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Qualitative Phytochemical Screening of *Thuja Occidentalis* and *Araucaria Heterophylla* of Leaf and Stem Extracted In Methanol

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ABSTRACT
The findings of a preliminary phytochemical investigation of extract of Thuja occidentalis and Araucaria heterophylla leaves and stems have been given. The investigation was conducted on both of this plants.The phytochemical analysis of TOLMe and TOSMe plants revealed the presence of phenolic compounds, flavonoids, tannins, alkaloids, phytosterols, terpenoids, and triterpenoids. The plants also included tannins and alkaloids. On the other hand, the AHLMe and AHSMe plant showed evidence of the presence of phenolic group, which included carbohydrates, flavonoids, glycosides, saponins, alkaloids, tannins, terpenoids, diterpenoids, oils, and lipids.
Kew Words-: *Thuja occidentalis, phytochemical analysis, Araucaria heterophylla*

I. INTRODUCTION

Medicinal properties can be extracted from plants. Medical plants serve as a key source of organic chemicals, which are used for physiological effects as well as medical purposes. Some species used primarily for decoration have tremendous value in the field of medicine, such as the separated components of Catharanthus roseus that are employed in cancer treatment . Resin is the primary component of gymnosperm plants. Resins are plant exudates that can be harvested from conifers through tapping. Resins are soluble in organic solvents.

Araucaria is a member of the Araucariaceae family of plant families. ***Araucaria*** and ***Agathis*** are the only two genera within this small family, which has a total of 38 different species of tree. Christmas trees are typically made out of Araucaria heterophylla, which is a type of generic columnar tree. Investigations on the chemical and biological properties of the resin of this genus, which was rumored to exhibit gastroprotective activities , were carried out.

The plant known as ***Thuja occidentalis***, which is a member of the ***Cupressaceae*** family, is yet another option. Rheumatism, migraines, and uterine carcinomas are some of the conditions that can be helped by using this. Anticancer, antiviral, anti-inflammatory, insecticidal, and diabetes-fighting properties have all been uncovered by it .

Compounds that have been obtained via extraction from live organisms are known as natural products. They have been extracted from a limitless variety of different substances . Natural materials have, in addition to their use in the treatment of human ailments, also been put to use in the treatment of a variety of diseases. Unani and Ayurveda are two of the most well-known medical practices in the world that make use of ingredients derived from natural sources. These methods, along with other forms of folklore from a variety of countries, continue to rescue a significant section of the world's population by making use of items derived from the natural world.

The use of plants in the production of medicine is a practice that has been passed down through generations. Plants have served as a fertile breeding ground for medicinal compounds, which are now an essential component of the healthcare system . Because India is the largest producer of medicinal herbs, the country is sometimes referred to as the botanical garden of the globe, which is an apt description. Plants are capable of producing secondary metabolites, which have a wide variety of biological and pharmacological properties, such as anti-allergic, antibacterial, hypoglycemic, and anti-carcinogenic. Plants that are utilized as remedies include a wide array of elements that have the potential to treat a number of ailments, including those that are chronic and infectious. Over the course of the past few years, gas chromatography–mass spectrometry has established itself as the primary technological program for characterizing secondary metabolites across all plant groups.

Metals are the group of materials that are used the most frequently, particularly in mechanical engineering, the transportation business, electronic manufacturing, and the construction industry. Metals can be mined from the earth in the form of ores, where they are found in the form of oxides, silicates, chlorides, and other compounds. Metals have a broad variety of applications in both commercial and domestic settings. They are extracted from the ores by a number of metallurgical processes that require a significant amount of energy. As a result of having a higher energy state, pure metal has a greater propensity to transform back into its complex state. At the surface, metals undergo a transformation that results in the formation of metallic compounds that are known as corrosion products. The majority of well-known inhibitors are organic inhibitors, but in addition to having strong corrosion inhibition efficacy, these inhibitors are expensive, non-biodegradable, and hazardous for both life and the environment. As a result of the drawbacks of existing inhibitors, the researchers were motivated to look for an eco-friendly green inhibitor. The use of extracts derived from plants as corrosion inhibitors is becoming increasingly common in modern times.

II. MATERIALS AND METHODS

Collection of plants

Plants of ***Thuja occidentalis*** and ***Araucaria heterophylla*** of procured from Saharanpur, Uttar Pradesh.

- **Thuja occidentalis**

This species is a member of the ***Cupressaceae*** plant family. Rheumatism, migraines, and uterine carcinomas are some of the conditions that can be helped by using ***Thuja occidentalis***. Anticancer, antiviral, anti-inflammatory, insecticidal, and diabetes-fighting properties have all been discovered in it .

