PHARMACOLOGICAL PROPERTIES OF COMMIPHORA WIGHTII Arn. BHANDARI – AN OVERVIEW

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ABSTRACT

Medicinal plants are those in which one or more of its organ contains substances that can be used for the therapeutic purposes or which, are precursors for the synthesis of useful drugs. Commiphora wightii (Burseraceae) is a most important medicinal plant in Ayurveda, Unani and Siddha system. Many biological effects have been demonstrated on lipid metabolism, thyroid hormone homeostasis, female reproductive tissues, and endogenous nuclear hormone receptors. Gum of guggul used in incense, lacquers, varnishes, and ointments, as a fixative in perfumes, and in medicine. Therapeutic uses include treatment of nervous diseases, leprosy, muscle spasms, opthalmia, skin disorders, ulcerative pharyngitis, hypertension, ischaemia, and urinary disorders. Therefore, present review is an overview of phytochemical, and pharmacological properties of plant.

Keywords: Commiphora wightii, Commiphora mukul, Pharmacognosy; Phytochemistry.

INTRODUCTION

Commiphora wightii (Syn. Commiphora mukul; Balsamodendron wightii; B. roxburghii; B. mukul) is a stunted bush with spinescent branches belonging to family Burseraceae. It is a shrub or small tree, attaining maximum height of 4 m, with thin papery bark, and thorny branches. The leaves are simple or trifoliate, the leaflets ovate, 1-5 cm long, 0.5-2.5 cm broad, irregularly toothed. Gynodioecious with some plants bearing bisexual and male flowers and others with female flowers. The individual flowers are red to pink, with four small petals1-3.

Oleogum resin obtained from Commiphora mukul used for the medicinal preparation and commercially known as Indian bdellium or Guggul and the extract of this gum, called gugulipid, guggulipid or guggul and has been a key component in ancient Indian Ayurvedic, Unani and Siddha system of medicine. Its generic name derived from a Greek word Kommi = gum and Phero = to bear because it is rich in gum exudation from the trunk of the plant. It’s found as a wild plant in some parts of South-West and North-Western regions of India including Mysore and Rajasthan and act as a good tolerant of poor soil1. In different ancient system called by different names as in Ayurveda known by the name of Guggulu, Pur, Kumbha, Palamkasna, Mahishaaksha, in Unani system as Muqil, Guggul; in Siddha system as Kungilyam. In Ayurveda five types of Guggulu are reported namely; Krishnan (black), Peet varn (yellow), Neel (blue), Kapish (light brown) and Rakt (blood red); among which only first two are suitable for human consumption2.

Oleogum resin contains 31% gum, 5.8% resin, 30% oil, and 12.7% ash. With respect to lipids, it contains 10-25% triglycerides, 12-15% sterols, 0.5-1% free fatty acids, and 2% of phospholipids. Oleogum resin obtained from Commiphora mukul used for the medicinal preparation and commercially known as Indian bdellium or Guggul and the extract of this gum, called gugulipid, guggulipid or guggul and has been a key component in ancient Indian Ayurvedic, Unani and Siddha system of medicine. Its generic name derived from a Greek word Kommi = gum and Phero = to bear because it is rich in gum exudation from the trunk of the plant. It’s found as a wild plant in some parts of South-West and North-Western regions of India including Mysore and Rajasthan and act as a good tolerant of poor soil1. In different ancient system called by different names as in Ayurveda known by the name of Guggulu, Pur, Kumbha, Palamkasna, Mahishaaksha, in Unani system as Muqil, Guggul; in Siddha system as Kungilyam. In Ayurveda five types of Guggulu are reported namely; Krishnan (black), Peet varn (yellow), Neel (blue), Kapish (light brown) and Rakt (blood red); among which only first two are suitable for human consumption2.

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The various types of compounds were obtained from different parts of Commiphora wightii. As per constituents, it contains 6.9% moisture, 0.6% volatile oil, 61% resin, 29.6% gum, and 3.2% insoluble substances. In flowers quercetin, 3-0-α-L-arabinoside, 3-0-β-D-galactoside, 3-0-β-D-galactoside, 3-0-β-D-glucoronic, elagic acid and palargonidin 3, 5-di-O-glucoside were obtained. While linoleic, oleic, palmitic and stearic acids, campesterol, cholesterol, β-sitosterol, stigmastanol and α-spinasterol are present in myrcene, dimyricene (comphorene), polyhydroxy, geraniol, 1,8-cineole, methyl chavicol, α-pinene, methyl heptanoate, eugenol, and caryophyllene were present in its essential oil and seed oil3,4.

