



RASNA SAPTAK KWATH-AN AYURVEDIC POLYHERBAL FORMULATION FOR ARTHRITIS

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Abstract: Rheumatoid arthritis (RA) is a most common immuno-inflammatory joint disorder seen in clinical practice mainly affecting synovial joints with synovial proliferation and destruction of articular cartilage. It is an autoimmune disease, whereby the body's immune system attacks its own tissues as if it were a foreign invader. The scientific community view that increased oxidative stress or defective antioxidant status contributes to the pathology of RA. In recent times, focus on Complimentary and Alternative Medicine (CAM) has increased all over the world. Ayurveda, a traditional system of medicine, emphasized the use of medicinal plants in form of various formulations for treatment of arthritis. Among them, Rasna Saptak Kwath (RSK) is a formulation, which contains eight medicinal plants viz. *Pluchea lanceolata*, *Tribulus terrestris*, *Tinospora cardifolia*, *Boerrihia diffusa*, *Ricinus communis*, *Cedrus deodara*, *Cassia fistula* and *Zingiber officinalis*. These herbs have the potential to treat symptoms of RA like inflammation and pain other than that it also treat arthritis at immune and free radical level. These herbs are known for their immunosuppressive action (e.g. *Pluchea lanceolata*), anti-inflammatory action (e.g. *Tribulus terrestris*), analgesic action (ex. *Ricinus communis*), and antioxidant (e.g. *Tinospora cardifolia*). This scientific paper emphasized on information for each herb of RSK on account of active constituent, pharmacology, mechanism of actions on basis of various preclinical studies, safety precautions along with the current research potential of the herb.

Keywords: Ayurvedic medicinal plants, Rheumatoid arthritis, Rasna Saptak Kwath, Immunosuppressive, Antioxidant.

Introduction: Rheumatoid arthritis is a most common immuno-inflammatory joint disorder seen in clinical practice mainly affecting synovial joints with synovial proliferation and destruction of articular cartilage^[1]. The scientific community views it as an autoimmune disease, whereby the body's immune system attacks its own tissues as if it were a foreign invader^[2] In recent times, focus on Complimentary and Alternative Medicine CAM has increased all over the world. Ayurvedic system of medicine is a plant base, mineral base and animal base system of medicine system.

Rasna Saptak Kwatha (RSK) is an ayurvedic polyherbal decoction prescribed for arthritis. The formulation RSK contains medicinal plants (Table-1)^[3] viz. *Pluchea lanceolata*, *Tribulus terrestris*, *Tinospora*

cardifolia, *Boerrihia diffusa*, *Ricinus communis*, *Cedrus deodara*, *Cassia fistula* and *Zingiber officinalis*. These herbs are known for their anti-inflammatory activity, analgesic, anti-arthritic activity. viz *Rasna* (*Pluchea lanceolata*), *Gokshura* (*Tribulus terristeris*), *Eranda*(*Ricinus communnis*). Some of them even known for their antioxidant activity like *Aragvadha*(*Cassia fistula*) and Immunomodulatory activity like *Guduchi* (*Tinospora cardifolia*). The present review incorporated a detailed account of the plant, stressing its therapeutic uses, pharmacology, mechanisms of action based on preclinical safety issues along with the current research potential of the herb. A high quality and reliable medical information from the internet was retrieved.

Table 1: Ingredients present in Rasna Saptak Kwath

S.No	Plant Name	Scientific Name	Part Used
1	Rasna	<i>Pluchea lanceolata</i>	Leaf
2	Gokshura	<i>Tribulus terrestris</i>	Fruit
3	Guduchi	<i>Tinospora cardifolia</i>	Stem
4	Punarnava	<i>Boerihhia diffusa</i>	Root
5	Eranda	<i>Ricinus diffusa</i>	Root
6	Devdaru	<i>Cedrus deodara</i>	Stem
7	Aragvadha	<i>Cassia fistula</i>	Fruit
8	Sunthi	<i>Zingiber officinalis</i>	Rhizome(dry)