Figure 1: Image of *Thuja occidentalis*

- ***Araucaria heterophylla***

Araucaria is a member of the Araucariaceae family of plants. There are just 38 different species of trees that belong to this tiny family, which include the genera agathis and araucaria. It is a common columnar tree that is decorated to seem like a Christmas tree . Investigations on the chemical and biological properties of the resin of this genus, which was rumored to exhibit gastroprotective activities , were carried out.

Figure 2: Image of *Araucaria heterophylla*

Preparation of plant extract

The components made from the fresh plant parts were allowed to dry out and were then pulverized roughly. After defatting the plant parts powder, a soxhlet extractor was utilized in order to perform a sequence of consecutive methanolic extractions. A rotary vacuum evaporator was used to remove moisture from the methanolic extract as the pressure was lowered. Following extraction using a Soxhlet apparatus maintained at a temperature lower than 60 degrees Celsius, the extract was obtained. The Soxhlet extraction method was chosen for the process of plant extraction because it is simple to implement, requires a short amount of time, is economical due to the fact that only one sample is required for the entirety of the extraction, makes it simple to determine when the extraction process is complete, and presents a lower risk of contamination due to the fact that it is a closed system.

Figure 3: Soxhlet assembly

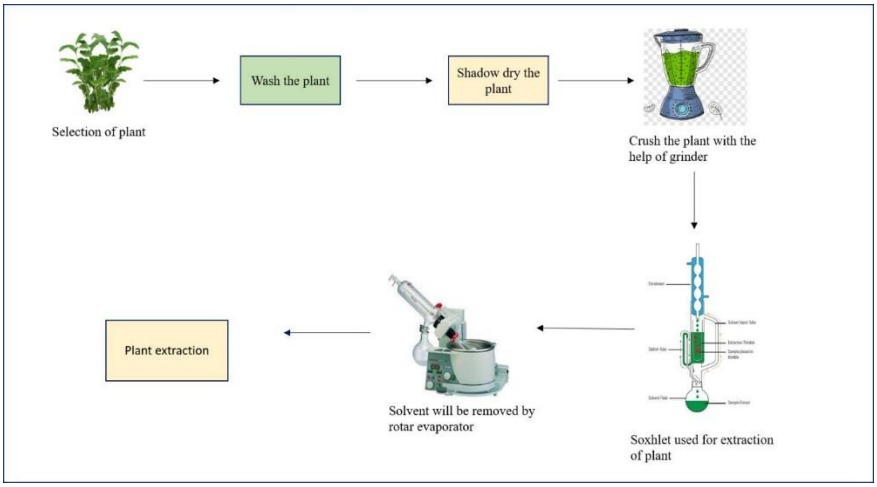

Figure 4: Process of making the plant extract

Materials

During the course of the experiment, many types of analysis, including weight loss, EIS, potentiodynamic polarization, and surface analysis, were performed using the metal sheet . To create a surface that was perfectly smooth, the metal sheet was first cut into squares measuring 2.5 cm2 by 2.5 cm2 before being cleaned using abrasive papers or Emery sheets of grades 320, 600, 1000, 1500, and 2000 respectively. They were cleaned with acetone to remove any oil, washed with distilled water, and then allowed to air dry before being submerged in the corrosive media .

Phytochemical Screening

The screening of the extracts' phytochemical properties was carried out in accordance with the standard techniques provided. Initial phytochemical screening was carried out on the plant extracts in order to identify the various phytocompounds that were found to be present in the plants. the compounds known as terpenoids, glycosides, alkaloids, flavonoids, tannins, saponins, and carbohydrates.

Test for Carbohydrates

A: Molisch test: Around 1 ml of the test sample was taken and 2-3 drops of α-naphthol were added to it. Concentrated sulfuric acid was also added along the side of the test tube. A purple ring was observed at the junction of two liquids that showed the presence of carbohydrates in the samples .

Alkaloid- When a few drops of Mayer's reagent are applied to an alkaloid solution, it results in a whitish yellowish precipitate. After the alcohol extract had evaporated, the remaining material had been heated with 2% hydrochloric acid in a water bath. After cooling, the liquid was filtered,and Mayer's reagent was added in little amounts. Following that, the sample was examined forthe presence of turbidity or yellow precipitation .

Test for Glycosides

A: Keller killani test: Approximately 2 ml of test extracts were taken and dissolved with 3 ml glacial acetic acid and 1 ml of 5% ferric chloride solution. This solution was carefully transferred to 2 ml concentrated. H_2SO_4 and changes were observed .

Test for Flavonoids

A: Lead Acetate Test: Test samples were mixed with lead acetate solution. The formation of a yellow color precipitate will indicate the occurrence of flavonoids .

B: Alkaline reagent test: Dil. NaOH was dissolved with 1 ml of the test sample and results in a yellow color formation .

Tests for Saponins

A. Froth test: 5 ml of distilled water was added to around 0.2 grams of the extract, and the mixture was properly mixed before boiling. Saponin is present if foaming is seen .

