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EXPLORING THE RASAYANA POTENTIAL OF MAHAYOGARAJA GUGGULU IN THE MANAGEMENT OF SANDHIGATAVATA - A CONCEPTUAL REVIEW

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ABSTRACT

Osteoarthritis, common in older adults, leads to pain and disability due to cartilage breakdown and reduced synovial fluid. In Ayurveda, *Sandhivata* is attributed to aggravated *Vata* and reduced *Shleshaka Kapha*, causing joint degeneration and symptoms like pain, swelling, and stiffness. *Rasayana* therapies, particularly *Naimittika Rasayana*, target specific diseases to enhance vitality. *Mahayogaraja Guggulu*, described in classical texts, contains 31 ingredients focusing on bone, joint, and marrow health. It possesses properties that alleviate *Vata* and *Kapha,* serving as a potent remedy in managing *Sandhigatavata. Mahayogaraja guggulu* does *Vata Shamaka* and *Kaphavatahara properties. MahaYogaraja is a powerful anti-oxidant, and stimulates the immune system's white blood cells (WBC's). (Guggulu's lekhana* effect eliminates the Aamatva accumulated in the joints and additionally the alchoholic extracts of

Guggulu also exhibits anti-oxidant property. The compound's antioxidant properties are attributed to prevent oxidative stress and cartilage destruction. This review focuses on antioxidant and *Rasayana* effect of *Mahayogaraja Guggulu* in *Janu Sandhigata Vata*.

Keywords: Mahayogaraja guggulu, Rasayana, Janu sandhigata vata, Antioxidant

INTRODUCTION:

Osteoarthritis (OA), is a degenerative joint disease that occurs mostly in older people. It is characterized by mild inflammation causing joint pain, a major contributor to long-term disability. It occurs due to the breakdown of cartilage, which cushions joints, and the reduction of synovial fluid that lubricates them **[1]**.

Sandhivata, a type of *Vatavyadhi* described in *Ayurveda,* typically affects elderly individuals due to the degeneration of bodily tissues (*Dhatukshaya*) **[2]**. In Ayurveda, *Sandhivata* is primarily caused by improper diet, lifestyle, and aging, which lead to the deterioration of body tissues resulting in an imbalance of *Vata* dosha, which governs bodily movements and functions, and Shleshaka Kapha decreases. In *Sandhivata*, the primary symptom is pain in the affected joint sandhi *Shula*, along with *Shotha* (~swelling), *Stabdata* (~stiffness), *Atopa*(~crepitus), and difficulty in using the affected joint **[3]**.

The term "*Rasayana*"(~rejuvenation) originates from "*Rasasya Ayanam Rasayanam*," meaning the path to achieving a good *Rasa* is *Rasayana*. According to *Acharya Dalhana*, *Rasayana* refers to techniques that promote youthfulness and longevity by cultivating optimal body tissues. *Kamya, Ajasrika, and Naimittika* are the three types of *Rasayana. Naimittika* type of *Rasayana* can be defined as *Rasayana* specific to a disease which will improve the vitality of individual towards the specific disease **[4]**. *Sharangadhara* clearly defines *Rasayana* as a measure which relieves ageing and disease. He emphatically mentions *Mahayogaraja Guggulu* as the *Rasayana* and *Tridoshahara* in *Vatavyadhi.*

Mahayogaraja Guggulu has been explained in *Sharangadhara Samhita* **[5]** and *Bhaishajya Ratnavalli* **[6]** and it has 31 ingredients. The primary target of the drug is *Asthi* (~bone), *Sandhi* (~joint /Articulation) and *Majja* (~bone marrow). Mahayograj Guggulu, with Guggulu as its primary ingredient, is known for its ability to balance vata. It contains several types of bhasmas, such as vanga, ropa, loha, abhraka, mandura, and rasasindura, which specifically target asthigata vata and help reduce knee joint pain. Additionally, it includes various agnideepaka and pachana dravyas that acts on ama, and also cures agnimandya and malavastambha. Due to its rasayana property, it enhances the action on Asthi and Sandhi

Prevalence:

Osteoarthritis (OA) in India lacks well-defined epidemiological data but is estimated to be the second most prevalent rheumatological condition and the most common joint disease, with prevalence ranging from 22% to 39%. Globally, approximately 250 million people are affected, with knee OA notably increasing due to rising rates of obesity and other risk factors. Among adults aged 60 years and older, it affects about 10% of men and 13% of women. Knee OA accounts for 85% of OA's global burden, with its prevalence increasing by 32.7% from 2005 to 2015, contributing significantly to global disability **[7]**.

Over the past 30 years, the number of symptomatic osteoarthritis (OA) cases in India rose 2.66 times, from 23.46 million in 1990 to 62.35 million in 2019. Additionally, the age-standardized prevalence of OA increased from 4,895 (with a 95% uncertainty interval of 4,420 to 5,447) to 5,313 (with a 95% uncertainty interval of 4,799 to 5,898) per 100,000 individuals **[8]**.

Intra-articular injections, topical anti-inflammatory gels, physical therapy, oral anti-inflammatory drugs, and ultimately surgical procedures are among the current treatment options for osteoarthritis (OA). Currently available pharmacological therapy have led to various complications, including congestive heart failure, hypertension, and renal damage **[9]**.

Mahayogaraja Guggulu acts as a Rasayana, which could aid in halting any deteriorating changes in the body. Guggulu contains anti-inflammatory, immunomodulatory, and anti-lipidaemic pharmacological qualities.

Pathophysiology of OA: [10]

Osteoarthritis (OA) results from various risk factors, mechanical stress, and abnormal joint mechanics, which trigger the release of inflammatory markers and enzymes leading to joint damage. Early changes in OA affect the cartilage, causing surface fibrillation, irregularities, and focal erosions that extend to the bone, leading to further damage. At the microscopic level, collagen matrix damage causes chondrocytes to proliferate and form clusters, which then transform into hypertrophic chondrocytes, leading to osteophyte formation. Collagen degradation leads to chondrocyte apoptosis, subchondral bone thickening, and, in advanced stages, bone cysts and erosive OA.

OA also involves mild inflammation and hypertrophy of the synovial membrane, affecting soft tissues like ligaments, the joint capsule, and menisci. Calcium phosphate and pyrophosphate crystals often accumulate, contributing to inflammation, though their precise role is unclear **[10, 12, 13]**.

