

A Comprehensive Review of Guggulu (Commiphora wightii): From Nighantus to Modern Science

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Abstract: *Guggulu (Commiphora wightii Arn, Bhand)* is a well-known oleo-gum resin that is highly valued in Ayurveda for its various therapeutic uses. Its significance in the Ayurvedic Materia Medica is highlighted by the several Nighantus that have recorded its synonyms, variations, characteristics, and therapeutic applications. By combining traditional knowledge with new scientific data, this review seeks to give a thorough explanation of Guggulu. Major Nighantus, traditional Ayurvedic books, pharmacopoeia standards, and published scientific research were the sources of the information. Alongside contemporary research on phytochemistry, pharmacology, standardization, and conservation, classical descriptions pertaining to nomenclature, pharmacodynamics characteristics, and therapeutic indications were critically examined. Many of the traditional claims made about Guggulu are supported by current research, which also emphasises the importance of sustainable use and quality control. This review offers a comprehensive understanding of Guggulu that unites conventional knowledge with contemporary scientific discoveries.

Keywords: Guggulu, Commiphora wightii, Ayurveda, Nighantus, Modern Science, Pharmacognosy

I. INTRODUCTION

Guggulu (*Commiphora wightii* (Arn.) Bhandari), a member of the family Burseraceae, is one of the most esteemed oleo-gum-resins described in the Ayurvedic literature. It has occupied a prominent place in the Indian system of medicine owing to its diverse therapeutic applications and unique pharmacological properties. The term "Guggulu" has been extensively documented in classical Ayurvedic texts and Nighantus, where it shows its efficacy in managing disorders such as obesity, arthritis, dyslipidemia, wounds, inflammatory conditions, and various Vata-Kapha predominant diseases. Its enduring significance across centuries underscores the profound understanding of medicinal plants within the Ayurvedic tradition.

There is an abundance of insight about Guggulu (*Commiphora wightii* Arn, Bhand) in the rich literary legacy of Ayurveda. Classical texts including the *Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Hridaya* describe its therapeutic indications and formulations, while later Nighantus such as *Dhanvantari Nighantu*, *Raja Nighantu*, *Kaiyadeva Nighantu*, and *Bhavaprakasha Nighantu* elaborate upon its synonyms, varieties, properties, and ideal characteristics. Notably, *Bhavaprakasha Nighantu* describes five varieties of Guggulu and identifies *Hiranya Guggulu* as the most suitable for human use. Guggulu's numerous aliases in ancient literature reflect its morphological, sensory, and therapeutic qualities in addition to making it easier to identify.

Over time, our understanding of Guggulu has changed significantly. Subsequent Ayurvedic writings developed its clinical applications, although the Nighantus mainly concentrated on its variations, nomenclature, and medicinal qualities. Many traditional claims about Guggulu have been scientifically validated in the modern period due to developments in botanical, pharmacognostic, phytochemical, and pharmacological sciences. Guggulu's path from the



descriptive tales of ancient Nighantus to evidence-based modern science thus illustrates how traditional wisdom and modern research can be successfully integrated.

Botanical description of Guggulu(*Commiphora wightii*)

Commiphora wightii (Arn.) Bhandari, belonging to the family Burseraceae, is commonly known as Guggulu and is widely distributed in the arid and semi-arid regions of India. It is a large shrub or small tree, typically attaining a height of 2–4 m. The branches are aromatic, profusely branched, often spinescent, knotty, and cylindrical, exhibiting a characteristic zig-zag appearance. Mature branches possess a papery, golden-brown bark that exfoliates in thin flakes, while young branches are green and glandular-pubescent.