Test for Steroids - Concentrated sulphuric acid was added after 4 mg of extract had been treatedwith 0.5 ml of acetic anhydride and 0.5 ml of chloroform. Steroids are detected by the presenceof a greenish-bluish color .

Test for proteins and amino acid

A: Ninhydrin test: Around three drops of 5% ninhydrin solution was heated with 3 ml of thetest solution and boiled for 10 minutes in a water bath and color change was observed .

B: Biuret test: Treatment of 1% $CuSO_4$ and 4% NaOH with test sample results in theappearance of pink or violet color .

Test for tannins

Ferric chloride test- The extract was heated with water and filtered in little amounts. When two drops of ferric chloride were added to the filtrate, the development of a blue-black or greenish- black precipitate in the presence of the ferric chloride was interpreted as a sign that tannins were present .

Test for phytosterols

Drops of concentrated H_2SO_4 were added to the plant extract, shaken well and allowed to stand,resulting in a red color in the lower layer.

Test for cholesterols

2 ml of $CHCl_3$ and 10 drops of conc. acetic anhydride was added to the plant extract then add adrop of conc. H_2SO_4 then gives red rose color.

Test for Terpenoids

The plant extract was added to 2 ml of $CHCl_3$ and 3 ml of conc. H_2SO_4 was then put on heatingin a water bath which led to a grey color in the solution determining the presence of terpenoids .

Test for Diterpenes

Plant extraction was dissolved in distilled water then 3-4 drops of copper acetate solution which gives green color.

Test for Lignin

Extraction of the plant was added to gallic acid then olive green color was observed.

Test for Carotenoids

Extraction of the plant evaporated to dryness then drops of a saturated solution of antimony trichloride in $CHCl_3$ were added which changes the bluish-green color to red.

Test for Anthocyanins

To the test sample, 2 ml of HCl and 1-2 ml NH_3.The pinkish red solution which turns out to be bluish violet after the addition of NH_3.

Test for Phenols

A: 5% FeCl3 solution- A small amount of leaf extract was warmed after being mixed with water separately. About 2 ml of a 5% ferric chloride solution was added, and the production of any green or blue color that would be a sign of phenols was examined.

Tests for Fats and Oils

A: Spot test: Filter paper was taken and one drop of the extract was applied to it. The filter paperwas air-dried and allowed the solvent to vaporize. The appearance of oily stains on filter paper confirmed the existence of fixed oils.

III. RESULTS AND DISCUSSIONS

Phytochemical Estimation

Table 1: Qualitative Phytochemical screening of *Thuja occidentalis* and *Araucaria heterophylla* of leaf and stem extracted in methanol.

Phytoconstituents	TOLMe	AHLMe	TOSMe	AHSMe
Carbohydrates	-ve	+ve	-ve	+ve
Alkaloid	+ve	+ve	+ve	+ve
Glycosides	-ve	+ve	-ve	+ve
Flavonoids	+ve	+ve	+ve	+ve
Saponins	-ve	+ve	-ve	+ve
Proteins and amino acids	-ve	-ve	-ve	-ve
Tannins	+ve	+ve	+ve	+ve
Phytosterols	+ve	-ve	+ve	-ve
Cholesterol	-ve	-ve	-ve	-ve
Terpenoids	+ve	+ve	+ve	+ve
Triterpenoids	+ve	+ve	+ve	+ve
Lignin	-ve	+ve	-ve	+ve
Carotenoids	-ve	-ve	-ve	-ve
Anthocyanins	-ve	-ve	-ve	-ve
Oils and fats	+ve	+ve	+ve	-ve
Phenolic compounds	+ve	+ve	+ve	+ve

The phytochemical analysis of TOLMe and TOSMe plants revealed the presence of phenolic compounds, flavonoids, tannins, alkaloids, phytosterols, terpenoids, and triterpenoids. The plants also included tannins and alkaloids. On the other hand, the AHLMe and AHSMe plant showed evidence of the presence of phenolic group, which included carbohydrates, flavonoids, glycosides, saponins, alkaloids, tannins, terpenoids, diterpenoids, oils, and lipids .

IV. CONCLUSION

The plants also included tannins and alkaloids. On the other hand, the AHLMe and AHSMe plant showed evidence of the presence of phenolic group, which included carbohydrates, flavonoids, glycosides, saponins, alkaloids, tannins, terpenoids, diterpenoids, oils, and lipids. The investigation was conducted on both of these plants. The phytochemical analysis of TOLMe and TOSMe plants revealed the presence of phenolic compounds, flavonoids, tannins, alkaloids, phytosterols, terpenoids, and triterpenoids.

