

A review on phytochemical properties of *Commiphora wightii* (Arn) bhandari with reference to its medicinal use

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ABSTRACT

Commiphora wightii is a medicinal plant belonging to the burseraceae family and well known for its healing properties. This plant has ancient records for its medicinal importance in our traditional ayurvedic system. Oleo resin extracted as raw material to further process of different phytochemical that used in different therapeutic purpose. *Commiphora wightii* contains large number of phytochemical steroids, guggultetrol, lignans, amino acid, flavanoid and terpenoids. It has endowed with enormous pharmacological values due to various types of guggulsterones. The therapeutic uses include curing ophthalmia, nervous disorder, leprosy, hypertension, ulcerative pharyngitis, skin diseases and urinary diseases. Due to high medicinal value it has been extremely exploited and consequently threatened on the verge of extinction in future. The plant possessed protection under conservative law and regulate by sustainable use for medicinal purpose.

Keywords: Phytochemical; *Commiphora wightii*; Medicinal use; Protection; Extinction

Introduction

Commiphora wightii is well known as guggul and highly demanded for its various medicinal properties in our traditional medicine since Vedic era [1]. It is small in size and branchy shrub which belongs to burseraceae family. *Commiphora wightii* is distributed in arid, rocky area In Indian-subcontinent, *Commiphora* spp. occurs in India, Pakistan and Baluchistan. In India, it occurs in the aridrocky tracts of Rajasthan, Gujarat, Madhya Pradesh, Karnataka and Kalat division of Andhra Pradesh as well as Sindh and Baluchistanstates of Pakistan. Oleogum resin obtained from *Commiphora wightii* used for the medicinal preparation and commercially known as Indian bdellium or Guggul and the extract of this gum, called gugulipid, guggulipid or guglipid, located in ducts of the soft underbark [2]. The resin secretedis allowed to harden before it collected, and it collected from May to June followed by tapping process done during November to January. The yellowish oleoresin collected in the form of pale yellow, aromatic fluid, flows out from bark that turn into a stalactic piece 250-500 g in season [3].

It is antiseptic, ecboic, appetizing, aphrodisiac, emmenagogue, expectrorant and used as menorrhagia, anaemia, leucorrhoea, rheumatism, nervous diseases, bone fracture, obesity, disorder lipid metabolism and peptic ulcer [4]. Due to high demand in international market it has been over exploited for oleo gum resins, consequently plant has listed as critically endangered in 2015 by IUCN Red list assessment. So that conservation purpose government has banned its export from India [5].

Literature Review

Morphological of plant

Commiphora wightii (Guggal, Guggul or Mukul myrrh tree) is a flowering plant in the family Burseraceae. It is a shrub or small tree, attaining maximum height of 4 m, with thin papery bark, and thorny branches [6]. 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 petals [7].

Phytochemical properties

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 [8]. In flowers quercetin, 3-O- α -L-arabinoside, 3-O- β -D-galactoside-, 3-O- α -L-rhamnoside and 3-O- β -D-glucuronide, elagic acid and pelargonidin 3, 5-di-O-glucoside were obtained. While linoleic, oleic, palmitic and stearic acids, campesterol, cholesterol, β -sitosterol, stigmasterol and α -spinasterol are present and myrcene, dimyrcene (comphorene), polymyrcene, geraniol, 1,8-cineole methyl chavicol, α -pineol, methyl heptanoate, eugenol and caryophyllene were present in its essential oil and seed oil (Table 1) [9].

Table 1: Shows the different phytochemical compound isolated from guggal.

Fraction of guggal	Chemical compound isolated
Oleo fraction	Myrcene, dimyrcene polymyrcene compound (with 0.37% essential oil)
Gum fraction A7	α -arabinose D-galactose L-fucose
Gum fraction B	6-D-D-galacto pyranose L-arabinose, D-galactose, L-fructose
	E-guggulsterone, Z-guggulsterone Guggal sterol-I, Guggal sterol-II Guggal sterol-III
	Guggal sterol-IV: Cholestane-5oc-ol-3,6-dione Guggal sterol-V: Cholestane-3 β ,5ocdiol-6- β -acetate
Resin fraction	Guggal sterol –Z, Guggal sterol –E Nonadecan-1,2,3-4-tetrol Diterpene alcohol, Octadecan-1,2-3,4-tetrol bicyclic sesquiterpene, cadinene guggultetrol-18, guggultetrol-20
Volatile oil	Eugenol, d-limonene, α -pinene, (\pm) linalool, cineole, α -terpineol, d- α -phellandrene, methylheptanone, bornyl acetate, geraniol,
Ethanollic extract	Muscanone, quercetin, pelargonidin-3,5,di-O-glucoside cystine, histidine, lysine, arginine, aspartic acid, serine, glutamic acid, threonine, alanine, proline, tyrosine, tryptophan, valine, leucine, and isoleucine
Lignans	Sesamin, diayangambin