The leaves are alternate and trifoliate, occasionally unifoliate, with subsessile leaflets that are ovate to obovate and cuneate at the base. The margins are entire or serrate near the base and dentate towards the apex. The terminal leaflet is comparatively larger and often shortly petiolate. Guggulu is a gynodioecious species, bearing either bisexual and male flowers or female flowers on separate plants. The flowers are small, red to pink in color, with four petals. The fruits are ovoid, acute drupes measuring approximately 0.6–1.0 cm in length, turning red upon maturity and containing 2–4 pyrenes, of which only one is usually seed-bearing. The medicinally important part is the oleo-gum resin, which has been extensively utilized in Ayurveda and validated through numerous scientific studies for its therapeutic potential.

When plants attain normal height and girth after 8 to 10 years there are now ready for tapping. Tapping is the method of getting gum from plant. The gum is present in the balsam canals in the phloem, bark-deep, therefore, a shallow, incision should be made on the bark. Care is taken so that incision is not too deep otherwise the plant will die or yields little resin in the following years. Usually, the incision is made after November but before April. The resin is collected at an interval of 10-15 days. Weather conditions influence the success of obtaining gum. Each plant yields about 700-900 g of gum resin.

II. METHODOLOGY AND LITERATURE REVIEW :

The present study is a narrative literature review conducted to comprehensively evaluate Guggulu (*Commiphora wightii*) from classical Ayurvedic literature to contemporary scientific research. An extensive literature review was undertaken to collect, compile, and critically analyze information related to Guggulu.

Classical data were gathered from major Nighantus, including Dhanvantari Nighantu, Raja Nighantu, Madanapala Nighantu, Kaiyadeva Nighantu, and Bhavaprakasha Nighantu, Shodhal nighantu as well as relevant references from the Ayurvedic Pharmacopoeia of India (API). Contemporary scientific literature was sourced from electronic databases such as PubMed, Google Scholar, Scopus, and Science Direct using keywords including “Guggulu,” “Commiphora wightii,” “Nighantus,” “Ayurveda,” “pharmacognosy,” “standardization,” and “conservation.”

The retrieved literature was systematically reviewed and organized into thematic sections encompassing nomenclature, synonyms, classical properties, therapeutic indications, pharmacological activities, standardization, and conservation. The compiled evidence was then synthesized to provide a comprehensive understanding of Guggulu, bridging traditional Ayurvedic knowledge with modern scientific advancements.

Etymology and Synonyms of Guggulu:

The term Guggulu is derived from the Sanskrit expression "Guje Vyadhe, Gudhati Rakshatiti", which implies "that which protects the body from diseases." This derivation reflects the broad therapeutic significance attributed to Guggulu Ayurvedic literature.

निरुक्तिः

"गुडतिरक्षतिवातरोगादइतिगुग्गुलुः।गोजतिगुज्जस्तेये।

गुजे व्याधेः गुडति। गुड रक्षणे।"

-Nighantu Adarsha, Guggulyadi Varga



Guggulu (*Commiphora wightii* (Arn.) Bhandari) is described by numerous synonyms in various Ayurvedic Nighantus highlighting a specific characteristic such as its resinous nature, fragrance, habitat, or therapeutic utility. Thus, the study of the synonyms is essential for the proper identification, authentication, and understanding of the classical properties of Guggulu.

Synonyms of Guggulu in different nighantu:

Table no I-showing references of Synonyms in nighantu – Dhanwantari Nighantu , Raj Nighantu, Kaidev Nighantu, Bhavprakash Nighantu, Madanpal Nighantu, Shodal Nighantu.