Table 2: Pharmacological properties of each herbs present in the formulation

S.No	Ingredient	Modern Pharmacology
1	Rasna	Anti-Inflammatory, Anti-Arthritic Activity, Anti-Oxidant Activity
2	Gokhsura	Anti-Inflammatory, Analgesic Anti-Arthritic Activity
3	Guduchi	Anti-Inflammatory, Immunomodulatory Effect
4	Punarnava	Rejuvenator, Anti-Inflammatory
5	Eranda	Anti-Inflammatory, Analgesic Activity
6	Devdaru	Anti-Inflammatory, Analgesic
7	Aragvadha	Anti-Inflammatory , Antioxidant
8	Sunthi	Anti-Inflammatory, Analgesic

Rasna: Rasna (*Pluchea lanceolata*), has been traditionally used since ancient times by Ayurvedic practitioners, to treat various painful afflictions and swelling of the body joints. It is a major ingredient of the famous anti-inflammatory ayurvedic decoction "Maharasnadi Qwath" and "Rasna Saptak Kwath"

Active Constituents: Moretenol, Moretenol Acetate, Neolupenol, Octacoanoic, Hexacosanoic and Tetracoanoic Acid, Flavanoids, Quercetin & Isorhamnetin (air dried leaves) ^[4].

Mechanism of Action on Basis of Preclinical Studies

Anti-inflammatory Activity: The ethanolic extract of *Pluchea lanceolata* exhibited significant anti-inflammatory activity. The anti-inflammatory potential of some ayurvedic compositions containing *P. lanceolata* extract was tested on experimental arthritis and granuloma pouch. These showed marked anti-inflammatory activity in both models. In experimental arthritis, a decoction of the plant has been reported to prevent the swelling of joints ^[5].

Immunosuppressive Actions: The immunosuppressive potential of 50% ethanolic extract (PL) of *Pluchea lanceolata* and its bioactive chloroform fraction (PLC) was investigated with basic models of immunomodulation, such as, the humoral antibody response, cell-mediated immune response. The findings revealed that *P. lanceolata* causes immunosuppression by inhibiting Th1 cytokines ^[6].

Anti-oxidant Activity: Flavonoids are reported as scavengers of free radicals and potent inhibitors of lipid peroxidation ^[7].

Anti-arthritic Activity: In albino rats, the water soluble fraction of the 90% alcohol extract showed significant anti-inflammatory activity in induced formalin arthritis ^[8].

Gokhsura: This spiky fruit looks like the cloven hoof of a cow and hence the name of a gokhsura (cow-hoof). 'Kshura' means "scratcher".

Active Constituents: Protodioscin, Terreestorins A-E, Gitonin, Beta-Sitosterol, Hecogenin and Ruscogenin. Kaempferol & Quercetin. Harmala Pottassium Nitrate, Lignans, Tribulusamides A & B ^[9].

Mechanism of Action on the Basis of Preclinical Studies

Anti-arthritic Activity: The anti-arthritic activity of *Tribulus terrestris* (200mg/kg and 300 mg/kg p.o) was assessed using Freund's complete adjuvant (FCA) induced arthritis in rats ^[10]. It was found that the administration of *T. terrestris* (200 and 300 mg/kg bodyweight) leads to inhibition of leukocyte migration which may have beneficial effect for joint preservation.

Analgesic Activity: The significant analgesic effects of different doses of *T. terrestris* extract in formalin test. The most effective dose of extract was 100 mg/kg.

Guduchi: Guduchi is described as "the one who protects the body" One of the synonym is "amrta" which means "divine nectar".

Active Constituents: Giloin, Bitter Principles, Berberin, Protoberberin, Tinosporin, Columbin, Chasmanthin, Palmarin, Tinosporone, Tinosporin Acidsyringin, Cordial ^[10].

Mechanism of Action on Basis of Preclinical Studies

Immunomodulatory Activity: It stimulates the granulocytes macrophage colony stimulating

factor (CGM-SF). The extract induced a significant increase in number of CFU-GM, indicating that activation of macrophages by guduchi had occurred, leading to increase in leucocytes and enhanced neutrophil functions^[11].

Anti-inflammatory Activity: The aqueous extract has significant anti-inflammatory activity. It significantly reduces the pain and morning stiffness in patient having rheumatoid arthritis. This effect is also considered to be due to the inhibition of C3 convertase and serine protease which indicates that inhibition of serine protease in general may be involved in anti-inflammatory activity.

