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PHYTOCHEMICAL ANALYSIS OF MEDICINALLY IMPORTANT PLANTS.

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Abstract

India has long been renowned for its abundant biological diversity. Five medicinal plants, including Ipomea aquatica, Ricinus communis, Tinospora cordifolia, Xanthium strumarium, and Bryophyllum pinnatum, were chosen for this investigation. The current study's objectives were to ascertain the total phenolic and flavonoid contents of the chosen medicinal plants as well as to look into the existence of phytochemicals. The organic solvent extraction process was carried out using Soxhlet apparatus. Water, methanol, ethanol, and acetone were the solvents used. The Folin-Ciocalteus reagent method was used to evaluate the total phenolic content of the plant aqueous extracts, while the aluminium chloride method was used to determine the total flavonoid content of the extracts. Every plant analyzed contained Saponins, glycosides, flavonoids, tannins, carbohydrates, alkaloids, terpenoids and steroids. Our research demonstrated the presence of medicinally significant bioactive chemicals in the crude aqueous and organic solvent extracts of the plants under test, supporting their usage in traditional Chinese medicine for the treatment of various illnesses.

Keyword- Flavonoids, tannins, phenols, saponins, steroids.

1.Introduction

Three major benefits can be derived from medicinal plants: health benefits for those who use them as medicines; financial benefits for those who harvest, process, and sell them; and societal benefits like increased employment possibilities, tax revenue, and a healthier work force.

Plant-based medications are widely accessible, less costly, safe, effective, and seldom cause adverse effects. Looking at the current hunt for novel, therapeutically effective medications, including anticancer medicines, the most obvious option is to look at the plants that have been chosen for medical usage over thousands of years. Plant chemicals that are present in fruits, vegetables, grains, legumes, plant leaves, and other naturally occurring materials are called phytochemicals. They are a component of a plant's defensive mechanism and give plants their colour, flavour, and scent.[1] Antihepatotoxic substances and antibacterial medications [2]. The World Health Organization (WHO) states that the greatest place to find a wide range of medications is from medicinal plants. Eighty percent of people in wealthy nations take traditional medicines, which contain ingredients derived from medicinal plants. But more research is needed to fully comprehend the characteristics, safety, and effectiveness of these plants [3]

Mr. Tarun Chandra conducted research on the medicinal plants that the traditional healers in the area utilise to treat disorders connected to reproductive health. He conducted research on steroids, which are used to treat disorders relating to reproductive health.[4]

Dr. Tambekar D.H Studied on medicinal plants in Lonar lake from the result he was concluded that all the medicinal plants in lonar lake have antimicrobial potential and should be further studied for the therapeutic use. These are very commonly available plants, economically affordable and have medicinal properties. So these can be used as herbal drugs without causing any side effects. Hence, study recommends the use of these plants can reduce the common health problems and efficiency to live healthy life. Antimicrobial potential of medicinal plant.[5] Mr Pritish shreshtha studied on Phytochemical screening of the medicinal plants of Nepal in this study he was selected thirty two plants out of these thirty two medicinal plants Fourteen Plants contain steroids. The result reveals that presence of medicinally impotanats constituents in the plants studied. Many plants confirm the identified phytochemical to be bioactive. Extract from these plants could be seen as a good source of useful drugs.[6] Five plants from the local region of maharashtra Ipomea aquatica, Ricinus communis, Tinospora cordifolia, Xanthium strumarium, and Bryophyllum pinnatum, were subjected to qualitative and quantitative phytochemical examination in the current study.

2.Materias and Methods:

2.1 Gathering botanical specimens:

Ipomea aquatic

Ricinus communis

Tinospora cordifolia **Xanthium strumarium**

Bryophyllum pinnatum

In month of September, All the plants are collected from the surround area of Lonar dist-buldana (MS). washed with fresh water and cut into small pieces, and left to dry for seven days at room temperature in the shade. For the phytochemical analysis, the dried leaves and bark were pulverised and kept in airtight containers. The plant materials were thoroughly dried for grinding under a shade canopy until all of the water molecules had vanished. Following drying[7-8]

The plant components were placed in containers for the phytochemical analysis. Using a mechanical blender, grind the material (Mortar and Pestle) thoroughly to a fine powder, then transfer it into airtight containers and properly label them for later use.

3. Preparation of plant extract:

200 ml of distilled water was added to 5g of dried, finely powdered plant material in a beaker. The mixture was cooked for 20 minutes at 35 to 40 degrees Celsius on a hot plate while being constantly stirred. Following that, filter paper was used to filter the water extract, and the filtrate was used for the phytochemical analysis. When not in use, the water extract was stored in the refrigerator.

3.1 Solvent preparation:

The Soxhlet extraction process was used to create crude plant extract. A thimble containing 20g of powdered plant material was filled evenly, and 250 ml of various solvents were used for independent extractions. Acetone, ethanol, and methanol were the solvents used. The extraction procedure lasts for a whole day, or until the solvent in the extractor's syphon tube turns colorless. The extract was then placed in a beaker and cooked at between 35 and 40 degrees Celsius on a hot plate until the solvent had completely evaporated. A refrigerator set at 5ºC was used to store the dried extract in preparation for phytochemical analysis.

4. The qualitative phytochemical analysis was done by using following accepted procedure to test the extract for the presence of bioactive chemicals [9-10].

1. **Test for Saponin detection:**

In a test tube, 5ml of distilled water was combined with crude extract, and the mixture was agitated vigorously. It was believed that the production of stable foam indicated the presence of saponins.

2. **Libermans test for glycoside detection:**

Two millilitres of acetic acid and two millilitres of chloroform were combined with crude extract. Ice was used to chill the concoction. Concentrated H2SO4 was added with care. When the colour changed from violet to blue to green, it meant that the glycone part of the glycoside, or the steroidal nucleus, was present.