Sr no	Synonyms	D.N.	R.N	K.N	B.P.N	M.N.	S.D.N.
1	Devdhup	-	-	-	+	+	+
2	Jatayu	+	-	+	+	+	+
3	Kaushika	+	+	+	+	+	+
4	Pura	+	+	+	+	+	+
5	Kumbholukhak	-	-	-	+	-	-
6	Klibe	-	-	-	+	-	-
7	Mahishaksha	+	+	+	+	+	+
8	Palankash	+	-	+	+	+	+
9	Bhavbhishta	-	+	-	-	-	-
10	Devesta	-	+	-	-	-	-
11	Divya	-	+	-	-	-	-
12	Durga	+	+	+	-	+	+
13	Guggula	+	+	+	+	+	+
14	Jatala	-	+	+	-	-	-
15	Jatukanda	-	-	-	-	-	+
16	Kananiryas	-	-	-	-	-	+
17	Kalaniryas	+	+	+	-	+	-
18	Khelaka	-	-	-	-	-	+
19	Marudbhuta	-	-	-	-	-	+
20	Marudesya	-	+	-	-	-	-
21	Naktancara	+	-	-	-	-	+
22	Nisacara	-	-	+	-	-	-
23	Nisasayi	-	-	-	-	-	+
24	Nisotsahi	-	-	+	-	-	-
25	Nisataka	-	+	-	-	-	-
26	Raksoha	-	+	-	-	-	-
27	Ruksagandhaka	-	+	-	-	-	-
28	Sambhava	-	+	-	-	-	-
29	Sarvasaha	-	+	+	-	-	+
30	Siva	+	+	+	-	+	+
31	Sivadhupa	-	-	+	-	-	-
32	Uluka	-	-	-	-	-	-
33	Ulukhala	-	-	+	-	-	-
34	Vayasali	-	-	-	-	-	+
35	Yavanadvista	-	+	-	-	-	-
36	Yatughna	-	+	-	-	-	-



Dravya vargikaran (classification) of Guggulu in different nighantu:

The classification of Guggulu varies among the Nighantus, reflecting the distinct approaches adopted by different lexicographers. While some Nighantus classify Guggulu based on its therapeutic actions, others emphasize its morphological and pharmacodynamic attributes.

Table no II- Showing references of varga of Guggulu in major nighantu — Dhanwantari Nighantu , Raj Nighantu, Kaidev Nighantu, Bhavprakash Nighantu, Madanpal Nighantu, Shodal Nighantu.

Sr no	Nighantu	Varga or gana
1	Dhanwantari nighantu	Chandandi varga
2	Raj nighantu	Chandandi varga
3	Kaidev nighantu	Aushadhi varga
4	Bhavprakash nighantu	Karpuradi varga
5	Madanpal nighantu	Karpuradi varga
6	Shodal nighantu	Chandandi varga

Raspanchak Of Guggulu in Major Nighantu:

Table no III showing Raspanchak of Guggulu in major nighantu- Dhanwantari Nighantu , Raj Nighantu, Kaidev Nighantu, Bhavprakash Nighantu, Madanpal Nighantu, Shodal Nighantu

Sr no	Nighantu	Rasa	Veerya	Vipaka	Guna
1	D.N.	Tikta ,katu , kashay	-	-	Laghu, ruksha, suksma, picchila
2	R.N.	Tikta ,katu	Ushna	-	Ruksha
3	K.N.	Tikta ,katu , kashay ,madhura	Usna	Katu	Laghu, ruksha, visada, suksma, sara
4	B.P.N.	Tikta ,katu , kashay ,madhura	Ushna	Katu	Laghu , ruksha, visada, suksma, picchila
5	M.P.N.	Tikta ,katu	Usna	-	visada, suksma, sara, picchila
6	S.D.N.	Tikta ,katu , kashay ,madhura	-	Katu	Laghu, ruksha , usna, visada, suksma, picchila

Karma of Guggulu in major nighantu:

Table no-IV showing karma of Guggulu in major nighantu- Dhanwantari Nighantu , Raj Nighantu, Kaidev Nighantu, Bhavprakash Nighantu, Madanpal Nighantu, Shodal Nighantu

