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Phytochemical Characterization Of Commiphora Wightii Plant (Guggul) Extract

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Abstract: In recent years, Guggul has become one of the most widely used medicinal herbs by Ayurvedic practitioners for a variety of medical conditions. In some Ayurvedic scriptures, Guggul is also called "Pura", meaning "a substance that protects against disease". Guggul has been part of the Ayurvedic medical system for centuries for the treatment and management of a variety of health disorders including obesity, cholesterol, arthritis, skin diseases, thyroid, nervous system abnormalities, inflammation, diabetes, respiratory disease, and kidney problems. This research is aimed to investigate the phytochemical content of Guggul. The holistic science of Ayurveda recognizes this herb as a powerful Rasayani Dravya and mentions it in the Ayurvedic scriptures of Charaka Samhita and Raj Nighantu

IndexTerms **– Guggul, phytochemical content, holistic science.**

I. INTRODUCTION

The plant Commiphora wightii (Guggul) emits an aromatic or aromatic oleoresin pale resin called gum guggul or guggulu from its bark and has a balsamic scent. The plant Commiphora wightii (Guggul) is found in northern India, particularly in Asia and North Africa. Guggul has been used for hundreds of years in Ayurveda, a traditional Indian medicine, to treat many ailments of the body such as arthritis, atherosclerosis, gout, blood, diuretic, thyroid stimulant, liver tonic, expectorant, appetite stimulant, obesity. and urinary tract infections. This oleoresin is also known for its use as a mouthwash for stomach ulcers and throat infections. Also, guggul is widely used in the Indian subcontinent to fight high cholesterol and boost metabolism. Guggul is an elaborate combination of many chemically materials like terpenoids, diterpenoids, steroids, and flavonoids aside from many inorganic compounds. Guggulsterones, myrrhanol, eugenol, and so forth. isolated from Guggul had been recognized as the powerful bioactive constituent chargeable for lots of its healing benefits. Apart from this, it is considered a potent bioactive ingredient with many therapeutic properties. In the herbal market guggul attracts new customers worldwide. More than 50 formulations of Guggul are sold in the Indian market under brands such as Himalaya, Patanjali, and Baidyanath Pharmaceuticals. It is also used as an excellent binder and mixed in various herbal formulations. The Commiphora wightii plant is one of the most advanced plants for gum and resin production, so the plant is under the IUCN red list and various approaches were made by way of diverse agencies to conserve this species of plant via plant tissue lifestyle strategies. The medicinal value of this plant, especially its secondary metabolites, play an important role. Phytochemical analysis revealed the presence or absence of alkaloids, flavonoids, proteins, quinons, reducing sugars, saponin, and phenolics.

II. MATERIAL AND METHODS

Commiphora wightii (Arn.) is an important member of the myrrh family (Burseraceae). The plant is a small tree 4-6 feet tall with thin leaves. The plant grows in northern India and is reported to be found in the arid and semi-arid climates in the soils of the states of Rajasthan, Karnataka and Gujarat. Oleoresin is a commercial part of the plant. It is excreted from special cells or channels in the plant, especially from the stem bark. It contains 6.9% water, 0.6% essential oil, 61% resin, 29.6% gum and 3.2% insoluble matter. This study now includes evaluation of the active phytochemical analysis of Guggul's gum-resin fraction. The gum of the Commiphora wightii plant was collected was taken to the laboratory and analyzed in October 2022, then washed with clean water. It was air-dried on filter paper at room temperature and ground it into powder under aseptic conditions with the help of sterile mortar and pestle. The remaining dry powder was extracted by the following method

2 .1 Extract preparation

Gum-resin of guggul were extensively washed under running tap water for removal of dust particles and epiphytic hosts normally found on the surface, followed by washing with sterilized distilled water. They were further air-dried on filter paper at room temperature and then powdered with the help of sterilized pestle and mortar under aseptic condition. Dry powder was further extracted by using following methodologies.

2.1.1 Water Extraction

The dry powder of the herb (10 g) was mixed well in 100 ml of sterile distilled water and kept at room temperature for 24 hours in an orbital shaker at 150 rpm. The solution was further filtered using muslin cloth. Centrifuge the filter at 5000 rpm for 15 minutes. The supernatant was then filtered by Whattman filter No.1 under strict aseptic conditions and the filtrate was collected in sterile test tubes before whey. Prepared aqueous extracts had concentration of 100 mg/ml. The test tubes were covered with cotton and placed in the refrigerator at 4°C until next use.

2.1.2 Organic solvent extraction

The dry powder of the plant (10 g) is thoroughly mixed with 100 ml of organic solvent such as methanol. Place the mixture in an orbital shaker at 150 rpm for 24 h at room temperature. Filter the solution with muslin and use No. 1 Whitman filter. The filtrate was concentrated by complete evaporation of the solvent at room temperature (25°C) to obtain a pure extract. Solutions of the crude extracts from methanol solvent were prepared by mixing the appropriate amount of dry extract with the corresponding solvent to obtain a final concentration of 100 mg/ml. After all drugs were filled into sterile bottles, they were stored in the refrigerator at 4 °C until the next use.

