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ANTI-ARTHRITIC AND ANTI-INFLAMMATORY ACTIVITY OF *SHIVA GUGGULU* W.S.R. TO AAMAVATA

Dr. Swapnali S. Patil*[1] and Dr. Raman Belge[2]

[1]P.G. Scholar, Dept. of Rasashastra & Bhaishajya Kalpana, Shri Ayurved Mahavidyalaya, Nagpur.

[2]P.G. Guide, Professor & H.O.D. Dept. of Rasashastra & Bhaishajya Kalpana, Shri Ayurved Mahavidyalaya, Nagpur.

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***Corresponding Author**
Dr. Swapnali S. Patil
P.G. Scholar, Dept. of Rasashastra & Bhaishajya Kalpana, Shri Ayurved Mahavidyalaya, Nagpur.

ABSTRACT

Introduction - Rheumatoid arthritis (RA) is a chronic, inflammatory condition of unknown etiology, affecting approximately 1% of the general population. It is a progressive, disabling, chronic multisystem disease that is characterized by pain, swelling and stiffness of the synovial joints. In the 9th century A.D., Indian physician, *Madhava* wrote a full description of *Aamavata.* **Aim & Objective-** To study Anti-Arthritic and Anti-Inflammatory Activity of *Shiva Guggulu* w.s.r. to Aamavata. **Methodology -** *Shiva Guggulu (SG)* has a significant role in RA, it is refered from *Rasayoga Sagar(2nd volume).*It contains *Gandhaka, Triphala, Erandataila, Guggulu, Rasna, Vidanga, Maricha, Danti, Shunthi and Devadaru.* The current research paper will discuss about the pharmacodynamic and pharmacokinetic actions of *Shiva guggulu*. A review of various research articles have proved the anti-arthritic and anti-inflammatory activity of these ingredients. **Gandhak-**(Sulphur) (Katu, Tikta, Kashay, Ushna, Madhur, Katu) possess Anti-inflammatory & Anti-bacterial activity. **Eranda taila-**(Ricinus communis) (Madhur, Kashay, Ushna, Madhur) possess Antinociceptive activity in writing test, formalin induced paw licking and tail immersion method in mice. **Guggulu-**(Commiphera mukul) (Tikta, Katu, Ushna, Katu) possess Anti-inflammatory & Anti-arthritic activity. **Haritaki-**(Terminalia chebula) (Pancharasa (Kashay+), Ushna, Madhur) possess Anti-inflammatory, Immunomodulatory activity and vasodilatory effect. **Bibhitak-**(Terminalia bellerica) (Kashay, Ushna, Madhur) possess Anti-inflammatory & Analgesic activity. **Amalaki-**(Embelica officinalis) (Pancharasa (Amla+), Shita, Madhur) Anti-oxidant, Anti-lipidemic &

vasodilator effect. **Rasna-** (Vanda roxburghii) (Tikta, Ushna, Katu) possess Anti-inflammatory & Analgesic activity. **Vidanga-**(Embelia ribes) (Katu, Kashay, Ushna, Katu) possess Anti-inflammatory & Analgesic activity. **Maricha-**(Piper nigrum) (Katu, Ushna, Katu) possess Anti-inflammatory & Analgesic activity. **Danti-**(Baliosperma monatano) (Katu, Ushna, Katu) possess Anti-inflammatory & Analgesic activity. **Shunthi-**(ZIngiber officinalis) (Katu, Ushna, Madhur) possess Anti-inflammatory & Anti-oxidant activity. **Devadaru-**(Cidrus deodara) (Tikta, Ushna, Katu) possess Anti-oxidant & Anti-lipidemic activity. **Conclusion-** Shiva Guggulu is a Herbomineral formulation. These herbominerals are experimentally proven for their Anti-inflammatory, Anti-arthritic and Analgesic activity. Hence Shiva Guggulu can be useful in the patients of Rheumatoid arthritis.