Sr no	Nighantu	Karma
1	D.N.	Nav Guggulu -Bruhan , Vrushaya ; Puran Guggulu -Lekhan
2	R.N.	Rasayana , vata-kaphara, krimighna
3	K.N.	Dipana, balya, bhagnsandhankar, vrushya, svaraya, rasayan, kledahara, krimighna, medohara, vata-kaphara, nava guggulu- bruhana , purana guggulu-lekhana ,vami-hara
4	B.P.N.	Dipana, balya, pittala, bhagnsandhankar, vrushya, svaraya, rasayan, kledahara, krimighna, medohara
5	M.P.N.	Dipana, balya, bhagnsandhankar, vrushya, svaraya, rasayan, medohara, kledahara, vata-kaphara, nava guggulu-bruhana, purana guggulu- lekha-na ,krimighna
6	S.D.N.	Dipana ,vrushya, svaraya, rasayan, kledahara, krimighna, medohara , nav guggulu -bruhana , purana guggulu -lekha-na, samsrana, amavinasana



Rogaghnta and Doshghnata of Guggulu in major nighantu:

Table no-V showing Rogaghnta and Doshghnata of Guggulu in major nighantu- Dhanwantari Nighantu , Raj Nighantu, Kaidev Nighantu, Bhavprakash Nighantu, Madanpal Nighantu, Shodal Nighantu

Sr no	Nighantu	Rogaghnta	Doshaghnta
1	D.N.	Meha , shopha , vana ,medoroga ,bhuta vikara	Vata-kaphahara
2	R.N.	Sopha, kasa, vatodara, udararoga, pliharoga	Vata-kaphahara
3	K.N.	Vrana, apache, prameha, asmari, kushta, amavata, sopha, pidika, granthi, arsha, vatarakta, galaganda, kandu	Sarvdosahara
4	B.P.N.	Vrana, apache, prameha, asmari, kushta, amavata, sopha, pidika, granthi, gandamala, arsha	Sarvdosahara
5	M.P.N.	Vrana, apache, prameha, asmari, kushta, amavata, sopha, pidika, granthi, arsha, vatarakta, galaganda	-
6	S.D.N.	Vrana, apache, prameha, kushta, sopha, pidika, granthi, arshamukhroga, akshiroga	-

Types of Guggulu in different nighantu: These types are differentiated on the bases of its color ,uses, stages.

Table no-VI showing Types of Guggulu in major nighantu- Dhanwantari Nighantu , Raj Nighantu, Kaidev Nighantu, Bhavprakash Nighantu, Madanpal Nighantu, Shodal Nighantu

Sr no	Types	D.N.	R.N.	K.N.	B.P.N	M.P.N.	S.D.N.
1	Mahishaksha	-	-	+	+	-	-
2	Mahaneel	-	-	+	+	-	-
3	Kumud	-	-	+	+	-	-
4	Padma	-	-	+	+	-	-
5	Hiranaya	-	-	+	+	-	-
6	Kana	+	+	-	-	-	+
7	Bhumija	+	+	-	-	-	-
8	Nav Guggulu	+	-	+	+	+	-
9	Puran guggulu	+	-	+	+	+	-

Therapeutic Indications of Guggulu:

The major Nighantus describe Guggulu as a versatile medicinal resin with a broad spectrum of therapeutic applications. Owing to its **Lekhana, Shothahara, Vata-Kaphahara, Vranaropana, and Rasayana** properties, it has been indicated in the management of numerous diseases. The commonly reported indications include **Medoroga** (obesity and disorders of fat metabolism), **Shotha/Shopha** (inflammatory swellings and edema), **Vrana** (wounds), **Pliharoga** (splenic disorders), **Udararoga** (abdominal disorders), **Vata Vyadhi** (neuromusculoskeletal disorders), **Kasa** (cough), **Apachi** (cervical lymphadenopathy), **Galaganda** (goiter), **Galagranthi** (glandular swellings), **Kushta** (chronic skin diseases), **Arsha** (hemorrhoids), **Bhagandara** (fistula-in-ano), and **Pidika** (boils and pustular lesions). These indications highlight the extensive therapeutic utility of Guggulu in classical Ayurvedic literature. Many of these traditional uses have subsequently been investigated through modern pharmacological and clinical studies, particularly in relation to inflammatory, metabolic, musculoskeletal, dermatological, and wound-healing disorders.