3. **Shinoda test for flavonoids detection:**

A small amount of magnesium ribbon pieces were combined with crude extract, and drops of strong hydrochloric acid were added. After a few minutes, a pinkish scarlet hue emerged, signifying the presence of flavonoids.

4. **Alkaline reagent test for flavonoids detection:**

There was a mixture of 2ml of 2% NaOH solution and crude extract. When a few drops of diluted acid were added, the strong yellow hue that had formed went colourless, indicating the presence of flavonoids.

5. **Test for phenols and Tannin:**

   Crude extract was combined with two millilitres of a 2% FeCl3 solution. Phenols and tannins were indicated by a blue-green or black colouring.

6. **Fehling test for carbohydrate detection:**

   Two millilitres of the equal volume Fehling A and Fehling B reagents were added to the crude extract and heated slowly. The test tube's bottom developed a brick-red precipitate, which suggested the presence of reducing sugars.

7. **Benidict test for carbohydrate detection:**

   When 2 millilitres of Benedict's reagent were added to crude extract and heated, a reddish-brown precipitate developed, signifying the presence of carbohydrates.

8. **Test for Alkoloid detection:**

Two millilitres of 1% HCl were combined with crude extract and heated slowly. The mixture was then supplemented with Mayer's and Wagner's reagents. The ensuing precipitate's turbidity was seen as proof that alkaloids were present.

9. **Test for Terpenoid detection**:

Two millilitres of chloroform were used to dissolve the crude extract, which was then allowed to evaporate until it was completely dry. After adding 2 millilitres of concentrated H_2SO_4, this was boiled for approximately 20 minutes. Terpenoids were characterised by a greyish hue.

10. **Test for Steroid detection**:

    Concentrated H_2SO_4 was applied sideways after crude extract and two millilitres of chloroform were combined. The presence of steroids was identified by a red colour formed in the lower chloroform layer. Another test involved combining 2 millilitres of chloroform with crude extract. Next, the mixture was added to 2 millilitres of concentrated H_2SO_4 and acetic acid, respectively[11-12] The appearance of a greenish hue suggested the presence of steroids.

Total flavonoid content :

With few adjustments, the aluminium chloride colorimetric method was utilised to ascertain the flavonoid content. One millilitre of the plant extract was combined with three millilitres of methanol, two millilitres of 10% aluminium chloride, two millilitres of 1M potassium acetate, and five millilitres of distilled water. The mixture was let to stand at room temperature for half an hour. At 425 nm, the absorbance was measured.[13] The typical dose of quercetin was 1 mg/ml. Every test was run in three duplicates. The standard curve was used to calculate the flavonoid levels, which were then represented as quercetin equivalent (mg/g of isolated molecule) [14-15].

Quantitative analysis of phenolic contents:

The Folin-Ciocalteu reagent method was used, with some changes, to determine the amount of phenol present in the aqueous extract. 1 millilitre of plant extract was combined with 2.5 millilitres of 10% Folin-Ciocalteu reagent and 2 millilitres of 2% Na2CO3 solution. The resultant combination was allowed to sit at room temperature for fifteen minutes. At 765 nm, the sample's absorbance was measured. Gallic acid (1 mg/ml) was utilised as the standard.

Every test was run in three duplicates. Gallic acid equivalent (mg/g of extracted substance) was the resultant measure, which was derived from the standard curve [16-17].

Table-I The phytochemical components of seven therapeutic plants were investigated.

Plants name	Saponins	Glycosides	Flavonoids	Tannins	Carbohydrates	Alkaloids	Terpenoids	Steroids
Ipomea aquatic	+	+	+	+	+	+	-	+
Ricinus communis	+	+	+	+	+	-	+	+
Tinospora cordifolia	+	-	+	+	+	-	+	+
Xanthium strumarium	+	+	+	+	+	+	-	-
Bryophyllum pinnatum	+	+	+	+	+	+	+	+

5. Result:

Table 1 provides an overview of the phytochemical properties of the five therapeutic plants that were examined. The five plants under investigation all contained substances that were shown to be medicinally active. The table showed that all of the plants contained Saponins, glycosides, flavonoids, tannins, carbohydrates, alkaloids, terpenoids and steroids. Only the leaves of Tinospora cordifolia lacked glycosides. Terpenoids were absent from the roots of Ricinus communis, the leaves of Xanthium strumarium, and the leaves of Ipomea aquatica, whereas steroids were only found in the leaves of Xanthium strumarium. The leaves of Ricinus communis roots, and Tinospora cordifolia leaves did not contain any alkaloids.

For the plants Ipomea aquatica, Ricinus communis, Tinospora cordifolia, Xanthium strumarium, and Bryophyllum pinnatum, the total phenolic contents were 16.2 mg/gm, 17.6 mg/gm, 12 mg/gm, 24.2 mg/gm, and 68.6 mg/gm of the extract. For the total flavonoid contents, they were 7.4 mg/gm, 34.6 mg/gm, 3.4 mg/gm, 5.4 mg/gm, 26.8 mg/gm,

6. Conclusion:

The findings showed that the plants under study contained components with potential medical uses. Numerous pieces of evidence from previous research supported the identification of the discovered phytochemicals as numerous studies have verified that the existence of these phytochemicals gives the plants under study their physiological and therapeutic qualities, which can be used to cure a variety of illnesses.

As a result, extracts derived from these plants may be a valuable source of medications. These plants are highly recommended for use in traditional medicine, and it is also advised that more research be done to identify, extract, and purify the key ingredients that give these plants their action. Further research is also encouraged to clarify the potential mode of action of these extracts.

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