International Journal of Education and Science Research Review
E-ISSN 2348-6457
Sep- Oct- 2018, Volume-5, Issue-5 P-ISSN 2349-1817
www.ijesrr.org Email- editor@ijesrr.org

A STUDY OF PHYTOCHEMICAL AND BIOLOGICAL ACTIVITY OF SOME MEDICINAL PLANTS

Satya Pal Singh

Department of Chemistry

Government College, Tonk(Rajasthan), India

ABSTRACT

Northeast India offers vast biological diversity. Seven medicinal plants—Bryophyllumpinnatum, Ipomeaaquatica, Oldenlandiacorymbosa, Ricinuscommunis, Terminaliabellerica, Tinosporacordifolia, and Xanthium strumarium—were chosen for this investigation. This study examined phytochemicals and total phenolic and flavonoid content of selected medicinal plants. Soxhlet device extracted organic solvents. Using water, methanol, ethanol, and acetone. Total phenolic and flavonoid contents of plant aqueous extracts were measured by Folin-Ciocalteus reagent and Aluminium Chloride methods, respectively. All plants had proteins, carbohydrates, phenols, tannins, flavonoids, and saponins. Total phenolic and flavonoid contents of the extract for Bryophyllumpinnat were 18.4mg/gm, 18.8mg/gm, 11.6mg/gm, 29.2mg/gm, 29.6mg/gm, 40.8mg/gm, 12.8mg/gm, 71.6mg/gm, and 8.4mg/gm, 37.6mg, 4.4mg, 6mg, 42.8mg, 18mg, 6mg, 28.8mg. Our results showed that crude aqueous and organic solvent extracts of these plants contain medicinally relevant bioactive components, justifying their usage in traditional medicines to treat various ailments.

KEYWORDS:*Plants, Phytochemical, Medicinal*

INTRODUCTION

Herbal medicines are a potential source of therapeutic aid that can be used for the treatment of a number of conditions as well as the prevention of others. Herbal remedies have been considered a possible source of novel bioactive compounds for as long as anyone can remember counting on their importance. Due to the high level of biodiversity found in plant species, these organisms are a veritable treasure trove for the discovery of new and unusual chemical compounds, which can either be used directly as pharmaceuticals or as lead molecules for the development of other types of medications. Medicinal plants include a wide variety of phytochemicals and secondary metabolites, all of which may work independently, in combination with one another, or in synergy to promote better health. When it comes to treating ailments, the various plant extracts each have their own unique mechanism of action. In addition, they have potential use as food preservatives.

The content of phytochemicals varies not only across plants but also between different regions of the same plant. Phytochemicals are found in plants. It is the substances found in plants, such as alkaloids, flavonoids, saponins, terpenoids, steroids, phlobatannins, glycosides, tannins, and so on, that are responsible for the plants' therapeutic effectiveness. All of these secondary metabolites are recognised for their ability to treat a variety of illnesses. For instance. Activities such as antispasmodic, antimalarial, analgesic, and diuretic can be attributed to alkaloids. Terpenoids have been shown to provide a variety of health benefits, including those

that are antiviral, antibacterial, anticancer, antimalarial, and anti-inflammatory. They are also known to suppress the creation of cholesterol and exhibit insecticidal characteristics, making them suitable for storing agricultural products because of their versatility. Saponins are known for their cholesterol-lowering, anti-inflammatory, antiviral, and plant-defense properties. Saponins also have anti-inflammatory and antiviral properties. Phlobatanins are known for their astringent qualities. It has been discovered that glycosides possess antibacterial and antifungal effects. Antioxidant, anti-allergic, antibacterial, and other beneficial properties are associated with phenols and flavonoids.

It is desirable to have knowledge of the phytochemical profiles of various plant parts and plants as a whole. This allows one to select the part of the plant that should be investigated for a particular activity, and it can also assist one in selecting the part or parts that should be chosen for any synergistic evaluation. It is preferable to begin any experiment by knowing the phytochemical profile of the plants being tested rather than selecting the plants at random.

In light of the aforementioned, the current investigation looked into the preliminary qualitative phytochemical contents of seven plants that have a long history of usage as cures or treatments for a wide range of diseases and conditions. These plants are from different parts of the world.

Aervalanata Linn.

Amaranthaceae is the name of the family.

