonoids and sterols. The phytochemical analysis of extract of various plants parts showed the presence of biologically active compounds in different fractions. The chemical compounds are the secondary metabolites of plants biochemical pathways which act against microorganisms. All these compounds are desirable in the extract for the antibacterial activity. It is concluded that the wide spectrum antimicrobial activity of some extract is due the presence of bioactive compounds which confirms that their application in traditional medicine as a treatment of infectious diseases is appropriate and lend some support to traditional claims about the utility of these plants in the treatment of some diseases.

Sr. No	Plant Species	Part	Alkaloids	Saponins	Flavonoids	Tannins	Phenols	Sterols
1	<i>Andrographis paniculata</i>	Root	+	++	-	+	+	-
2	<i>Andina cardifolia</i>	Leaf	+	-	+	-	+	-
3	<i>Bombax ceiba</i>	Bark	-	+	+	+++	+	+
4	<i>Bridelai retusa</i>	Bark	+	++	-	++	+	-
5	<i>Calotropis procera</i>	Root	+	+	-	-	+	-
6	<i>Cardiospermum helicacabum</i>	Leaf						
7	<i>Cassia tora</i>	Leaf	-	+	+	++	+	-
8	<i>Cassia fistula</i>	Leaf	+	+	+	+	-	-
9	<i>Elephantopus scaber</i>	Root	-	-	-	++	-	-
10	<i>Euphorbia hirta</i>	Aerial parts	-	-	+	+	-	-
11	<i>Flacourtia indica</i>	Bark	-	-	-	++	++	+
12	<i>Hernidesmus indicus</i>	Root	+	-	+	-	+	+
13	<i>Ixora arborea</i>	Root	++	++	-	+	-	++
14	<i>Mimosa hamta</i>	Bark	+	+	-	+	+	-
15	<i>Nyctanthes arbortristis</i>	Bark	-	-	+	++	-	-
16	<i>Pergularia daemia</i>	Aerial parts	-	+	-	+	+	-
17	<i>Pongamia pinnata</i>	Seed	+	+	-	+	-	++
19	<i>Psoralea corylifolia</i>	Seed	++	-	-	++	+	+
20	<i>Schleichera oleosa</i>	Seed	-	+	-	-	+	++
21	<i>Wrightia tinctoria</i>	Bark	-	-	-	+	+	-

The concentration of phytochemical rated as: + = Low; ++ = Moderate; +++ = Good; ++++ = High; - = Negative test.

Conflicts of interest: The authors stated that no conflicts of interest.

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