REFERENCES

[1]. Atanasov, A. G., Waltenberger, B., Pferschy-Wenzig, E. -M., Linder, T., Wawrosch, C., Uhrin, P., Temml, V., Wang, L., Schwaiger, S., Heiss, E. H. (2015). Discovery andresupply of pharmacologically active plant-derived natural products: A review. Biotechnology advances, 33(8), 1582-1614.

[2]. Shukla, S., Mehta, A. (2015). Anticancer potential of medicinal plants and their phytochemicals: a review. Brazilian Journal of Botany, 38(2), 199-210.

[3]. Verma, R. S., Padalia, R. C., Goswami, P., Verma, S. K., Chauhan, A., Darokar, M. P. (2014) .Chemical composition and antibacterial activity of foliage and resin essential oils of Araucaria cunninghamii Aiton ex D. Don and Araucaria heterophylla (Salisb.) Franco from India. Industrial Crops and Products, 61, 410-416.

[4]. Akkol, E. K., İlhan, M., Demirel, M. A., Keleş, H., Tümen, I., Süntar, İ. (2015). Thuja occidentalis L. and its active compound, α-thujone: Promising effects in the treatment of polycystic ovary syndrome without inducing osteoporosis. Journal of ethnopharmacology, 168, 25-30.
[5]. Singh, I. P., Ahmad, F., Chatterjee, D., Bajpai, R., Sengar, N. (2021). Natural products: Drug discovery and development. In: Drug Discovery and Development.Springer, 11-65.
[6]. Mukherjee, P. K. (2019), Traditional Systems of Medicine and Harmonization, Quality Control and Evaluation of Herbal Drugs, 1-28.
[7]. Ahmad, R. S., Hussain, M. B., Saeed, F., Waheed, M., Tufail, T. (2017). Phytochemistry, metabolism, and ethnomedical scenario of honey: A concurrent review. International journal of food properties, 20, S254-S269.
[8]. Waseem, R., Low, K. H. (2015). Advanced analytical techniques for the extraction and characterization of plant-derived essential oils by gas chromatography with mass spectrometry. Journal of separation science, 38(3), 483-501.
[9]. Caines, S., Khan, F., Shirokoff, J. (2013). Analysis of pitting corrosion on steel under insulation in marine environments. Journal of Loss Prevention in the process Industries, 26(6), 1466-1483.
[10]. Singh, P., Ebenso, E. E., Olasunkanmi, L. O., Obot, I., Quraishi, M. (2016). Electrochemical, theoretical, and surface morphological studies of corrosion inhibition effect of green naphthyridine derivatives on mild steel in hydrochloric acid. The Journal of Physical Chemistry C, 120(6), 3408-3419.
[11]. Aljamali, N. M., Mohsin, N. M. B., Ali, H. N. (2019). Review on corrosion and rust inhibition of machines in chemical engineering field. International Journal of Thermodynamics and Chemical Kinetics, 5(1), 1-9.
[12]. Cragnolino, G. A. (2021). Corrosion fundamentals and characterization techniques. In: Techniques for corrosion monitoring. Elsevier, 7-42.
[13]. Sastri, V. S. (2015). Challenges in corrosion: costs, causes, consequences, and control. John Wiley & Sons, 95-402.
[14]. Yang ,Y., Khan, F., Thodi, P., Abbassi, R. (2017). Corrosion induced failure analysis of subsea pipelines. Reliability Engineering & System Safety, 159, 214-222.
[15]. Dobkowska, A., Castillo, M. D. H., Turnbull, J. P., Ramamurthy, S., Zagidulin, D., Moser, D. E., Behazin, M., Keech, P. G., Shoesmith, D. W., Noël, J. J. (2021). A comparison of the corrosion behavior of copper materials in dilute nitric acid. Corrosion Science, 192, 109778-109789.
[16]. Esmaily, M., Svensson, J., Fajardo, S., Birbilis, N., Frankel, G., Virtanen, S., Arrabal, R., Thomas, S., Johansson, L. (2017). Fundamentals and advances in magnesium alloy corrosion. Progress in Materials Science, 89, 92-193.
[17]. Srinivasan, S. (1992). Electrode Kinetic and Electrocatalytic Aspects of Electrochemical Energy Conversion. Electrochemistry in Transition, 577-602.
[18]. Ujjain, S., Ahuja, P., Kanojia, R. (2021). Electrochemical studies of green corrosion inhibitors. Theory and Applications of Green Corrosion Inhibitors, 86, 91-126.
[19]. Khan, A., Qurashi, A., Badeghaish, W., Noui-Mehidi, M. N., Aziz, M. A. (2020). Frontiers and challenges in electrochemical corrosion monitoring; surface and downhole applications. Sensors, 20(22), 6583-6617.
[20]. Quraishi, M., Nayak, D., Kumar, R., Kumar, V. (2017). Corrosion of reinforced steel in concrete and its control. An overview. Journal of Steel Structures & Construction, 3(1), 1-6.