Mahayogaraja Guggulu, an Ayurvedic formulation, contains herbs like Guggulu

(Commiphora wightii), which possess anti-inflammatory and antioxidant properties. With its Katu, Tikta, and Kashaya rasa, and Ushna virya, Mahayogaraja Guggulu helps balance the doshas and enhances the nourishment of tissues, particularly Asthi (bone) and Majja (marrow). By improving metabolic processes and reducing oxidative damage, it slows cartilage degeneration and reduces inflammation in OA, contributing to joint health **[11]**.

Clinical manifestations:

Knee symptoms can vary depending on their underlying cause. In the case of knee osteoarthritis (OA), the primary symptom is usually pain around the knee joint, which can range from dull to sharp and can be constant or intermittent. The severity of pain can vary widely, from mild discomfort to intense agony. Decreased range of motion is common, and individuals may experience grinding or popping sounds in the knee. Muscle weakness is also reported by some patients.

The onset of knee pain associated with OA can be gradual, worsening over time, or it can occur suddenly. Morning stiffness, stiffness after sitting for a while, or after prolonged rest are typical complaints. Painful symptoms tend to become more frequent as the condition progresses, sometimes occurring even during rest or at night. Generally, vigorous activity can trigger flare-ups of pain **[12]**.

Other problematic symptoms include episodes of swelling where the knee locks or gives way, which can significantly impact daily activities such as walking, climbing stairs, doing household chores, and sitting comfortably, leading to a decreased quality of life.

Nidana, Samprapti, and lakshana of sandhivata in Ayurveda: [13]

The *Nidana* and *Samprapti* of *Sandhi Gata Vata* is similar to that of *Vatavyadhi.* Due to intake of *Vatala Ahara* and *Viharas* like *Ativyayama* (~over physical exercise), *Abighata (~trauma) Marmaghata (*~That which affects marma)*, Adhyasana, Vegadharana* (leads to aggravation of *Vata Vriddhi and Kapha Kshaya* and impaired *Agni* and *Dhatus* ultimately leading to degeneration. As *Kapha* decreases there is decrease of *Sleshaka kapha* in joints causing *Asthi-Sandhi Kshaya*. Thereby leading *Sthana Samshraya* in the *kha-Vaigunyayuktha* sandhi.

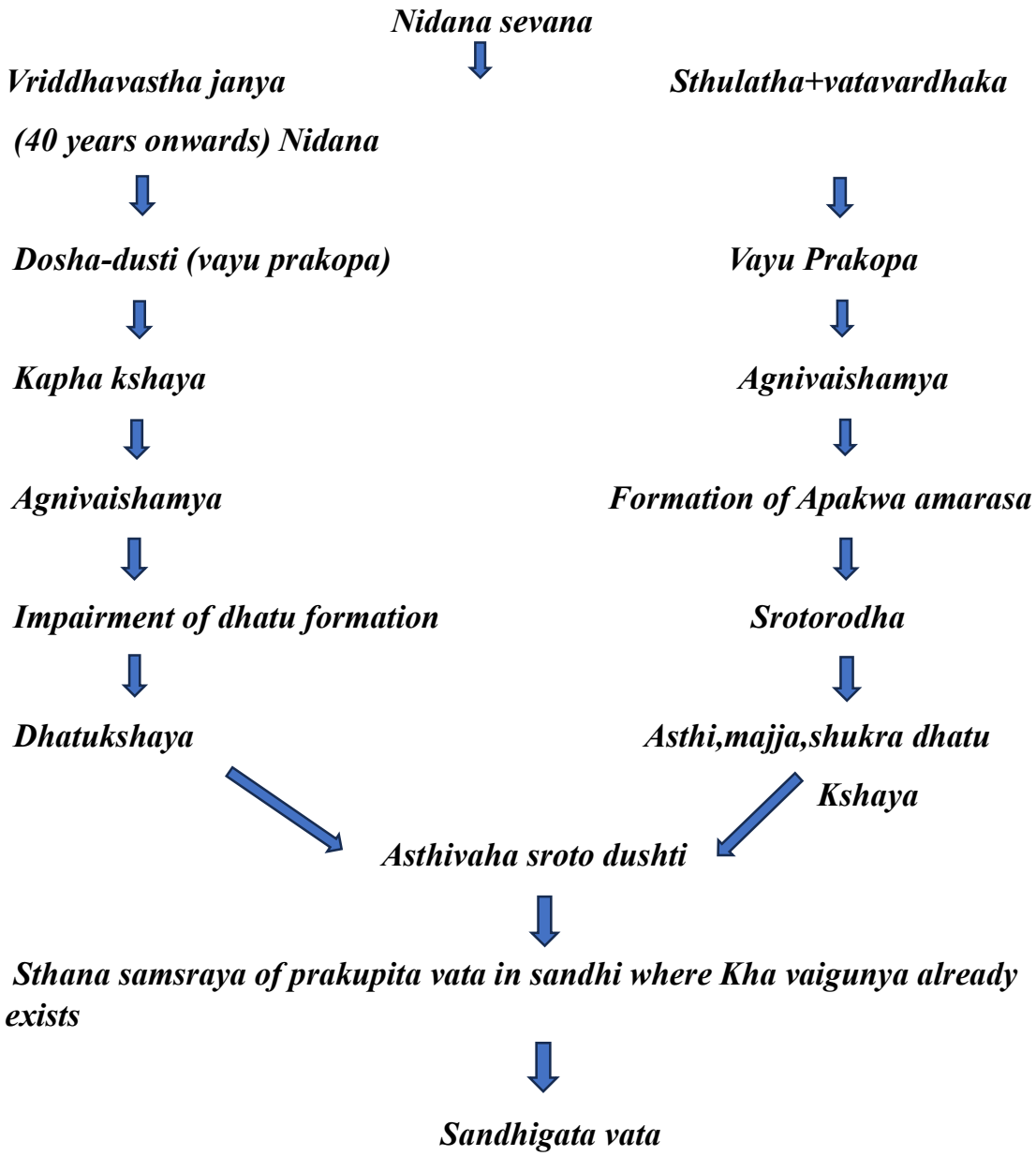
The *Lakshanas* of *Sandhi Gata Vata* are *Vatapurnadruthi Sparsha* (~tenderness), *Shotha* (~swelling), and pain during *Prasarana*(~extension) and *Akunchana* (~flexion)

Two predominant causes of *Vata Prakopa* have been described in texts.