2.2 Phytochemical tests

Phytochemical tests on methanolic and aqueous extracts of myrrh were performed using standard methods to identify and confirm the presence of compounds in the extracts.

2.2.1 Alkaloid Test

Mayer test: 50 µl of methanolic and aqueous extracts of C.wightii are treated with 1.36 g of mercury chloride and 5 g of potassium iodide in 100 ml of distilled water and checked for formation of liquid sticky precipitate.

Wagner Reagent: 10-50ul extract was treated with 1.27g iodine and 2g potassium iodide in 100ml distilled water .

2.2.2 Flavonoid Test

NaOH and HCL Test: Treat a small amount of the extract with aqueous NaOH and HCL and observe a yellow-orange color formation.

H2SO4 Test: The extract is treated with concentrated solution of sulphuric acid and orange color formation are observed.

2.2.3 Protein test

Millon test: Mix 2 ml of Millon reagent with plant extract and look for a white color that turns red at slow boiling, confirm there is too much protein.

Ninhydrin test: The extract is treated with 2 ml of 0.2% ninhydrin and produces blue and purple colors indicating the presence of amino acids and proteins, respectively.

2.2.4 Tannin Test:

Extract treated with 10% lead acetate and observe the formation of a white precipitate.

2.2.5 Carbohydrates and reducing sugars tests :

Fehling test: Fehling A and Fehling B reagents are mixed together, 2 ml are added for extraction, brought to a boil and cooled in a water bath. A brick-red precipitate appears at the bottom of the test tube, indicating low sugar.

Benedict test: Commiphora wightii plant extract was mixed with 2 ml of Benedict's reagent and boiled to see if a reddish-brown precipitate formed, indicating the presence of carbohydrates.

2.2.6 Test for phenolic compounds

Treat Guggul extract with 10% NaCl solution and observe its sweet color.

2.2.7 Saponin Test:

Dilute 1 ml of each Gürgül extract with 20 ml of distilled water and shake well in a test tube to see if foam forms at the top of the tube, inform that there are saponins in myrrh extract.

2.2.8 Glycoside test:

Take about 0.5 g of methanol gum extract into a test tube, add 1 ml of glacial acetic acid with traces of ferric chloride. Add 1 ml of concentrated sulfuric acid to the solution, see if the junction between the two layers is red-brown and if the top layer turns blue-green in the presence of glycosides.

2.2.9 Steroid test:

2ml of chloroform and concentrated sulphuric acid were added in aqueous extract, if lower chloroform layer appeared red, it indicates presence of steroids.

III RESULTS AND DISCUSSION

In this study, various phytochemical tests of aqueous and organic extracts confirmed the presence of different metabolites such as terpenoids, flavonoids, saponins, tannins, proteins, alkaloids, glycosides, and steroids. These show that the extract is enriched in most of the secondary metabolites. Many researchers have indicated that guggulu is a complex mixture of steroids, , carbohydrates,aliphatic esters, diterpenoids,and a different inorgranic compounds Cholestrol and sesamin had been isolated .Sukh Dev et al also isolated EGuggulsterone , Z-Guggulsterone, Guggulsterol I ,Guggulsterol II , Guggulsterol III. Antimicrobial activity was observed by A Zaid et al against E.coli and Bacillus subtilis which may be due to different bioactive compounds present in the plant of Commiphora wightii, they also noted that very less or no activity is observed against Enterobacter aerogene

3.1MEDICINAL USES

Guggul means "fighting disease". It is mainly used in the treatment of obesity and hyperlipidemia. Other uses include anti-inflammatory, astringent, rheumatoid arthritis, blood enrichment, diuretic, thyroid stimulant, heart booster, stomach stimulant, expectorant, carminative, sedative, and appetite suppressant. Oleo gum resin is also known for cosmetic use to treat mild infections and mouthwash for throat infections. Guggul is one of the main or secondary ingredients of many drugs or drugs. It is also recommended for asthma, laryngitis and bronchitis. It is also used for gout and heart diseases. The steroids found in Guggul have been associated with hypolipidemic and anti-inflammatory activity.

IV CONCLUSION

From this study it can be concluded that various phytochemicals such as alkaloids, flavonoids, Saponins, & Tannin have been confirmed in all the Commiphora wightii plant. The evidence of antimicrobial interaction between various extract of these plants and their effects are associated with the presence of phytochemicals like steroid, saponins, tannins, flavanoids, and alkaloids which have been shown to possess antimicrobial properties. So, this plant can be used to discover bioactive compounds that may serve as lead for the development of new pharmaceutical agents for therapeutic needs & the plants like googul are one of our greatest gifts.

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