KEY WORDS: Aamvata, Pain, Rheumatoid arthritis, *Rigveda, Shiva Guggulu.*

INTRODUCTION

Aamvata was first described as an independent disease in ‘’Madhavnidan’’.[1] It is a disease of *Madhyama Rogamarga* as it affects *Sandhis* and *Hridaya marma*. Aamvata the term derives from the words as ‘’*AMA*’’ and ‘*’VATA*’’.[2] The word ‘’*AMA*’’ means unripe food stuff, also *Anna rasa* which is not found up to level of the *Dhatu i.e. Apachit Dhatu.*[3] The *AMA* when combines with *Vata Dosha* and occupies in *Shleshma Sthan* [Asthi-Sandhi] results painful disease’’*Aamvata*’’.[4] The disease is characterized by various features like *Sandhishoola* in the nature of *Toda*, stiffness, inability of joint movements, redness, fever, general debility, swelling, also the joints in *Vatavyadhi* disorders eventually become deformed.[5] Aamvata is included under the category of *Vata-Kaphaja* disorders.

Modern medical science has concluded that even after administration of their best drugs, the disease has a tendency to persist progress and cripples the patient, therefore they consider it is a disease of remission. It is a debilitating disease in view of its chronicity and complications. Therefore, it has taken the foremost place among the joint disorders. It continues to pose challenge to physicians due to severe morbidity and crippling nature and claiming the maximum loss of human power, making it a biggest worldwide burning problem irrespective of races. It is equated with Rheumatoid arthritis, an inflammatory Auto-immune disorder.

The clinical presentation of *Aamvata* closely mimics with the special variety of Rheumatological disorders called Rheumatoid arthritis. In accordance with their similarities on clinical features. The modern treatment provides the symptomatic relief but the underlined

pathology goes on unchecked due to the absence of effective therapy. As no system in medical fields offers satisfactory solutions to this disease, Ayurveda is the only excellent solution for the treatment of Rheumatoid Arthritis. Hence Ayurvedic medicine "Shiva Guggulu" from *Rasayog sagar (vol.2)* selected for study as it has been significant effect on Rheumatoid Arthritis. Shiva Guggulu consist of *Gandhaka Triphala, Erandataila, Guggulu, Rasna, Vidanga, Maricha, Danti, Shunthi and Devadar*. These all drugs are excellent not only in doing Deepan –Pachan but also they have anti- inflammatory, immune modulatory, anti- oxidant anti- arthritic and cartilage protective activity. It is recommended in Rheumatism, lower backache, sciatica, gout, paraplegia and deformed knee synovitis etc.

AIM AND OBJECTIVE

- To evaluate efficacy of *Shiva Guggulu* in the management of *Aamavata.*
- To review the therapeutic properties and pharmacological effect of Shiva Guggulu.

MATERIAL AND METHOD

Literary review

- **Samprpti of Aamvata-** Ama + Vatadosha→Shleshma sthan → Aamvata.
- **Dosha –** Vata, Kapha dosha.
- **Dushya –** Asthi-sandhi
- **Strotodushti –** Asthivaha, Majjavaha, Annavaha strotas.
- **Adhisthan –** Sandhi, Hrudaya Marma.

Ingredients of Shiva Guggulu and their properties

Drug	Latin name	Rasa	Virya	Vipak	Karma
Gandhak	Sulphur	Katu, Tikta, Kashay	Ushna	Madhur, Katu	Deepan, Pachan, Krimihara
Eranda taila	Ricinus communis	Madhur, Kashay	Ushna	Madhur	Aamvat, Shula, Shothahara
Guggulu	Commiphera mukul	Tikta, Katu	Ushna	Katu	Bhagna sandhankrut, Vatahara
Haritaki	*Terminalia chebula*	Pancharasa (Kashay+)	Ushna	Madhur	Vedana sthapan, Tridoshahara
Bibhitak	*Terminalia belerica* Roxb.	Kashay	Ushna	Madhur	Kapha, Vata hara, Bhedan
Amalaki	Embelica officinalis	Pancharasa (Amla+)	Shita	Madhur	Tridoshahara
Rasna	Vanda roxburghii	Tikta	Ushna	Katu	Aamvat, Shula, Shothahara
Vidanga	Embelia ribes	Katu,	Ushna	Katu	Vata, Shula, kaphahara

		Kashay,			
Maricha	Piper nigrum	Katu	Ushna	Katu	Kapha, Vatahara, Tikshna
Danti	Baliosperma monatano	Katu	Ushna	Katu	Tikshna, Sara, Deepan
Shunthi	ZIngiber officinalis	Katu	Ushna	Madhur	Aamvatghni, Pachan, Vedanasthapan
Devadaru	Cidrus deodara	Tikta	Ushna	Katu	Shotha, Vatahara

Properties of ingredients according to modern research studies

The ingredients of Shiva Guggulu shows their anti-inflammatory, Analgesic and Anti-arthritic properties as per different study.