1)*Dhatukshayajanya Sandhivata*

2)*Margavaranajanya Sandhivata*

Samprapti of Sandhivata **[13]**



Management of sandhivata: [13]

Nidana Parivarchana is the first line of treatment in *Sandhivata*.This can be accompolised by dietary modification ,yoga,and regular exercises.It is followed by *Samshodana Chikitsa*. *Basti Chikitsa*, which is regarded as a half treatment, works best for *Vatavyadhi* and is also efficient for OA. *Snehanbasti* will aid in both promoting strength and reducing discomfort

Various procedures mentioned in different classics shodana) [23]

Treatment	Su.Sa	AH.Sa	AH.Hr	YR	Bha.Pra
Snehana	+	-	-	+	+
Swedana	-	+	-	+	+
Upanaha	+	+	+	+	+
Bandana	-	+	+	-	-
Abyanga	-	-	+	-	-
Agnikarma	+	+	+	-	-
Mardana	+	+	-	+	+

Indications of Mahayogaraja guggulu: [14]

Tridoshagna, Rasayana, Sarvavataroga, Kushta, Arshas, Grahani, Prameha, Vataraktha, Nabishoola, udavartha, kshaya, Gulma, Apasmara, Mandagni, swasa, Kasa, Aruchi, Retodoshahara, Rajodoshara, vandhyatwa (sarangadhara)

Probable mode of action of Mahayogaraja Guggulu :

The drugs of *Mahayogaraja guggulu* mostly possess *katu Tikta Kashaya rasa, Lagu, Ruksha gunas, Ushna Veerya and Katu Vipaka* it does *Vatakaphahara.* Bhasmas like *Raupya, Naga, Loha, Abraka*, and *Rasa sindura* having *Guru, snigdha, sita gunas* and *Madhura vipaka* which provides *Bruhmana* effect in the body. Hence *mahayogaraja guggulu* acts as *rasayana. Rasayana* is the specialized approach of treatment influencing the fundamental aspect of the body ie, *Dhatu* (~Major structural components of the body)*, Agni* (~digestive or metabolic factors*), Ojas* (~essence of all 7 dhatus*), and Srotas*(~structural or functional channels). Different *Rasayana* drugs may act with predominance effect at different levels **[19]**.

1.At the level of Rasa:[15][22]

The *Rasayana* drugs work at the level of *Rasa* by enhancing the specific nutrional values of *Poshaka rasa*. In *Mahayogaraja guggulu Bhasma* like *Raupya, Naga, Loha, abraka* and *rasa Sindura* having *Guru* (~heaviness*), Snigdha* (~unctuousness)*, Sita* (~coldness*) gunas* act at the level of rasa promoting the nutritional value of tissue plasma, which helps in *utharothara dhatu Pushti* from the rasa dhatu upto the level of *Majja dhatu*, thereby it corrects the *Dhatu Kshaya in Sandhigata vata.*

2.At the level of Agni:[15][22]

Most of the drugs in *Mahayogaraja guggulu* having properties like *Katu, tikta, Kashaya* rasa and *Ushna veerya, Laghu, Ruksha Guna* (property) may acts at the level of Agni, vitalizing the organic metabolism leading to an improved structural and functional pattern of tissues and production of the *Rasayana* effects. Drugs like *Pippali, Guggulu* mainly acts at the level of *Agni,* which enhances the digestion and create the essence of

Saptadhatu. The Rasayana drugs like *Citraka, Vidanga* and *Haritaki* are found to enhance the agni status at the level of *Jataragni*. Similarly *Amalaki and Pippali* are supposed to act at level of *Dhatvagni (*~metabolic factors located in dhatu)

3. At the level of srotas:[15][22]

Rasayana medications function fundamentally at the *Srotas,* or microchannel, level. These medications increase tissue perfusion and aid in the bioavailability of nutrients to the tissues. The drugs of *Mahayogaraja guggulu having Katu, Tikta, Kashaya rasa, Ruksha, Laghu Guna, Ushna Virya* and *Katu Vipaka* may leads to *Srotoshodana* and *Rasayana* effect in the body.

Therefore, employing *Rasayana* therapy as early intervention is crucial for patients with *Sandhigata vata* to prevent permanent physical impairment. This approach aims to effectively arrest the disease's advancement in time, offering benefits such as improved nutritional status, enhanced tissue health, bolstered immune function, heightened mental acuity, and the promotion of long-term wellness. Hence *Rasayana* helps in correcting the *dhatu Kshayajanya Sandhivata* by *Poshana* of *Rasadi Dhatus* and *Avarana* (~occlusion) *Janya Sandhivata* by removing the *Srotorodha*(~obstructive pathology occurring in channels)

MATERIALS AND METHODS:

Comprehensive searches through classical Ayurvedic texts such as *Charaka Samhita, Sharangadhara Samhita*, and *Bhaisajya Ratnavali* to identify references to Rasayana and the pharmacological effects of *Mahayogaraja Guggulu* and similar Ayurvedic medications and also explored modern databases including Google Scholar, Ayushdhara, and PubMed to gather insights into the pathophysiology and therapeutic approaches for *Sandhivata* (osteoarthritis). Furthermore, the pharmacological properties and mechanisms of action of each component was analyzed to understand their roles in managing Sandhivata.

RESULTS AND DISCUSSION:

Mahayogaraja Guggulu has been explained in *Sharangadhara Samhita* and *Bhaishajya Ratnavalli* and it has 31 ingredients. The primary target of the drug is *Asthi, Sandhi, and Majja*. Mainly the drugs have properties like *Katu, Tikta, Kashaya rasa and Ushna, Ruksha Guna, Ushna Virya,* and acts as *Kaphavatahara* **[15]**. Most of the components in the compound function as *Vata Shamaka*. Additionally, these drugs are *Vedana Stapaka, Nadi Balya, Shulashamaka, and Shothahara*, which are crucial for alleviating symptoms associated with *Sandhigata vata.*

The previous study highlights the therapeutic benefits of MahaYogaraja Guggulu, particularly its antimicrobial and

antioxidant properties. The polyherbal formulation showed effectiveness against microbes linked to septic arthritis and skin diseases, likely due to its active constituents such as tannins, alkaloids, terpenes, and flavonoids, which have known antimicrobial effects. The methanol extract, in particular, displayed the highest antimicrobial activity, suggesting that organic solvents, like methanol, are effective in extracting these compounds **[16]**.

Additionally, the study explored the antioxidant potential of MahaYogaraja Guggulu, as oxidative stress is associated with inflammatory conditions like rheumatoid arthritis. The extract demonstrated significant antioxidant activity, especially in DPPH and FRAP assays, which is attributed to the presence of phenolic compounds. The study notes that the variations in antioxidant effectiveness across different methods are likely due to the differing mechanisms of action of these compounds **[16]**.