Medicinal uses and importance

Guggal has a long back history for its therapeutic properties in our traditional medicine system since ancient period [10]. Several research works has done on pharmacological aspects to serve mankind. It has been used to treat nervous diseases, hemiplegia, leprosy, marasmus, muscle spasms, neuralgia, ophthalmia, pyelitis, pyorrhea, scrofula, skin diseases, spongy gums, ulcerative pharyngitis, hypertension, ischaemia, hypertension, hemorrhoids and urinary tract [11-14]. It also exhibits interesting biological activities like anti-inflammatory, anti-bacterial, antimicrobial, anti-oxidant, anti-arthritis, anti-malarial, antimycobacterial, anti-schistomal, hepato protective, muscle relaxing, larvicidal and mollucidal.

Discussion

The petroleum extract of guggal was scientifically accepted in lipid lowering remedies. Ketonic fraction of guggal lipid is a used to treat hyperlipidemia and hypolipidaemic in India and Europe [15,16]. It is also used as hypolipidaemic, anti-inflammatory drug. Guggal plays potential rolein cancer prevention. A number of studies have reported the cardiac and neuronal protective activity of guggulu steron. Herbal extracts from *C. wightii* (guggal) have been broadly used in Asia as cholesterol lowering agents and their popularity is also increasing inthe United States [17].

Apart from its lipid lowering properties and reducing obesity, oleo-resin of *C. wightii* increases leucocytes in the blood and stimulates phagocytosis serving as resistance in the system to fight diseases [18,19]. Anti-proliferative and apoptosis inducing effects of guggulu steron have also been documented in other cell types including human lung, acute myeloid, leukemia and breast cancer cells (Table 2) [20].

Table 2: Shows pharmacological activities and related health issues with reference to phytochemical.

Pharmacological activities	Health issues	Related phytochemicals
Hypolipidemic	Atherosclerosis, obesity	Guggalsterones–Z, guggalsterones–E
Platelet aggregation and fibrinolytic	Myocardial infarction thromboembolism coronary artery disease	Guggalsterones–Z, guggalsterones–E
Thyroid stimulatory	Thyroid	Guggalsterones–Z
Anti-inflammatory Antiartritic	Osteoarthritis	Guggulosomes
Cardio protective	Myocardial necrosis	Isoproterenol
Cytotoxic	abnormal cell growth neoplasia, prostate cancer	Ferulates
Skin diseases	Nodulocystic acne	Gugulipid
Antihyperglycemic	Type II diabetes	Guggulsterone

Conclusion

Quite precise understanding about the phytochemical and its medicinal uses has emerged importance of the plant. It has scientifically proved for vast array of health issues from Vedic era to modern age. Guggal is a versatile drug and, because of its healing properties, although it contains a number of bioactive constituents including terpenoids, steroids, flavonoids, guggal tetrols, lignans, sugar and amino acids. Guggul sterones *E* and *Z* are the chief bioactive constituents of this resin and are endowed with immense pharmacological value. These reviews could open a new window on the use of this plant in Ayurveda. This conclusion authenticates the Sanskrit definition of the term “guggul” which means one that protects against diseases. It is superbly reflected and proved by the diverse medicinal uses of this Ayurvedic drug. It has been listed as critically endangered by IUCN, due to voracious exploitation in 2015. Keeping this in view, stem, bark, and leaf of this plant should receive more attention so that the complete depletion on account of plant death due to tapping can be checked. This plant still possesses an unexplored potential and expansion of research materials would provide more opportunities for the discovery of novel bioactive principles from this plant.

On other hand the Indian government has banned the export of the species while biotic pressure has been regulated and developed sustainable extraction techniques adopted to reduce mortality rate. To minimize the pressure on wild population, it developed multiplication through micro and macro propagation techniques by *ex situ* conservation.

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