Classical Guggulu Formulations:

Table no VII-showing different types of guggulu formulation mentioned in classical text

Sr no	Guggulu formulations	Dosage	Indication
1	Sinhanad guggulu	2 -3 gm in divided dose	Rheumatoid arthritis, skin disease, gout, tumour, painful condition, rejuvenation, etc (anupan-ghruta, taila, mansarasa, shaali)
2	Gokshuradi guggulu	3gm divided dose.	Diabetes, Burning sensation on urination (mutrakruchra), Menorrhagia (pradar), Anuria (mutraaghat), gout (vatarakta), Renal calculi (ashmari).
3	Amrutakhya guggulu	2-3 gm	Gout, skin disorder (kushta), treatment of wound (dustavrana), diabetes (prameha), Rheumatoid arthritis (aamvata), Fistula (bhagandar), pilonidal sinus (naadivrana)
4	Panchtikta guggulu	6-12gm divided dose	Skin disorders involving toxicity or rashes, Antitoxic activity, vata related disorders (vatavyadhi), tumour (gulma), diabetes (meha), Anemia (pandu)
5	Punarnava guggulu	2-3gm divided dose	Skin disorder (Twacharoga), swelling (shotha), Anemia (pandu), obesity (sthaulya), Kapharoga
6	Vatari guggulu	early in morning with warm water for a month 2-3gm divided dose	Vata vyadhi, painful conditions like sciatica, RA, gout, burning sensation at extremities
7	Loha guggulu	12 gm	Rejuvenator(rasayan)
8	Kaishor guggulu	3gm	Gout (Vatarakta), Skin disorder (kustha), Wound (vrana), Diabetic wounds (prameha pitika), Diabetes (prameha), Ascitis (udar), Anemia (pandu), rejuvenation (rasyana), improves skin health, eye diseases (netraroga), vranakushthaghnna (to be consumed with khadir kwatha).
9	Chandraprabha vati	125mg to 500 mg	Disorders of teeth (dantaroga), eye disorder (netraroga), aartavadushti, shukradushti, mandagni, Anorexia (aruchi), Dyspnea (shwas), cough (kaas), skin disorders (kushtha), Diabetes (prameha), burning sensation on urination (mutrakruchra), anuria (mutraghata), renal calculi (ashmari), tumour (granthi), pain in lower back (katishoola), ascites (udar), fistula (bhagandar), rejuvenation (rasayana)
10	Amrutadi guggulu	3 gm	Diabetic wound (Pramehapidika), fistula (bhagandar), obesity (sthaulya)



III. MODERN REVIEW

Taxonomy of Guggulu :-

Table no VIII-Showing Taxonomical Description Of Guggulu

Kingdom	Plantae
Sub kingdom	Tracheobionta
Super division	Spermato-phyta
Division	Magnolio-phyta
Class	Eudicots
Subclass	Rosidae
Order	Sapindales
Family	Burseraceae
Genus	Commiphora
Species	Wightii

Pharmacopoeia and Standard Reference Sources:-

Table no IX- Showing The Standard References For Modern Review

Sr no	Book	Description
1	Ayurvedic pharmacopeia of India, part 1, volume by AYUSH.	Description of Guggulu (<i>Commiphora wightii</i> (Arn.) Bhand) resin . macroscopy study ,physicochemical and phytochemical properties. .
2	Database on medicinal plants used in Ayurveda Volume 2 by Sharma P C, Yelne M B, Dennis T J.	Morphology, distribution.,properties ,various formulations and physico chemical parameters.
3	Indian Medicinal Plants Volume 1 , by K R Kirtikar, B J Basu and L C S.	Taxonomical data ,species data , medicinal uses of plants .
4	Quality standard of Indian medicinal plants ,volume 3.	Morphology , macroscopy ,microscopy ,standard references for TLC ,HPLC,HPTL.
5	Comprehensive technical dossier of medicinal plant used in Ayurveda Guggulu ,series 1,by CCRAS	Botanical description, Vernacular names, cultivations, harvesting, phytochemistry of plant parts, its medicinal uses along with researches.
6	Recent trends in good agricultural and collection practices for medicinal [plants by CCRAS,kartar singh dhiman ,M M padhi , anupam mangal , Narayan Srikanth.	Good agriculture and collection practices for medicinal plant.