Guggulu's lekhana (~scraping) effect eliminates the *Jalamsha* and *Aamatva* accumulated in the joints. Its *Ushna* guna helps restore the vitiated *Vata*. Combined with *Triphala,* it reduces *Ushnata* and *Teekshnata (~* sharpness) of *Guggulu.***[17]** Guggulsterones, present in *guggulu*, were tested in vitro and found to prevent the formation of harmful substances by inhibiting lipid peroxidation in human LDL and liver microsomes. This protective effect is attributed to their ability to scavenge free radicals and bind to metals. Additionally, the alcoholic extract of *Guggulu* also exhibited antioxidant properties **[18]**.

Previous Studies confirm guggulu's anti-inflammatory and anti-arthritic effects. The 50% aqueous methanolic extract reduced inflammation in animal models and inhibited nitric oxide production. A crystalline steroid from guggul helped reduce inflammation in rats with arthritis. Guggulosomes combining guggul and ibuprofen showed superior efficacy and sustained drug release. Guggulu extract also effectively reduced symptoms of osteoarthritis in both animal and clinical studies, alleviating pain and stiffness **[19]**.

Additionally, guggulu demonstrated promise in treating osteoarthritis, reducing pain and stiffness. As an antioxidant, guggulu helps prevent cholesterol oxidation, lowers platelet stickiness, and reduces the risk of coronary artery disease. Guggulsterones, in particular, protect against free radical-induced oxidation and lipid peroxidation, potentially due to their metal chelation properties and free radical scavenging activity. These findings suggest that guggulu offers therapeutic potential for inflammatory conditions and cardiovascular health **[20, 21]**.

A Previous study was conducted showing the effects of guggulsterone on bone

resorption, specifically its role in suppressing NF-κB activation during osteoclastogenesis. Guggulsterone inhibits RANKL-induced NF-κB activation, IKK activation, and IκBα degradation, preventing osteoclast differentiation from monocytes. The study highlights that guggulsterone effectively suppresses the RANKL signaling pathway, which is crucial for osteoclast development. These findings support guggulsterone's potential in treating osteoclast-related bone diseases by targeting NF-κB signaling **[22]**.

Drugs like *Nagara, Chitraka, Renuka, Pata, Bharangi, and Guggulu* have carotenoids. It is observed that obese patients with OA significantly have lower β-carotene **[23, 24]**. Carotenoids, recognized for their antioxidant and anti-inflammatory properties, can play a beneficial role in managing Sandhigata Vata. β-carotene has been shown to reduce oxidative stress and modulate inflammation in metabolically impaired adipocytes **[23, 24]**.

As potent antioxidants, carotenoids protect joint tissues from oxidative stress by neutralizing free radicals, thereby slowing cartilage degeneration and joint wear associated with Sandhigata Vata. Additionally, carotenoids may preserve cartilage by minimizing the degradation of collagen and other joint proteins, potentially delaying the progression of joint damage common in this condition **[25]**. *Trikatu* aids in preventing the visceral deposition of metals such as *Tamra, Naga, Vanga, and Loha*. Plumbagin, an alkaloid found in *Chitraka,* is recognized for its stimulating effects on muscle tissue.

Amalaki contains Vitamin C, a significant nonenzymatic antioxidant that aids in minimizing damage caused by free radicals. Recent research indicates that Vitamin C can provide beneficial effects for individuals with early knee osteoarthritis. It also acts as a biological regulator in immune cells, plays a role in collagen and catecholamine synthesis, and there is evidence suggesting that high doses of Vitamin C administration can enhance bodily functions and improve survival rates in critically ill patients **[25]**.

Drugs such as *Pippalimoola, chavya, krishnajeeraka, gajapippali, Bharangi*, and *vibitaki* contain Beta-sitosterol, a phytosterol known for its anticatabolic properties. Beta-sitosterol helps prevent cartilage destruction by inhibiting specific cell activities involved in this process and by promoting collagen production. These supplements demonstrate a chondro-protective role, reducing joint stiffness and providing analgesic effects **[25]**.

Drugs like Nagara, Citraka, Renuka, and others contain flavonoids, which support the management of Sandhigata Vata through their anti-inflammatory, antioxidant, and bone-strengthening properties. Flavonoids like quercetin, kaempferol, and catechins

reduce joint inflammation and pain, protect against oxidative damage, and promote bone formation. They also improve collagen production, enhance joint lubrication, and prevent cartilage degeneration by neutralizing free radicals and inhibiting lipid peroxidation. These compounds help nourish and strengthen bones, counteracting the dryness and reduced synovial fluid characteristic of Sandhigata Vata **[26]**.

Rasadravyas such as *Naga Bhasma and Tamra Bhasma* have a direct impact on *Snayushakti Vridhikara* (~enhancing tendon strength) and *Nadi Mandala Balya Kara* (~nerve function) **[27]**. *Rasa Sindoor* is crucial in regulating Vata and fortifying motor neuron activities. Additionally, *Abraka Bhasma*, *Vanga Bhasma,* and *Tamra Bhasma* are effective in alleviating aggravated Vata condition **[28]**. Antioxidant activity plays a crucial role in enhancing the Rasayana effect in Sandhigatavata by protecting cells and tissues from oxidative stress, supporting regeneration, and promoting vitality **[29]**.

CONCLUSION:

Mahayogaraja Guggulu is a potent Rasayana used in Ayurveda to treat conditions like Sandhigata Vata (~osteoarthritis), asthi(~Bones), joints (~sandhi), and bone marrow (~majja). It includes herbs and minerals with predominantly *katu* (pungent), *tikta* (bitter), and *kashaya* (astringent) tastes, *ushna* (hot), *ruksha* (dry) properties, and *ushna virya* (hot potency) which balances vitiated Vata and Kapha doshas. The main ingredients like Guggulu, Triphala, and Trikatu help detoxify the body, reduce inflammation, and promote antioxidant activity, essential for managing oxidative stress in joint degeneration. Bioactive compounds such as guggulsterones, flavonoids, and Beta-sitosterol offer anti-inflammatory and chondro-protective benefits, reducing cartilage damage. Rasadravyas like Naga Bhasma and Tamra Bhasma strengthen tendons, nerves, and motor neuron function, supporting tissue regeneration. Mahayogaraja Guggulu not only alleviates osteoarthritis symptoms but also promotes vitality and resilience, making it a holistic solution for joint health, particularly in aging populations.