Oleogum resin is the economically viable part of the plant. It is excreted by specialized cells or ducts in plants, especially from stembark. The gum resin contains guggulsterones Z and E, guggulsterol B-IX, two diterpenoids, a terpene hydrocarbons cembrene A, and a deterpeneakholoh malukol, alpha-camphorone and cembrene; long chain of aliphatic tetrol octadecan-1,2,3,4-tetrol, eicosan-1,2,3,4-tetrol and nonadecan-1,2,3,4-tetrol, Myrrhanol A and myrrhanone A1,12,11,21,22.
PHARMACOLOGICAL ACTIVITY

Pharmacological activities of guggul have been reported from several decades; since 1979 the work is going on in continuation by several researchers and up to now research work is progressed in the treatment of several diseases. It useful in the treatments of nervous diseases, hemiplegia, leprosy, marasmus, muscle spasms, neuralgia, ophthalmia, pyelitis, pyorrhea, scrofula, skin diseases, spongy gums, ucerative pharyngitis, hypertension, ischaemia, hypetension, hemorrhoids and urinary tract.

The antioxidant property of guggul helps to stop the oxidation of cholesterol and subsequent hardening of the arteries, reduces the stickiness of platelet and also lowers the risk of coronary artery disease. It increases the fecal excretion of bile acids (cholic and deoxycholic acids) and cholesterol not only this it lows the intestinal absorption of fats and cholesterol. It also has capacity to enhance the production of thyroxin and triidothyronine, these hormones increase the metabolism of carbohydrates and protein synthesis that’s helps in lowering the lipid activity and not only it reduces the lipid activity but also helps to reduce lipid peroxidation, xanthine oxidase. It was also reported that the guggulipid increased the levels of norepinephrine, dopamine, and dopamine β-hydroxylase activity in the heart and brain tissues of rhesus monkeys in a dose-dependent manner.

The guggul steroid can also be converted into animal steroid eg pregnenolone like diosgenin of yam thus offering an alternative to diosgenin. The bioactive components as guggulsterone Z and E, commonly used for lowering the high blood cholesterol and lipids synthesis by acting as antagonist to farnesoid X receptor, a nuclear hormone receptor that activated by bile acid. It significantly lowers the triglycerides serum and cholesterol, but LDL and VLDL cholesterol help in protection against atherosclerosis. Guggulsterones E and Z were the most potent inhibitors of nitric oxide (NO) production, followed by myrrhanol A and myrrhanone A. More recently, C. mukul was found to be a relatively safe and effective supplement for osteoarthritis of the knee.

Guggulsterone increased by in vitro techniques because recent research reported that the callus of C. wightii have higher amount of bioactive compound than in vivo. While the lipophilic extract of guggul combined with a mixture of phosphate salt it results in to weight loss, fat loss and mood elevating property.

Ferulates an important bioactive constituent identified from the guggul gum and play a significant role in in vitro cytotoxicity by decreasing the cell viability in MCF-7 (breast) tumor cells, PC-3 (prostate) tumor cells, and in parental and transfected P388 cells. Therefore ferulates compounds used in the methods for prevention and treatment of abnormal cell growth and proliferation of inflammation, neoplasia, and cardiovascular disease. Another compound Myrrhanol A (terpene) also isolated from guggul displays its potent anti-inflammatory effect on exudative pouch fluid, angiogenesis and granuloma weights in adjuvant-induced air-pouch granuloma of mice.
The methanolic extract of guggul gum has an active compound 5(1-methyl, 1-amoenoethyl)-5-methyl-2-octanone possesses a significant antibacterial activity against Gram-positive bacteria and moderate activity against Gram-negative bacteria. Its extract also has anti-inflammatory activity equal tophenylbutazone and ibuprofen in reducing the severity of secondary lesions and it also helpful in treatment of arthritis. Along with its importance it also has some side-effects with the crude gum. It can cause skin rashes, irregular menstruation, diarrhea, headache, mild nausea and very high doses it cause toxicity in liver. Always caution is recommended for the peoples with the liver disease, inflammatory bowels, or diarrhoea. Gum guggul interact with several drugs and it is avoided during the pregnancy as it can cause hiccups, apprehension and restlessness.

CONCLUSION
Medicinal plants produce bioactive compounds which used mainly for medicinal purposes therefore all pharmaceutical industries focusing towards design and development of new plant based drugs by the help of traditional system used in Ayurveda, Uninani and Siddha. By screening of available literature on C. wightii is most popular plant from ancient to modern period for treatment of several human ailments. In recent years researchers are exploring the therapeutic potential of this plant and many more properties yet to be known.

ACKNOWLEDGEMENT
The author is thankful to the Director and all staff members of the Homeopathic Pharmacopoeia Laboratory, Department of AYUSH, Ministry of Health and Family Welfare, Ghaziabad.

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