1] Gandhak (Sulphur)

Sulphur compounds isolated from garlic exert anti-inflammatory properties." Thiacremonone "is a Sulphur compounds isolated from garlic exert **anti-inflammatory** properties. The anti-inflammatory and arthritis effects of thiacremonone in *in vivo* were investigated in 12 Otetradecanoylphorbol-13-acetate-induced ear edema, carrageenan and mycobacterium butyricum-induced inflammatory and arthritis models. Lipopolysaccharide-induced nitric oxide (NO) production was determined by Griess method.

The various research studies suggested that thiacremonone exerted its **anti-inflammatory and anti-arthritic** properties through the inhibition of NF-κB activation via interaction with the sulfhydryl group of NF-κB molecules, and thus could be a useful agent for the treatment of inflammatory and arthritic diseases.[6]

2] Eranda Taila (Ricinus communis)

Commonly known as castor oil plant, it is indigenous to the southeastern Mediterranean Basin, Eastern Africa, and India. The seed from the plant is a rich source of triglycerides (mainly ricinolein) and ricin. The oil obtained from the seed of the plant has been used as a laxative, purgative, and cathartic in Unani, Ayurvedic and other ethnomedical systems.

Traditional Ayurvedic medicine considers castor oil the king of medicines for curing arthritic diseases. In a study carried out in guinea-pig eyelid, ricinolein was found to possess both **pro-inflammatory and anti-inflammatory** properties that were observed upon acute and repeated application of the compound, respectively.[7]

Antinociceptive activity of Eranda was evaluated using acetic acid induced writing test, formalin induced paw licking and tail immersion method in mice at doses of 100, 125 and 150 mg/kg bw.in in-vivo study.[8]

3] Guggulu (Commiphera mukul)

The results of several studies confirm **anti-inflammatory and antiarthritic activities** of guggulu. The 50 percent aqueous methanolic extract was found to exhibit an anti-inflammatory effect on adjuvant-induced air pouch granuloma in mice. The methanolic extract inhibited nitric oxide production in lipopolysaccharide activated mouse peritoneal macrophages.[9] A crystalline steroid was isolated from the petroleum ether extract and tested in rats for inhibition of inflammation induced by Freund's adjuvant. It inhibited the full development of the primary lesions in adjuvant arthritis and also reduced the severity of secondary lesions as compared with the untreated control group.[10]

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.[11]

The **antioxidant** property of guggulu helped stop the oxidation of cholesterol and subsequent hardening of the arteries, reduced the stickiness of platelet, and also lowered the risk of coronary artery disease.[12] It also enhanced the production of thyroxin and triiodothyronine; these hormones increase the metabolism of carbohydrates and protein synthesis and help in lowering the lipid activity.[13] The antioxidant activity was attributed to the presence of guggulsterones. It was tested *in vitro* against the formation of oxygen free radicals. The oxidation of human LDL induced by Fe2+ or by rat peritoneal macrophages caused marked formation of lipid peroxidation products.

4] Haritaki (*Terminalia chebula*)

Terminalia chebula Retz. (Combretaceae) have been known from ancient times and were described by Charaka in his text "Charaka Samhita". It contains the active ingredient chebulagic acid. Aqueous extract of Terminalia chebula had shown numbers of activity such as digestive, allergic and infectious diseases like cough and skin disorders, antimicrobial activity antidiabetic and antioxidant properties.[14]

It also reported to have strong anti-anaphylactic actions, **anti-inflammatory and analgesic** properties.[15] The **anti-arthritic** effect in in –vivo study was accessed by measuring changes in paw edema, joint thickness, body weight, secondary lesions, ESR, and rheumatoid factor.