Further Studies can be carried out on Clinical trials focusing on the molecular pathways influenced by Mahayogaraja Guggulu could elucidate how it modulates pro-inflammatory cytokines, oxidative stress markers, and cartilage protection mechanisms. Research exploring its effects on chondrocyte apoptosis and matrix degradation would provide valuable insights.

Further Research comparing Mahayogaraja Guggulu with commonly prescribed pharmaceutical treatments for osteoarthritis (such as NSAIDs or corticosteroids) would

help to position this Rasayana as a complementary or alternative therapy. This could focus on pain management, joint function, and potential side effects.

REFERENCES:

[1] S H Ralston, I D Penman, M W J Strachan, R P Hobsen; Davidsons Principles & Practice of Medicine. 24th ed. China. Elsevier 2023

[2] Gunjan Sabarwal, Vikas Prajapati, Shivakumar S Harti, Medha Sanjay Kulkarni. A Review on Sandhivata (Osteoarthritis) and its Management through Ayurveda. International Journal of Ayurveda and Pharma Research. 2020;8(6):85-89.

[3] Mangal A, Shubhasree MN, Devi P, Jadhav AD, Prasad SA, Kumar K, Otta S, Dhiman KS. Clinical evaluation of Vatari guggulu, Maharasnadi kwatha and Narayan taila in the management of osteoarthritis knee. J Ayurveda Integr Med. 2017 Jul-Sep;8(3):200-204. doi: 10.1016/j.jaim.2017.02.001. Epub 2017 Jul 28. PMID: 28757225; PMCID: PMC5607387.

[4] Minakshi, Rakesh Sharma, A review article on the concept of Rasayan in Ayurveda. J Ayu Int Med Sci. 2023;8(2):101-106.

[5] Prof S.S Savrikar;Sharangadhara Samhita with Dipika and Gudharthadipika commentary; vol 2 Madhyama khanda; Delhi; Chaukamba Sanskrit Pratisthan

[6] Prof Siddhi Nandan Mishra;Bhaisajya Ratnavali with siddhiprada Hindi commentary vatavyadhi rodadhikara;pg no 526; Chaukambha Surbharati Prakhasan; Varanasi

[7] Pal CP, Singh P, Chaturvedi S, Pruthi KK, Vij A. Epidemiology of knee osteoarthritis in India and related factors. Indian J Orthop 2016;50:518-22.

[8] Singh, A. et al, Osteoarthritis and Cartilage, Volume 30, Issue 8, 1070 – 1078

[9] Ritu Kumari, Mandip Goyal, Kalpesh Panara,Ayurveda interventions against osteoarthritis – A structured study protocol for systematic review and network meta-analysis,Advances in Integrative Medicine,2024,ISSN 2212-9588,https://doi.org/10.1016/j.aimed.2024.08.017.

[10] Sen R, Hurley JA. Osteoarthritis. [Updated 2023 Feb 20]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK482326/

[11] Ritesh Roy, Rubal Bamal, Kamini Soni. Comprehensive Ayurvedic management of Sandhigata Vata : A Case Report. J Ayurveda Integr Med Sci 2023;12:278-283. http://dx.doi.org/10.21760/jaims.8.12.42

[12] Stewart HL, Kawcak CE. The Importance of Subchondral Bone in the Pathophysiology of Osteoarthritis. Front Vet Sci. 2018;5:178. [PMC free article] [PubMed] [Reference list]

[13] Loef M, Schoones JW, Kloppenburg M, Ioan-Facsinay A. Fatty acids and osteoarthritis: different types, different effects. Joint Bone Spine. 2019 Jul;86(4):451-458. [PubMed] [Reference list]

[14] Dobson GP, Letson HL, Grant A, McEwen P, Hazratwala K, Wilkinson M, Morris JL. Defining the osteoarthritis patient: back to the future. Osteoarthritis Cartilage. 2018 Aug;26(8):1003-1007. [PubMed] [Reference list]

[15] Lespasio MJ, Piuzzi NS, Husni ME, Muschler GF, Guarino A, Mont MA. Knee Osteoarthritis: A Primer. Perm J. 2017;21:16-183. doi: 10.7812/TPP/16-183. PMID: 29035179; PMCID: PMC5638628.

[16] Suman P, Ramkumar KY, Smitha PV and Sreeramulu SH: In Vitro Antiarthritic, Antioxidant and In Vivo Cytotoxic Activity of Yogaraja Guggulu. Int J Pharm Sci Res 2015; 6(7): 3005-13.doi: 10.13040/IJPSR.0975-8232.6(7).3005-13.

[17] Ritu Chaudhary, Anirban Singha, Preeti Gavali, J P Chaudhary, Kavita. A Critical Review on Importance of Samprapti with special reference to Sandhivata (Osteoarthritis).AYUSHDHARA,2023;10(Suppl1):66-71 https://doi.org/10.47070/ayushdhara.v10iSuppl1.1138

[18] J.L.N Sastry,Prof K.C.Chunekar; Dravyaguna Vijnana; Vol 2; Varanasi; Choukamba Publications

[19] S. Verma, A. Jain, and V. B. Gupta, "Synergistic and sustainedanti-inflammatory activity of guguul with the ibuprofen: apreliminary study," International Journal of Pharma and BioSciences, vol. 1, pp. 1–7, 2010.

[20] R. Chander, A. K. Khanna, and R. Pratap, "Antioxidant activ-ity of guggulsterone, the active principle of guggulipid fromCommiphora mukul," Journal of Medicinal and Aromatic PlantSciences, vol. 24, pp. 371–375, 2002

[21] Sarup, Prerna, Bala, Suman, Kambo j, Sunil, Pharmacology and Phytochemistry of Oleo-Gum Resin

of *Commiphora wightii* (Guggulu), *Scientifica*, 2015 , 138039, 14 pages, 20

[22] Ichikawa H, Aggarwal BB. Guggulsterone inhibits osteoclastogenesis induced by receptor activator of nuclear factor-κB ligand and by tumor cells by suppressing nuclear factor-κB activation. Clinical cancer research. 2006 Jan 15;12(2):662-8

[23] Cho S.O., Kim M.H., Kim H. β-Carotene Inhibits Activation of NF-κB, Activator Protein-1, and STAT3 and Regulates Abnormal Expression of Some Adipokines in 3T3-L1 Adipocytes. *J. Cancer Prev.* 2018;23:37–43. doi: 10.15430/JCP.2018.23.1.37

[24] Kaulmann A., Bohn T. Carotenoids, inflammation, and oxidative stress—Implications of cellular signaling pathways and relation to chronic disease prevention. *Nutr. Res.* 2014;34:907–929. doi: 10.1016/j.nutres.2014.07.010

[25] Tudorachi, N.B.; Totu, E.E.; Fifere, A.; Ardeleanu, V.; Mocanu, V.; Mircea, C.; Isildak, I.; Smilkov, K.; C ˘ar ˘au¸su, E.M. The Implication of Reactive Oxygen Species and Antioxidants in Knee Osteoarthritis. Antioxidants 2021, 10, 985. https://doi.org/10.3390/antiox10060985

[26] Hassanpour SH, Doroudi A. Review of the antioxidant potential of flavonoids as a subgroup of polyphenols and partial substitute for synthetic antioxidants. Avicenna J Phytomed. 2023 Jul-Aug;13(4):354-376. doi: 10.22038/AJP.2023.21774. PMID: 37663389; PMCID: PMC10474916.