Herb with a suberect growth habit

Distribution: - All Across the Country of India

Vernacular name: - Gorakhganjo

Used parts include the leaf and the stem.

Constituents: - Active constituents Beta-sito sterol, palmitate and alpha- amrin

Treatment of headaches, cough, lithiasis, and removal of kidney stones are some of the uses and actions of this medicine. It keeps the level of sugar in the blood at its optimal level.

Utilization for business purposes: - Leaves use as a vegetable.

Activities that were reported include: Efforts to combat cancer

Exercises that lower blood sugar

Efforts aimed at combating parasites

Activity aimed for preventing urolithiasis

Activity that is protective to the liver

Activity that lowers cholesterol levels

The Combretaceae family includes the species Terminaliabellirica (Gaertn.) Roxb.

Mode of existence: a deciduous tree

Distribution: - All Across the Country of India

Vernacular name: - Beheda

Used parts include the leaf and the stem.

Constituents: - Chebulagic acid, ellagic and ethanedioic acid, palmitic acid, oleic acid and linolic acid

Leucoderma patients can benefit from the bark's anti-inflammatory properties. The fruits are beneficial in treating conditions such as a vitiated vata and pitta, cough, bronchitis, insomnia, dipsia, dropsy, dyspepsia, pharyngitis, flatulence, vomiting, strangury, haemorrhages, ophthalmopathy, splenomegaly, cephalalgia, skin diseases, leprosy, ulcer, fever, and general debility. The oil that is extracted from the seeds can be used to treat skin illnesses, leucoderma, stomach disorders, and premature greying of the hair.

Utilization for business purposes: A fruit that is available for purchase and plays a significant role in the production of ayurvedic medicines

Acetylcholinesterase inhibitory action has been reported as one of the activities.

Exercises that lower blood sugar

Activity detrimental to fertility

Activation of antioxidant defences

Behavioral aspects of reproduction

Healing procedures for wounds

Terminaliachebula Retz. Family: - Combretaceae

Habit: a tree that sheds its leaves annually Distribution: all over India

Vernacular name: - Harde

Used parts include the leaf and the stem.

Constituents: - Chebulic acid, chebulinic acid, chebulagic, neochebulinic acid, punicalagin, corilagin

Action and Uses: - helpful in vitiated conditions of the tridoshas, wounds, ulcers, inflammations, hepatopathy, gastropathy, anorexia, helminthiasis, flatulence, jaundice, haemorrhoids, hepatopathy, splenopathy, pharyngodynia, cough, hiccough, uropathy, and general debility.

Utilization for business purposes: Fruits have tannin, which can be utilised in tanning leather and also in the production of ayurvedic medication.

Analgesic action has been reported, among other activities.

Activity detrimental to fertility

Efficacy in reducing inflammation

Antimicrobial activity

Activation of antioxidant defences

Activation of nephroprotective mechanisms

Plasmid-based activity that cures

Family: - Combretaceae

Mode of existence: a deciduous tree

Distribution: - All Across the Country of India

Vernacular name: - Badam Components utilised: - Leaf

Constituents: - Tannins abundant in the bark, ascorbic acid abundant in the fruit, oil and vitamin B present in the seed

Uses and actions: biliousness, bronchitis, and bowels can all benefit from eating fruit. The juice of the leaves is effective in the treatment of headaches and colic, and it is also employed in the manufacture of an ointment that is used to treat scabies, leprosy, and other skin illnesses. In cases of dysentery and diarrhoea, the root bark is typically administered. The bark is effective in treating bilious fevers.

Commercial value: the oil that is extracted from the kernels can be used in place of almond oil.

Activities that were reported include:

Behavior that is allelopathic

Efforts antibacterial in nature

Activity inhibiting the formation of clasts

Activity against free radicals and microorganisms

Antiulcer activity

Molluscicidal activity

OBJECTIVE

1. To conduct research on the Phytochemical Analysis of Various Medicinal Plants.
2. To conduct research on the Biological Activity of Various Medicinal Plants.