The therapeutic significance of Guggulu described in the classical Nighantus has stimulated extensive scientific investigations over the past few decades. While the Nighantus primarily emphasize its nomenclature, pharmacodynamic attributes, and therapeutic applications, modern research has focused on elucidating its chemical composition, pharmacological activities, quality control parameters, and clinical efficacy. These studies have provided scientific evidence supporting many of the traditional claims and have contributed to the standardization and global recognition of Guggulu as an important medicinal resin.



Phytochemistry of Guggulu:

In its chemical composition volatile oil, resins, gum and a bitter compound is found. Five types of **guggul sterols**, **Z-guggul sterone**, **E- guggulsterone**, **guggul sterol - I, II, III**, sesamine, cholesterol, mucolol and other steroids are also found. Monocyclic **diterpenes- alpha – camphorene and cembrene** isolated from resin; allylcembrol isolated from plant and characterized (ChemAbstr. 1972,77, 111554 t). Three new steroids - **guggulsterols I,II,III** are isolated from gum resin (Tetrahedron 1972, 28, 2341). Cembrene A isolated from resin and characterized (Tetrahedron 1973, 29, 341). Isolation and structure elucidation of two aliphatic tetrols - octadecan - 1, 2, 3, 4 and eicosan - 1, 2, 3, 4 – tetrol from gum resin (Tetrahedron 1973, 29, 1595). Guggulsterol VI and Z - guggulsterol isolated from gum resin (Tetrahedron 1982, 38, 2949).

The diverse phytochemical profile of Guggulu is considered responsible for its wide range of biological activities reported in modern scientific studies.

Among these, **guggulsterones (E and Z isomers), guggulsterols, and related steroidal constituents** are considered the principal bioactive compounds and have been extensively investigated for their pharmacological potential. Experimental studies suggest that these constituents contribute significantly to many of the reported therapeutic activities of Guggulu, although the overall pharmacological effects are likely the result of the synergistic action of multiple phytochemicals present in the oleo-gum resin.

Pharmacological activities of Guggulu:

Table no X-Showing Different Pharmacological Activity Of Guggulu

Sr no	Study	Activity	Type of study
1	The hypolipidemic activity of the isomers <i>E</i> -guggulsterone and <i>Z</i> -guggulsterone has also been studied in animal models. Administration of guggulsterone (<i>Z</i> and <i>E</i>) significantly lowered serum lipid levels of rats with either triton (WR-1339) or cholesterol-induced hyperlipidemia.	Hypolipidemic activity	In vivo
2	The steroidal compound isolated from fraction A of PE extract reduced the lipid content (Viz., total lipids, cholesterol, TG and phospholipids) of both hepatic and aortic tissues. The response was doses-dependent and the maximum effect was noted at 10mg/kg.	Hypolipidemic activity	In vivo
3	Alcoholic extract (25-50 mg/kg orally), reduced serum cholesterol level in normal and hyperlipaemic rats and rabbits. Further, a resin fraction, a pure steroid and fraction F isolated from crude extract showed hypocholesterolemia effect on normal and triton- induced hyperlipaemic rats	Hypolipidemic activity	In vivo
4	The purified steroid mixture from guggulu completely inhibited ADP, adrenaline, or serotonin induced platelet aggregation. No difference was observed between the effectiveness of the steroid mixture and the purified guggulsterone <i>E</i> or <i>Z</i> . The effect of guggulsterones <i>E</i> and <i>Z</i> was very similar to the inhibitory effect of clofibrate. This finding has therapeutic value in myocardial infarction and thromboembolism	Fibrinolytic Activity	In vitro
5	<i>Z</i> -Guggulsterone was shown to be responsible for the thyroid stimulatory action of guggulu. Administration of isolated <i>Z</i> -guggulsterone to rats led to significant increase in all thyroid function parameters, namely, uptake of iodine by the thyroid, enzymes	Thyroid Stimulatory Activity	In vivo