[27] Dr. Rohitakumar | Dr. Ravi R Chavan "A Critical Review on Yogaraja Guggulu" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-5 Issue-5, August 2021, pp.29-31, URL: www.ijtsrd.com/papers/ijtsrd43744.pdf

[28] Kupati VB and Jadar PG: Free radical scavanging activity of Rasasindura (Red sulphide of mercury). Int J Pharm Sci Res 2018; 9(8): 3360- 66. doi: 10.13040/IJPSR.0975-8232.9(8).3360-66

[29] Ansari MY, Ahmad N, Haqqi TM. Oxidative stress and inflammation in osteoarthritis pathogenesis: Role of polyphenols. Biomed Pharmacother. 2020 Sep;129:110452. doi: 10.1016/j.biopha.2020.110452. Epub 2020 Jul 3. PMID: 32768946; PMCID: PMC8404686.

[30] Dr. Parameshwarappa.S.Byadgi and Dr. Ajay Kumar Pandey, A Textbook of Kayachikitsa, Vol. 3, chapter 15, page 921, Chaukambha Publications, New Delhi.

[31] Shah R, Gulati V, Palombo EA. Pharmacological properties of guggulsterones, the major active components of gum guggul. Phytother Res. 2012 Nov;26(11):1594-605. doi: 10.1002/ptr.4647. Epub 2012 Mar 3. PMID: 22388973.14.

[32] Vashistha N, Sharma P. Inside review of Naimittika Rasayana. International Journal of Research and Review. 2021; 8(3): 102-106.

[33] Balveer Singh, Jitesh Bansal, Ashok Kumar, Narinder Singh, P. Hemantha Kumar. A Comprehensive Review Article on Sandhigatavata with special reference to Osteoarthritis AYUSHDHARA, 2023;10(Suppl 4):108-112

[34] Zhang S, Kou X, Zhao H, Mak KK, Balijepalli MK, Pichika MR. *Zingiber officinale* var. *rubrum*: Red Ginger's Medicinal Uses. Molecules. 2022 Jan 25;27(3):775. doi: 10.3390/molecules27030775. PMID: 35164040; PMCID: PMC8840670.

[35] Kumari M, Ashok BK, Ravishankar B, Pandya TN, Acharya R. Anti-inflammatory activity of two varieties of Pippali (Piper longum Linn.). Ayu. 2012 Apr;33(2):307-10. doi: 10.4103/0974-8520.105258. PMID: 23559810; PMCID: PMC3611634.

[36] Amalraj A, Gopi S. Biological activities and medicinal properties of Asafoetida: A review. J Tradit Complement Med. 2016 Dec 20;7(3):347-359. doi: 10.1016/j.jtcme.2016.11.004. PMID: 28725631; PMCID: PMC5506628

[37] Ritu singh, D.C. Singh, Pravesh Tomar, Sarita Verma. Ajamoda (Apium Leptophylum)- A Natural Painkiller. International Journal of Ayurveda and Pharma Research. 2016;4(9):61-63.

[38] Adamov GV, Rendyuk TD, Saybel OL, Dargaeva TD, Tsitsilin AN, Bokov DO. Vitex agnus-castus: Botanical features and area, chemical composition of fruit, pharmacological properties, and medicinal uses. J Appl Pharm Sci, 2022; 12(03):034–044

[39] Samanta J, Bhattacharya S, Rayat R. Phytochemical investigation and pharmacognostic standardization of Cissampelos pareira root. Anc Sci

Life. 2012 Apr;31(4):181-4. doi: 10.4103/0257-7941.107352. PMID: 23661865; PMCID: PMC3644755

[40] Shreya Talreja, Shashank Tiwari. A comprehensive review of Aconitum heterophyllum. J Ayurveda Integr Med Sci 2023;10:195-201. http://dx.doi.org/10.21760/jaims.8.10.31

[41] A Critical Review of Amalaki-(Emblica Officinalis Gaertn.) in Classical Texts and Promote its Use in Our Life. International Journal of Ayurveda and Pharma Research. 91-98. 10.47070/ijapr.v10i7.2412.

[42] Sharma, Shalu & Singh, Bhavna & Kumar, Hement. (2023). A Critical Review of Pharmacological Actions of Haritaki (Terminalia chebula Retz) In Classical Texts. 258.

[43] Sobeh M, Mahmoud MF, Hasan RA, Abdelfattah MAO, Osman S, Rashid HO, El-Shazly AM, Wink M. Chemical composition, antioxidant and hepatoprotective activities of methanol extracts from leaves of Terminalia bellirica and Terminalia sericea (Combretaceae). PeerJ. 2019 Feb 27;7:e6322. doi: 10.7717/peerj.6322. PMID: 30834179; PMCID: PMC6397638

[44] Singh, A. et al, Osteoarthritis and Cartilage, Volume 30, Issue 8, 1070 - 1078

सामान्य सारांश :