5] Bibhitak (*Terminalia belerica*)

Terminalia belerica has been used for its lowering serum glucose level and **antioxidant activity** by reducing lipid peroxidation, scavenge hydroxyl radical and superoxide radicals. This plant has been used for treatment of digestive and liver disorders. It can significantly reduce the total cholesterol, low density lipoprotein (LDL), very low density lipoprotein (VLDL), high density lipoprotein (HDL) and free fatty acid in experimentally induced hypercholesteremic rats.[16][17]

6] Aamlaki (Embelica officinalis)

Emblica officinalis (Family: Euphorbiaceae) indigenous to India, is valued for its unique tannins and flavanoids, which contain very powerful **antioxidant** properties and used for the treatment of a number of diseases, such as dyslipidemia and atherosclerosis, as hepatoprotective, radioprotective, antibacterial, antitumor, and **anti-inflammatory** agents.[18]

7] Rasna (Vanda roxburghii)

Extract of *V. roxburghii* has wound-healing potential in rats. It augments the uterine contractions and is a bronchodilator, digestant and blood purifier. It is used in diseases like gout, **rheumatic disorders,** asthma, abdominal pain, fever and edema.[19]

8] Vidanga (Embelia ribes)

The fruit of the *Embelia ribes* Burm (Myrsinaceae) has been used to treat fever, inflammatory diseases, and a variety of gastrointestinal ailments for thousands of years. Embelin from *E. ribes* has been shown to have antitumor, **anti-inflammatory, and analgesic** properties. More recently, active principle, embelin was also identified as a cell-permeable, small molecular weight inhibitor of the X chromosome-linked inhibitor-of-apoptosis protein (XIAP), an antiapoptotic protein, through structure-based computational screening of a traditional herbal medicine three-dimensional structure database of 8221 individual traditional herbal products.[20] Embelin also inhibited activity through modulation of NF-κB activation. Embelin inhibited both inducible and constitutive NF-κB activation was abrogated by embelin. Thus, embelin inhibited sequentially the TNF-induced activation of the IκB kinase, IκBa phosphorylation, IκBa degradation, and p65 phosphorylation and nuclear translocation.

Furthermore, embelin down-regulated gene products involved in cell survival, proliferation, invasion, and metastasis of the tumor. This down-regulation was associated with enhanced apoptosis by cytokine and chemotherapeutic agents.[21]

9] Maricha (Piper nigrum)

Black pepper (*Piper nigrum*) is commonly used as a spice in human diets, but it is also used as a medicine, a preservative, and a perfume in many Asian countries. An extract of the active phenolic component, piperine, is well known to provide beneficial physiological effects. It stimulates the digestive enzymes of pancreas, protects against oxidative damage, lowers lipid peroxidation, and enhances the bioavailability of a number of therapeutic drugs. In addition, its **anti-inflammatory activities** have been demonstrated in rat models of carrageenan- induced rat paw edema, cotton pellet-induced granuloma, and a croton oil-induced granuloma pouch. Constituents of the piper species have shown *in vitro* inhibitory activity against the enzymes responsible for leukotriene and prostaglandin biosynthesis, 5-lipoxygenase and COX-1, respectively.[22] These effects of piperine seem to be beneficial for inflammatory diseases that are accompanied by severe pain; for example,rheumatoid arthritis.

10] Danti (Baliosperma monatano)

Anti-inflammatory activity of Danti can be determined by using Carrageenan-induced paw edema method **Anti-inflammatory activity** was evaluated by the carrageenean-induced paw oedema method.[23]

11] Shunthi (ZIngiber officinalis)

Traditionally, ginger has been used to treat a wide range of ailments including gastrointestinal disorders, such as stomachaches, abdominal spasm, nausea, and vomiting, as well as in arthritis and motion sickness. Phytochemical studies showed that the plant is rich in a large number of substances, including gingerols and shogaols. These compounds display diverse biological activities such as **antioxidant, anti-inflammatory, and anticarcinogenic** properties. They also exhibit a spasmolytic activity, which is mediated via blocking Ca channels. A number of recent studies have renewed interest in ginger for the treatment of chronic inflammatory conditions.[24]