RESEARCH METHODOLOGY

Accumulation of materials derived from plants

Fresh parts of seven different medicinal plants, including Bryophyllumpinnatum (Leaves), Ipomeaaquatica (Leaves), Oldenlandiacorymbosa (Whole plant), Ricinuscommunis (Roots), Terminaliabellerica (Leaves), Tinosporacordifolia (Leaves/Stem), and Xanthium strumarium (Leaves), were collected from the local area. The Department of Botany at Government College,Tonk(Raj.), was tasked with the task of determining the plant samples' taxonomic classification and establishing their authenticity. To prepare the plant materials for grinding, the plant materials were shade dried until all of the water molecules had evaporated and the plants had become sufficiently dry. Following the drying process, the plant components were milled into a fine powder using a mechanical blender. This powder was then placed into airtight containers, given the appropriate labels, and stored for later use.

The preparation of extracts from plants Extraction using hot water

A beaker had 5 grammes of dried and finely powdered plant material, and then 200 millilitres of distilled water was added to the mixture. The mixture was cooked on a hot plate with constant stirring at a temperature between 30 and 40 degrees Celsius for twenty minutes. Following that, the water extract was filtered using filter paper, and the filtrate that was obtained was used for the phytochemical examination. When it was not being used, the water extract was stored in the refrigerator.

Extraction with a solvent

The Soxhlet technique was utilised in the preparation of the crude plant extract. A thimble containing around 20 grammes of powdered plant material was packed evenly, and then 250 millilitres of each of several different solvents were used to extract the substance. Methanol, ethanol, and acetone were the several solvents that were utilised. The extraction process will continue for twenty-four hours, or until the solvent in the syphon tube of an extractor becomes colourless, whichever comes first. Following that, the extract was placed in a beaker, placed on a hot plate, and cooked at a temperature between 30 and 40 degrees Celsius until all of the solvent had evaporated. The dried extract was stored in the refrigerator at a temperature of 4

degrees Celsius so that it may be used in the phytochemical analysis in the future.

a look into the phytochemicals in further detail

Following established protocols, the extract was analysed to determine whether or not it contained any bioactive components.

Test for proteins Millon's examination

When crude extract was mixed with 2 ml of Millon's reagent, a white precipitate emerged. This precipitate turned red when it was heated on a low setting, which demonstrated the presence of protein.

Ninhydrin test

The appearance of a violet colour in the crude extract after it was heated with 2 millilitres of a solution containing 0.2% ninhydrin indicated the presence of amino acids and proteins.

Check for sugars and starches. Test developed by Fehling

After thoroughly mixing an equal volume of Fehling A and Fehling B reagents, 2 millilitres of the resulting solution was added to the crude extract, which was then gently heated. It was determined that there were reducing sugars present when a brick-red precipitate developed at the bottom of the test tube.

The evaluation of Benedict

A reddish brown precipitate was generated after boiling crude extract that had been combined with 2 ml of Benedict's reagent. This result indicated the presence of carbohydrates in the sample.

Molisch's test

After thoroughly shaking the mixture, crude extract was combined with 2 ml of Molisch's reagent and then added to the shaker. After that, 2 millilitres of highly concentrated H_2SO_4 was slowly poured along the side of the test tube in a meticulous manner. Carbohydrate was found when a violet ring appeared in the interphase. This ring showed the existence of carbohydrate.

Iodine test

Iodine solution was added to the crude extract that had been previously combined. The presence of the carbohydrate was denoted by a colouring that was either very dark blue or very purple.

Conduct analyses to look for phenols and tannins.

The crude extract was combined with 2 millilitres of a $FeCl_3$ solution that was 2%. The presence of phenols and tannins was indicated by a colouring that was either blue-green or black.

Test for flavonoidsShinoda test

The crude extract was combined with a few shards of magnesium ribbon, and concentrated HCl was added

drop by drop as the mixture was being stirred. After a few minutes, a reddish pink colour emerged, which was a clear indication that flavonoids were present.

Alkaline reagent test

The crude extract was combined with 2 millilitres of a NaOH solution that was 2%. The formation of a strong yellow colour that became colourless after the addition of a few drops of diluted acid demonstrated the existence of flavonoids in the substance.

Test for saponins

In a test tube, crude extract was combined with 5 millilitres of distilled water, and then the mixture was violently agitated. It was determined that the existence of saponins may be inferred from the fact that stable foam was produced.