ओस्टियोआर्थराइटिस, जो वृद्ध वयस्कों में सामान्य है, में कार्टिलेज के टूटने और संधि तरल पदार्थ में कमी के कारण दर्द और विकलांगता होती है। आयुर्वेद में, संधिवात वात के बढ़ने और श्लेषक कफ के कम होने के कारण होता है, जिससे संधि अपघटन और दर्द, सूजन, और कठोरता जैसे लक्षण उत्पन्न होते हैं। रसायन चिकित्सा, विशेष रूप से नैमित्तिक रसायन, विशिष्ट बीमारियों को लक्षित कर जीवनी शक्ति को बढ़ाते हैं। महायोगराज गुग्गुलु, जो शास्त्रीय ग्रंथों में वर्णित है, में 31 घटक होते हैं जो हड्डी, संधि और मज्जा स्वास्थ्य पर केंद्रित होते हैं। इसमें वात और कफ को शांत करने के गुण होते हैं, जिससे संधिगतवात के प्रबंधन में यह एक शक्तिशाली उपाय साबित होता है। महायोगराज गुग्गुलु के रसायन प्रभावों की खोज करने के लिए चरक संहिता, शारंगधर संहिता और भैषज्य रत्नावली जैसे शास्त्रीय आयुर्वेदिक ग्रंथों के साथ-साथ गूगल स्कॉलर और पबमेड जैसी आधुनिक डेटाबेस में व्यापक खोज की गई। महायोगराज गुग्गुलु वात शमक और कफवातहर है। गुग्गुलु का लेखन प्रभाव संधियों में जमा आमत्व को समाप्त करता है और इसके अतिरिक्त गुग्गुलु के अल्कोहलिक अर्क में भी एंटी-ऑक्सीडेंट गुण होते हैं। इस यौगिक के एंटी-ऑक्सीडेंट गुण ऑक्सीडेटिव तनाव और कार्टिलेज विनाश को रोकने में सहायक होते हैं। यह समीक्षा जनु संधिगतवात में महायोगराज गुग्गुलु के एंटी-ऑक्सीडेंट और रसायन प्रभाव पर केंद्रित है।

Table 1: Pharmacological properties of Mahayogaraja Guggulu: [18]

DRUG	Botanical name	Rasa	Guna	Virya	Vipaka	Karma
Nagara	Zingiber officinale	Katu	Guru,ruksha, tikshana	Ushna	Madhura	Vatakaphahara, dipana,bedana
Pippali	Piper longum	Katu	Laghu,snigdha,tikshana	Ushna	Madhura	Vataslesmahara,dipana,vrshya, rasayana
Chavya	Piper chaba	Katu	Laghu, ruksha	Ushna	Katu	Vatakapha samaka
Pippalimoola	Piper longum	Katu	Lagu,ruksha	Ushna	Katu	Kaphavatahara, bhedana, dipana pachana
Citraka	Plumbago zeylanica	Katu	Lagu,ruksha, Tikshna	Usna	Katu	Vatakaphahara, Dipana,pachana,grahi
Hingu	Ferula foetida	Katu	Laghu,snigdha,tikshana	Ushna	Katu	Kaphavatahara, hridya,artavajanana, sulahara, cakshushya, Bhedaniya, anulomiya, balya
Ajamoda	Alpium graveolens	Katu, Tikta	Laghu,Ruksha,tikshana	Ushna	Katu	Kaphavatahara, vidahi, dipana, hrdya, balya, vrshya
Sarsapa	Brassica campestris	Katu, Tikta	Laghu,snigdha	Ushna	Katu	Kaphavatahara, vidahi Vamaka
Krsna jiraka	Carum carvi	Katu	Ruksha	Ushna	Katu	Kaphahara, medhya, cakshushya, grahi, garbashaya vishodaka
Swetha jiraka	Cuminum cyminum	Katu	Laghu,ruksha	Ushna	Katu	Kaphavatahara, Dipana, pachana, grahi, vrshya, Garbashayasodhaka, Balya
Renuka	Vitex agnus	Katu,tiktha	Laghu	Anushna	Katu	Pittala, Deepana, pachana, Garbhapatini
Indrayava	Holarrhema antidysentrica	Tiktha kashaya	Laghu,ruksha	Sita	Katu	Kaphapittahara, Grahi Dipana
Patha	Cissampelos pareria	Tikta	Laghu,Tikshna	Ushna	Katu	Vatakapha samaka
Vidanga	Embelia ribes	Katu, kashaya	Laghu,ruksha, Tikshna	Ushna	Katu	Vishagna, Krimighna, Dipana

Table 2: Pharmacological properties of Mahayogaraja Guggulu: [18]

Drug	Botanical name	Rasa	Guna	Virya	Vipaka	Karma
Gajapippali	Scindapus officinalis	Katu	Laghu,ruksha, Tikshna	Ushna	Katu	Kapha shamaka
Katuka	Picrorhiza kurroa	Tikta	Ruksha,laghu	Sita	Katu	Kapha pittahara,Bhedana, Lekhana,dipana,hridya
Ativisa	Aconitum heterophyllum	Katu, Tikta	Lagu,Ruksha	Ushna	Katu	Dipana,Pachana,GrahiTridoshahara,sothaha,Vishagna,Krimihara, Arsoghna,Jwarahara, Kasa hara
Bharangi	Cleodendrum serratum	Tikta, katu	Laghu,Ruksha	Ushna	Katu	Kaphavatahara, Jwarahara,Kasahara
Vacha	Acorus calamus	Katu, tikta	Laghu,Tikshna	Ushna	Katu	Kaphavata samaka
Murva	Marsdenia tenacissima	Tikta, Kashaya	Guru,ruksha	Ushna	Katu	Kaphavatahara, Jwarahara
Amalaki	Emblica officinalis	Amla pradhana pancharasa except lavana	Guru,ruksha, sita	Sita	Madhura	Tridoshahara,vayahsthapana,Rasayana, chakshusya,vrsya
Haritaki	Terminalia chebula	Kashaya pradhana pancharasa	Laghu,ruksha	Usna	Madhura	Tridoshahara,anulomana,rasayana,Prajasthapana,cakshusya,hridya, Lekhana
Vibitaki	Terminalia bellirica	Kashaya	Ruksha,laghu	Ushna	Madhura	Kaphapittahara, Keshya, Cakshusya,Bhedana, Madakari
Guggulu	Commiphora wighitti	Tikta, katu	Laghu,ruksha, vishada Suksma,sara(old) Snigdha,picchila (new)	Usna	Katu	Tridosa samaka
Vanga	Tin	Tikta, kashaya, alpalavana rasa	Laghu,sita,ruksha	Ushna	Katu	Medohara,ruchikara,rasayana,and kapha roga
Raupya	Silver	Kashaya, amla rasa swadupaka	Guru,snidha,sara	Sita	Madhura	Lekhana,vatakahahara,balyavayasthapana,Medhya, Rasayana
Naga	Lead	Madhura, tikta rasa	Snigdha,ushna,Guru, Lekhana,sara guna	Ushna	Madhura	Tridoshagna,chakshushya,Medogna,ruchivardhaka,Lekhana,Dipana,rasayana
Loha	Iron	Tikta, Madhura Kashaya	Ruksha,guru	Sita	Madhura	Balya,vrshya,udara, kaphapittaja roga,varnya,medhya
Abraka	Mica	Madhura	Snigdha	Sita	Madhura	Ayushya,keshya,Deepanavarnya,ruchikara,netrya, Balya,Medhya
Mandura	Iron slag	Kashaya	Ruksha,lagu	Sita	Katu	Vrshya,ruchikara, dipana,Pittashamana
Rasasindura	Rasasindura	Shadrasa	Guru,snidgdha guna	Ushna	Madhura	Rasayana,vajikarana, sarvaroga prabhavaka