	involved in the synthesis of thyroid hormones, and tissue oxygen uptake, thus suggesting thyroid stimulatory action		
6	Oleoresin was found to be highly potent anti- inflammatory agent, as compared to hydrocortisone and butazoladin against Brownlee's for maldehyde- induced arthritis in albino rats.	Anti- Inflammatory Activity	In vivo
7	Several animal studies have demonstrated the effectiveness of guggulu extract in standard osteoarthritis (OA) models. The authors had conducted both animal and clinical investigations of guggulu for OA prior to this study. The goal of this study was to determine the effectiveness of guggulu for reduction of pain, stiffness, and other symptoms that arise from OA.	Anti-arthritis activity	In vivo
8	Guggulu administered orally (2 and 20mg/100 g body weight) to female rats decreased the weight of the uterus, ovaries, and cervix, whereas glycogen and sialic acid levels in these organs increased. This suggested that guggulu may be useful as an antifertility agent	Antifertility Activity	In vivo
9	Administration of gugulipid was reported to be effective in the treatment of nodulocystic acne. A study in 21 patients found that gugulipid was as effective as tetracycline in the treatment. The patients with oily faces responded better to the gugulipid treatment.	Skin Diseases	Clinical
10	The volatile oil of C mukul was found to be highly effective against Rhyzopertha dominica which suggested its role as a fumigant. The ethanolic extract of C. mukul exhibited best antibacterial activity at 5mg/ml against multidrug-resistant Klebsiella pneumonia.	Antibacterial activity	In vitro
11	Administration of alcoholic extract of C. mukul at a dose of 200mg/kg for 60 continuous days reduced plasma glucose levels in streptozotocin-induced diabetic rats.	Antihyperglycemic Activity	In vivo

Quality Control and Standardization

The growing scientific evidence supporting the therapeutic potential of Guggulu has underscored the need for its proper standardization and quality control. As a natural oleo-gum resin, Guggulu is susceptible to variations in its chemical composition due to geographical origin, environmental conditions, harvesting practices, processing methods, and storage conditions. Therefore, establishing reliable quality control parameters is essential to ensure its authenticity, purity, safety, efficacy, and batch-to-batch consistency. Standardization of Guggulu involves a comprehensive evaluation using pharmacognostic, physicochemical, phytochemical, and chromatographic techniques in accordance with the standards prescribed by the Ayurvedic Pharmacopoeia of India (API) and other recognized quality guidelines.

Pharmacognostic evaluation:-

Oragnoleptic And Macroscopic Study-

Drug occurs in vermicular or stalactitic pieces of pale yellow or brown coloured mass, makes milky emulsion in hot water and readily burns, when fresh viscid and golden coloured, odour, aromtic, taste., bitter and astringent.

Physicochemical evaluation:-

Table no XI-Showing The API and QSIMP Standardization Parameter.

Sr no	Parameters	Standard API value	Standard QSIMP
1	Foreign matter	Not more than 4 %	Not more than 2%



2	Total Ash	Not more than 5 %	Not more than 5%
3	Acid-insoluble ash	Not more than 1 %	Not more than 2.4%
4	Alcohol-soluble extractive	Not less than 27 %	Not less than 35.0%
5	Water-soluble extractive	Not less than 53%	Not less than 26.0%
6	Volatile oil	Not less than 1%	Not less than 0.5%

Phytochemical evaluation :- According to API Guggulu contains ,

- Essential oil
- Gum
- Resin
- Steroids
- Terpenoids
- Triterpenoids

Phytochemical evaluation involves the qualitative and quantitative assessment of the bioactive constituents present in Guggulu (*Commiphora wightii*). It aids in the identification of characteristic phytochemicals and contributes to the authentication, standardization, and quality assessment of the oleo-gum resin. Marker compounds of Guggulu for phytochemical study is Z- guggulusterol ,E-guggulusterol, guggulusterol, guggulusteron , cambrene, myrecene ,etc.