Examine the sample for glycosides. Liebermann's test

The crude extract was combined with two millilitres of chloroform and two millilitres of acetic acid, respectively. Ice was used to chill the mixture down. It was added in carefully concentrated H2SO4 form. The presence of steroidal nucleus, also known as the glycone component of glycoside, was indicated by a colour change that progressed from violet to blue to green.

quantitative investigation of phytochemicals total amount of phenolic compounds

The Folin-Ciocalteu reagent method, with some changes, was utilised in order to ascertain the amount of phenol that was present in the aqueous extract. 1 millilitre of plant extract had 2.5 millilitres of Folin-Ciocalteu reagent with a concentration of 10% and 2 millilitres of Na2CO3 solution with a concentration of 2% added to it. The resulting combination was allowed to mature in an incubator at room temperature for a period of fifteen minutes. At a wavelength of 765 nm, the absorbance of the sample was determined. The amount of gallic acid that served as the standard was 1 mg/ml. Every single one of the tests was carried out three times. The findings were analysed on a standard curve, and the findings were presented in terms of the gallic acid equivalent (mg of chemical extracted per gramme).

Total flavonoid content

For the purpose of determining flavonoid content, the aluminium chloride colorimetric method was utilised, albeit with some adjustments. After combining 1 millilitre of sample plant extract, 3 millilitres of methanol, 0.2 millilitres of 10% aluminium chloride, 0.2 millilitres of 1M potassium acetate, and 5.6 millilitres of distilled water, the mixture was allowed to stand at room temperature for half an hour. At a wavelength of 420 nm, the absorbance was measured. The concentration of quercetin that served as the standard was 1 mg/ml. Every single one of the tests was carried out three times. The flavonoid contents were measured using a standard curve, and the results were represented as the quercetin equivalent in milligrammes per gramme of the extracted substance.

RESULTS

The phytochemical properties of seven different medicinal plants that were evaluated are compared and

summarised in table 1. The findings suggested that each of the seven plants under investigation included components with potential therapeutic use. It was clear from the table that all of the plants had proteins, carbohydrates, phenols and tannins, flavonoids, and saponins. These bioactive compounds were all present. Only the leaves of Tinosporacordifolia were found to be devoid of glycosides. Terpenoids were lacking in the leaves of Ipomeaaquatica, roots of Ricinuscommunis, and also in the leaves of Xanthium strumarium, but steroids were absent only in the leaves of Xanthium strumarium. Steroids were absent only in the leaves of Xanthium strumarium. There was no evidence of the presence of alkaloids in the roots of Ricinuscommunis, the leaves of Terminaliabellerica, or the leaves of Tinosporacordifolia.

Table 1.Analyses of the phytochemical components of seven different medicinal plants.

Plants	Proteins	Carbohydrates	Phenols/ Tannins	Flavonoids	Saponins	Glycosides	Steroids	Terpenoids	Alkaloids
Bryophyllumpinnatum (leaves)	+	+	+	+	+	+	+	+	+
Ipomeaaquatica (leaves)	+	+	+	+	+	+	+	-	+
Oldenlandiacorymbosa (leaves)	+	+	+	+	+	+	+	+	+
Ricinuscommunis (leaves)	+	+	+	+	+	+	+	-	-
Terminaliabellerica (leaves)	+	+	+	+	+	+	+	+	-
Tinosporacordifolia (leaves)	+	+	+	+	+	-	+	+	-
Tinosporacordifolia (stems)	+	+	+	+	+	+	+	+	+
Xanthium strumarium (leaves)	+	+	+	+	+	+	-	-	+

Total phenolic contents obtained were 18.4mg/gm, 18.8mg/gm, 11.6mg/gm, 29.2mg/gm, 29.6mg/gm, 40.8mg/gm, 12.8mg/gm, 71.6mg/gm of the extract and total flavonoid contents obtained were 8.4mg/gm, 37.6mg/gm, 4.4mg/gm, 6mg/gm, 42.8mg/gm, 18mg/gm, 6mg/gm, 28.8mg/gm of the extract for the plants Bryophyllumpinnatum (Leaves), Ipomeaaquatica (Leaves), Oldenlandiacorymbosa (Whole plant), Ricinuscommunis (Roots), Terminaliabellerica (Leaves), Tinosporacordifolia (Leaves), Tinosporacordifolia (Stem), and Xanthium strumarium (Leaves) respectively.