Table 3: Chemical constituents of Mahayogaraja Guggulu [18]

Drug	Botanical Name	Chemical constituents	Pharmacological activity
Nagara	Zingiber officinale	monoterpenes, sesquiterpenes, diterpenes, vanilloids, flavonoids [34]	immunomodulatory, antihypertensive, antihyperlipidemic, antihyperuricemic, antimicrobial, and cytotoxic activities.
Pippali	Piper longum	piperine, piperlonguminine, piperlongumine and methyl-3,4,5- trimethoxycinnamate [35]	Anti-asthmatic, Anti-inflammatory,Anti oxidant
Chavya	Piper chaba	Piperine, sitoserol, piparltine, Refractomide A, B, C, D	Hepatoprotective and antioxidant
Pippalimoola	Piper longum	Piperine,Beta sitosterol,cephradiones	Anti-oxidant,Anti-inflammatory,hepatoprotective,immunostimulatory
Citraka	Plumbago zeylanica	naphthoquinones flavonoids, alkaloids, glycosides, saponins, tannins, triterpenoids, coumarins	Anti-inflammatory, Anti-oxidant activity
Hingu	Ferula foetida	Butyl propenyl disulphide,trisulfide, arabinose, rhamnose, glucuronic acid, polysaccharides and glycoproteins [36]	antioxidant, neuroprotective, antispasmodic, hypotensive, hepatoprotective, antimicrobial, antiobesity anthelmintic
Ajamoda	Alpium graveolens	limonene/apiol/myristicin [37]	Antibacterial,hypolipidemic Cardiovascular
Sarsapa	Brassica campestris	Rutin,arabinogalactan	Antioxidant,antimicrobial
Krsna jiraka	Carum carvi	Monoterpene Sterols,carvone,limonene,dermacrene-D transcis-carveol,flavonoids quercetin-3-glucuronides,	Antioxidant,antimicrobial, anticarcinogenic,immunomodulatory activity
Swetha jiraka	Cuminum cyminum	Cuminin,apigenin,apin,diacylglycerol,imperatorin,isoimperatonin,isoimpeulline	Antioxidant,antimicrobial,anticarcinogenic, immunomodulatory activity
Renuka	Vitex agnus	Terpenoids,flavaoids,iridiods,phenol carboxylic acids.[38]	immunomodulatory activity, Antioxidant,
Indrayava	Holarrhema antidysentrica	aspartic acid and arginine.	anti-microbial, anti-inflammatory and analgesics
Patha	Cissampelos pareria	Alkaloids (hayatine, hayatinine), Flavonoids, Steroid tri-terpenoids, Saponins, Tannins[39]	Anti inflammatory and anti oxidant,Anti neoplastic activity
Vidanga	Embelia ribes	Embelin, a dihydroxy benzoquinone	anthelmintic, antifertility, antidiabetic, antidyslipidemic, anticancer and antioxidant
Gajapippali	Scindapus officinalis	Piperine, isobutyl amide, longamide, guineensine, Betasitosterol, glycosides,	anti bacterial,antioxidant
Katuka	Picrorhiza kurroa	picroside I and II,kutkoside and iridoid glycosides	Antioxidant Activity,Anti-Inflammatory Activity,Antimicrobial Activity
Ativisa	Aconitum heterophyllum	C20-Diterpenoid Alkaloids,Aconitine, Heteratisine, Flavonoids, Terpenoids,Phenolic compounds[40]	Antibacterial activity,Immunomodulatory,Antihelminthic activity

Table 4: Chemical constituents of Mahayogaraja Guggulu[18]

Drug	Botanical Name	Chemical constituents	Pharmacological activity
Bharangi	Cleodendrum serratum	flavonoids namely scutellarein, hispidulin and their 7-O-glucuronides,sterols,triterpenoid, beta-sitosterol, mannitol, b-sitosterol.	Antioxidant Activity,Anti-Inflammatory Activity,Antimicrobial Activity
Vacha	Acorus calamus	Alpha and βeta-asarone,Calacone,Acorin, Starch and Tannin.	Inflammatory and Immunomodulatory Effect,Neuromodulatory Effect
Murva	Marsdenia tenacissima	Marsdenin, D- Cymarose, Asclepobiose, D Canarose and Cissogenin, tenacissoides A-E	Anthelmic activity, anti spasmodic activity
Amalaki	Emblica officinalis	Emblicanin A and B, Phyllemblin,gallic acid, corilagin, furosin and geraniin.[43]	Anti-inflammatory activity antioxidant activity,immunomodulatory activity.
Haritaki	Terminalia chebula	Gallic acid, chebulic acid, chebulagic acid, mannitol [42]	Hepatoprotective, Immunomodulatory
Vibitaki	Terminalia bellirica	Glycoside (bellericanin) Tannins, ellagic acid, ethyl gallate, galloyl glucose and chebulagic acid, phyllemblin, β-sitosterol, annitol,lignans, bellaric, and triterpene acids [41]	Analgesic activity
Guggulu	Commiphora wighitti	diterpenoids, triterpenoids, steroids, long-chain aliphatic tetrols, aliphatic esters, ferulates, lignans, carbohydrates	Antioxidant Activity, Antiatherosclerotic Activity,Antihyperglycemic Activity,Cytotoxic Activity, Anti-Inflammatory and Antiarthritic Activity
Vanga	Tin	-	Antioxidant,anti inflammatory
Raupya	Silver	-	Anti inflammatory,anti oxidant,immunomodulator, anti-bacterial.
Naga	Lead	-	Hepatoprotective,antioxidant
Loha	Iron	-	Antioxidant,Antibacterial,Anti-inflammatory, Analgesic
Abraka	Mica	-	Anti-inflammatory,Immuno-modulatory,anti-cancer,Anti-diabetic,Hepatoprotective,Anti Direutic
Mandura	Iron slag	-	hepato-protective, anti-fibrotic, anti-inflammatory, detoxifying and anti viral properties i
Rasasindura	Rasasindura	-	Antioxidant