• **Other Standard Techniques:**

Various analytical techniques, including preliminary phytochemical screening, Thin Layer Chromatography (TLC), High-Performance Thin Layer Chromatography (HPTLC), High-Performance Liquid Chromatography (HPLC,) Gas Chromatography–Mass Spectrometry (GC-MS).

The *Ayurvedic Pharmacopoeia of India (API)* and *Quality Standards of Indian Medicinal Plants (QSIMP)* provide standardized methodologies for the evaluation of Guggulu, including chromatographic techniques such as Thin Layer Chromatography (TLC), High-Performance Thin Layer Chromatography (HPTLC), and High-Performance Liquid Chromatography (HPLC). These established protocols play a crucial role in the authentication, quality assessment, and standardization of Guggulu (*Commiphora wightii*).

In addition to TLC, HPTLC, and HPLC, advanced analytical techniques such as Gas Chromatography–Mass Spectrometry (GC-MS) and Liquid Chromatography–Mass Spectrometry (LC-MS) have been employed for the qualitative and quantitative evaluation of Guggulu (*Commiphora wightii*). These techniques facilitate the identification, characterization, and quantification of its major phytoconstituents, thereby contributing to the authentication, quality assessment, and standardization of the drug. The combined application of qualitative and quantitative analyses ensures the authenticity, purity, and consistency of Guggulu and its preparations.

The available evidence demonstrates a remarkable convergence between Ayurvedic knowledge and contemporary scientific findings, reinforcing the therapeutic potential and clinical relevance of Guggulu. This integrated understanding provides a strong foundation for future research and paves the way for its continued utilization as a standardized and evidence-based medicinal resource.

IV. RESULT AND DISCUSSION

The findings of the present review demonstrate that Guggulu (*Commiphora wightii*) has been extensively documented in the classical Nighantus and continues to be the subject of considerable scientific investigation. Classical literature highlights its diverse nomenclature, pharmacodynamic properties, and broad therapeutic applications, while modern studies substantiate its medicinal potential through phytochemical, pharmacological, and standardization research. Furthermore, advancements in analytical techniques have facilitated the authentication and quality assessment of Guggulu, thereby supporting its safe and effective use. The convergence of traditional Ayurvedic knowledge with



contemporary scientific evidence underscores the significance of Guggulu as an important medicinal resin and emphasizes the need for continued research, standardization, and conservation efforts.

V. CONCLUSION

Guggulu (*Commiphora wightii*) stands as a remarkable example of the continuity and evolution of medicinal knowledge across centuries. The descriptions preserved in the Ayurvedic Nighantus provide a comprehensive account of its nomenclature, varieties, properties, and therapeutic significance, reflecting the depth of traditional understanding surrounding this valuable oleo-gum-resin. Over time, these classical insights have been increasingly supported by modern scientific investigations, which have elucidated its phytochemical profile, established quality control parameters, and validated several of its pharmacological activities.

The transition of Guggulu from Nighantus to modern science illustrates the successful convergence of ancient wisdom and contemporary research. However, concerns regarding adulteration, standardization, and the endangered status of *Commiphora wightii* emphasize the need for continued efforts in conservation, sustainable utilization, and scientific validation. Future studies focusing on clinical efficacy, molecular mechanisms, and advanced analytical techniques will further strengthen the evidence base for Guggulu and enhance its acceptance in integrative healthcare systems.

Thus, the journey of Guggulu—from its revered place in the Nighantus to its recognition in modern scientific literature—not only highlights its therapeutic importance but also serves as a testament to the enduring relevance of Ayurveda in the twenty-first century.

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