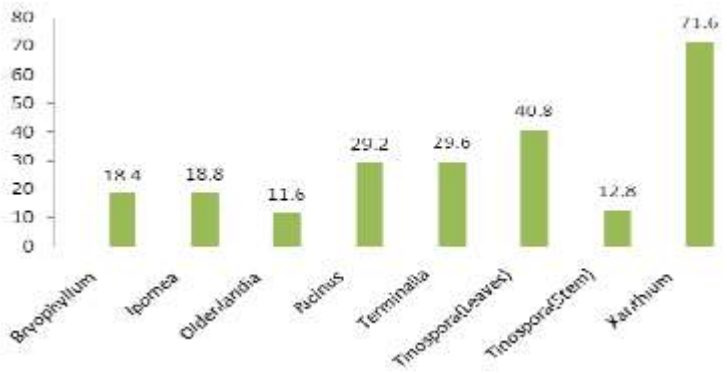

Fig 1.It exhibits the total phenolic content of Bryophyllumpinnatum (Leaves), Ipomeaaquatica (Leaves), Oldenlandiacorymbosa (Whole plant), Ricinuscommunis (Roots), Terminaliabellerica (Leaves), Tinosporacordifolia (Stem), and Xanthium strumarium (Leaves) respectively.

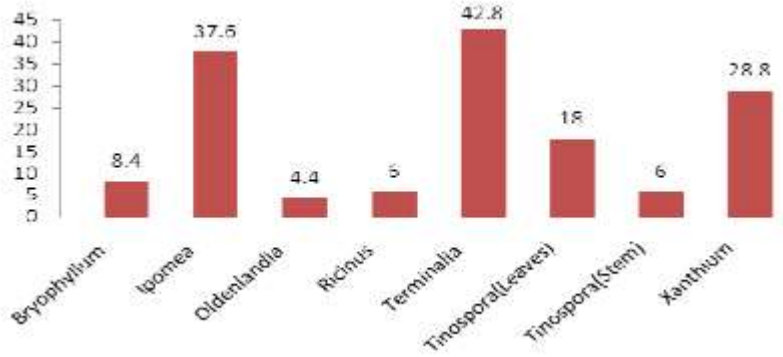

Fig.2. It displays the total flavonoid content of Bryophyllumpinnatum (Leaves), Ipomeaaquatica (Leaves), Oldenlandiacorymbosa (Whole plant), Ricinuscommunis (Roots), Terminaliabellerica, Tinosporacordifolia, and Xanthium strumarium (Leaves) respectively.

DISCUSSION

The phytochemical study that was done on the plant extracts indicated the existence of constituents that are known to exhibit medicinal as well as physiological activities. These constituents were found to have exhibited both of these types of activities. The phytochemicals such as phenols, tannins, flavonoids, saponins, glycosides, steroids, terpenoids, and alkaloids were found after conducting an analysis on the plant extracts.

The phenolic compounds are one of the classes of plant metabolites that is both the most numerous and the most widespread. Antiapoptosis, antiaging, anticarcinogen, antiinflammatory, antiatherosclerosis, cardiovascular protection, improvement of endothelial function, and prevention of angiogenesis and cell proliferation activities are some of the biological qualities that they exhibit. Medicinal plants that are high in phenolic compounds have been the subject of a number of studies, all of which have described the antioxidant effects of these plants. The majority of the phenolic chemicals that make up natural antioxidants come from plants. These compounds include flavonoids, phenolic acids, tocopherols, and others. Tannins have the ability to bind to proline-rich proteins and disrupt the protein synthesis process. Flavonoids are hydroxylatedphenolic chemicals that are known to be produced by plants in response to microbial infection.

It has been discovered that flavonoids are antibacterial agents against a wide array of pathogens when tested in vitro. It is likely that their activity is the result of their ability to form complexes with extracellular and soluble proteins, as well as with the cell walls of bacteria. In addition to this, they possess high anticancer properties and are efficient antioxidants.