12] Devadaru (Cidrus deodara)

The wood of *C. deodara* has been used since ancient days in Ayurvedic medical practice for the treatment of **inflammations and rheumatoid arthritis**, anti-cancer activity, potent disinfectant, anti-fungal properties, and analgesic activity.[25]

OBSERVATIONS AND RESULTS

1] Gandhak- (Sulphur) - Gandhak is Katu, Tikta, Kashay rasatmaka, Ushna virya, and having Madhur and Katu vipak drug. As per Ayurveda, Gandhak is Rasayan, Pachak, Aamdosha nashak, Vishahara etc. As per different studies we have concluded that Gandhak possess Anti-inflammatory, Anti-arthritic and Anti-bacterial property.

2] Eranda taila-(Ricinus communis) -Eranda has Madhur, Kashay rasa, Ushna virya, Madhur vipak. As per Ayurveda it has Aamvat, Shula, Shothahara and virechak properties. From the various in-vivo studies we have concluded that Eranda taila possess pro-inflammatory, anti-inflammatory and antinociceptive activity.

3] Guggulu- (Commiphera mukul) -Guggulu have Tikta, Katu rasa, Ushna virya, Katu vipak properties. According to Ayurveda Guggulu has Bhagna sandhankrut and Vatahara properties. From the several in-vivo study it is concluded that guggulu possess Anti-inflammatory, Antiarthritic and Anti-oxidant activity.

4] Haritaki- (Terminalia chebula) -Haritaki is Pancharasa (kashay+), Ushna vrya, Madhur vipak dravya. It acts as Vedana sthapan, Tridoshahara. In various in-vivo study it proves its anti-inflammatory, anti-arthritic and analgesic properties.

5] Bibhitak-(Terminalia bellerica) -Bibhitak has Kashay rasa, Ushna virya, Madhur vipak. It is vata-kapha hara and bhedan in nature. In various in-vivo study it proves its anti-inflammatory, anti-arthritic and anti-oxidant properties.

6] Aamlaki-(Embelica officinalis) -it has Pancharasa (Amla+), Shita virya, Madhur vipak.It is tridoshahara in nature. As per various research studies it possess Anti-oxidant, Anti-inflammatory, Anti-lipidemic & vasodilator effect.

7] Rasna (Vanda roxburghii) - It has Tikta rasa, Ushna virya, Katu vipak. It acts on Aamvat, Shula, Shotha. As per various research studies it possess Anti-inflammatory & Analgesic activity.

8] Vidanga (Embelia ribes)-It has Katu, Kashay rasa, Ushna virya, Katu vipak. It is Vata, Shula, kaphahara. As per various research studies it possess Anti-inflammatory & Analgesic activity.

9] Maricha (Piper nigrum)-It has Katu rasa, Ushna virya, Katu vipak. It is Kapha, Vatahara, Tikshna. As per various research studies it possess Anti-inflammatory & Analgesic activity.

10] Danti (Baliosperma monatano)- It has Katu rasa, Ushna virya, Katu vipak. It is Tikshna, Sara, Deepan. As per various research studies it possess Anti-inflammatory & Analgesic activity.

11] Shunthi (ZIngiber officinalis)-It has Katu rasa, Ushna virya, Madhur vipak. It is Aamvatghni, Pachan, Vedanasthapan in action. As per various research studies it possess Anti-inflammatory & Anti-oxidant activity.

12] Devadaru (Cidrus deodara)-It has Tikta rasa, Ushna virya, Katu vipak. It is Shotha, Vatahara. As per various research studies it possess Anti-oxidant & Anti-lipidemic activity.

CONCLUSION

Shiva Guggulu is a Herbomineral formulation. Pharmacokinetic and Pharmacodynamic actions of Shiva Guggulu is discussed in current research paper with the study of different texts, articles and research studies. From these studies we can conclude that contents of Shiva Guggulu possess Anti-inflammatory, Analgesic, Anti-Arthritc, Antinociceptive and Anti-oxidant activity. This study clearly highlights the potential of *Shiva Guggulu* as a reliable treatment for Rheumatoid arthritis substantiating the claims of the *Ayurvedic* system of medicine.

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