Saponins, which are known to exert an anti-inflammatory impact, were found to be present in the plant extracts that were analysed. Saponins are capable of coagulating and precipitating red blood cells due to their unique chemical structure. Bitterness, hemolytic activity, cholesterol binding qualities, and foam production in aqueous solutions are some of the characteristics of saponins. Saponins also have cholesterol binding properties. Steroids, which are particularly essential molecules due to their connection with other compounds such as sex hormones, have been shown to possess antibacterial characteristics, and it has been claimed that they contain these capabilities. Cytotoxicity is one of the common biological features shared by alkaloids, which have a long history of usage in medical applications. Alkaloids have been shown to have analgesic, antispasmodic, and antibacterial effects, according to the findings of a number of researchers. According to numerous publications, glycosides have been shown to have the effect of lowering blood pressure. The findings of this study therefore imply that the detected phytochemical substances might be the bioactive ingredients, and these plants are proving to be an increasingly valuable reservoir of bioactive compounds that have great medical worth.

CONCLUSION

The findings suggested that the plants under investigation had components with potential applications in medicine. There is a large body of information that was obtained in earlier studies that confirmed the phytochemicals in question to be bioactive. The existence of these phytochemicals contributes medicinal as well as physiological properties to the plants that have been examined in the treatment of various disorders, as has been proved by a number of studies. The essences of these plants therefore have the potential to serve as a rich source for the development of effective pharmaceuticals. In addition to the strong recommendation that the practise of traditional medicine be carried out with these plants, it is suggested that additional research be carried out in order to isolating, purifying, and characterising the active constituents that are responsible for the activity of these plants. Additionally, additional research to explain the potential mechanisms of action of these extracts is strongly urged..

REFERENCES

1. GirachRD,KhanH,AhmadM.BotanicalidentificationofThuharseldomusedasUnanimedicine. HamdardMedicus(Pakistan).2003.

2. DjeridaneA,YousfiM,NadjemiB,BoutassounaD, Stocker P, Vidal N. Antioxidant activity of someAlgerianmedicinalplantsextractscontainingphenolic compounds. Foodchemistry.2006Aug1;97(4):654-60.

3. ElujobaAA,OdeleyeOM,OgunyemiCM.Traditional medicine development for medical anddentalprimaryhealthcaredeliverysysteminAfrica.AfricanJournalofTraditional,Complementaryand AlternativeMedicines.2005;2(1):46-61.

4. ElghazaliGEB.MedicinalPlantsinSudan,ResearchInstitute, Khartoum.2003.

5. Elkhalifa MY. Women income generating activitiesand the conservation of rural resources: Medicinal,CulinaryandaromaticplantsintheSudan.Document of the FAO Regional Office of the NearEast. Sustainable Development Department (SD),Food and Agriculture Organization of the UnitedNations(FAO).2003.

6. GehlotDandBoharA.Toxiceffectofvariousplant extracts on the causal organism of typhoidfever.In:CurrentScience.2000;(78):7.

7. Khamis MA, Uhlig HS, Phoris H. Management ofBoswelliapapyrifera stands for resin production inJebel Marra area, west Sudan: present situation andfutureprospects.

8. NiX,SuhailMM,YangQ,CaoA,FungKM,PostierRG,WoolleyC,YoungG,ZhangJ,LinHK.Frankincensee ssentialoilpreparedfromhydrodistillationofBoswelliasacragumresinsinduceshumanpancreaticcancercel ldeathincultures and in a xenograftmurine model. BMCComplementaryandAlternativeMedicine.2012Dec1;12(1):253.

9. deAlmeidaPA,daSilvaTM,EchevarriaA.Mesoionic5-alkyl-1,3-dithiolium-4-thiolates:Synthesis and brine shrimp toxicity. HeterocyclicCommunications.2002;8(6):593-600.

10. P. K. Vayalil, “Antioxidant and antimutagenic properties of aqueous extract of date fruit (Phoenix dactylifera L. Arecaceae),” Journal of Agricultural and Food Chemistry, vol. 50, no. 3, pp. 610–617, 2002.

11. J. A. Vinson, L. Zubik, P. Bose, N. Samman, and J. Proch, “Dried fruits: excellent in vitro and in vivo antioxidants,” The Journal of the American College of Nutrition, vol. 24, no. 1, pp. 44–50, 2005.

12. G. A. Agbor, P. Moumbegna, E. O. Oluwasola et al., “Antioxidant capacity of some plant foods and beverages consumed in the Eastern Region of Nigeria,” African Journal of Traditional, Complementary, and Alternative Medicines, vol. 8, no. 4, pp. 362–369, 2011.