Antioxidant activity: An extract of *T. cardifolia* reduced the toxicity induced by free radicals and inhibit lipid peroxidation and the generation of superoxide and hydroxyl radicals in vitro.

Punarnava: It means one that renews the old body. Its rejuvenative action works via its opening and cleansing activity allowing effective nourishment to reach the tissues.

Active Constituents: Punarnavine, Beta-Sitosterol, Lignans; Boeravinone A,B,C2,D And F, Punarnavoside, Lignans; Liriodendrin^[10].

Mechanism of Action on Basis of Preclinical Studies

Anti-arthritis Activity: The aqueous extract significantly inhibited the increased serum amino transferase activity in arthritic animals similar to hydrocortisone. Liver ATP phosphohydrolase activity was also increased by the aqueous extract^[12].

Anti-inflammatory activity: The aqueous and acetone extracts of the root, showed significant anti-inflammatory activity against carrageenan-induced oedema and formaldehyde induced arthritis in albino rats.

Eranda: Castor oil is considered as the king of the medicines for treating arthritis.

Active Constituents: Quercetin, Isoquercetin, Rutin (Aerial Parts), Gallic Acid, Gallic Acid, Chlorogenic. Ricinine (Seed). Fatty Acids; Ricinoleic Acid, Palmitic, Linoleic and Stearic Acids. Ricin (Seed)^[10].

Mechanism of Action on Basis of Preclinical Studies

Antioxidant effect: Extract produced an inhibition of Aryl Hydrocarbon hydroxylase (AHH) activity and H₂O₂ production by lindane-induced mouse Hepatic microsomes, indicating the antioxidant activity of the plant.

Anti-inflammatory Activity: Petroleum ether extract of the root bark shows anti-inflammatory

activity against formaldehyde induce arthritis. It significantly reduces the odema when administered upto 15 days^[13].

Devdaru: The outer bark is astringent and is used for diarrhea and Pain. The essential oil usually comes from the uprooted stumps of felled trees.

Active Constituents: Heartwood Yield About 2.1% Of Essential Oil, consisting mainly of the Sesquiterpene Hydrocarbons, Taxifolin and Quercetin^[10].

Mechanism of Action on Basis of Preclinical Studies

The Anti-inflammatory, Anti-arthritis Activity and Analgesic Activity: Aqueous extract of the air dried stem bark showed anti-inflammatory and antiarthritic activity against acute and chronic inflammation in carrageenan-induced oedema, cotton pellet, granuloma pouch and formalin and adjuvant arthritis in albino rats.

Aragvadha: This medium sized tree grows all over the world. Aragvadha literally means remover of disease.

Active Constituents: Glycosides, Anthraquinones; Fistulic Acid, Sennosides, Sugar Sacchrose, Sterols^[10].

Mechanism of Action on Basis of Preclinical Studies

Anti-inflammatory Activity: The methanol extract of leaves exhibited anti-inflammatory activity against carrageenan, histamine and dextran-induced paw odema in rats (Bhakta et al., 1999a)^[14].

Antioxidant Activity: Anti-inflammatory and Antioxidant activities of the aqueous (CFA) and methanolic extracts (CFM) of the *Cassia fistula* Linn. bark were assayed in wistar albino rats. The extracts were found to possess significant anti-inflammatory effect in both acute and chronic models.

Immunomodulatory Activity: The immunomodulatory activity of methanolic extract in rats was evaluated by administered doses of 100 and 200 mg kg⁻¹ orally. The extract showed a significant stimulation of the cell mediated immunity in immune responses with the antigenic challenge by sheep RBCs, a significant increase in neutrophil adhesion and delayed type hypersensitivity response and no effects on the humoral immunity.

Sunthi: As it increases digestion of nutrients it may also increase assimilation of pharmaceutical drugs.

Active Constituents: Gingerols, Gingerdiols and Gingerdiones, 1-2% volatile oil Zingiberine,

Zingerone, Camphene, Borneol, Phellendrene, Citral^[10].

Mechanism of Action on Basis of Pre Clinical Studies

Anti-inflammatory Activity: It blocks inflammatory prostaglandins and thromboxane. The volatile and diaphoretic essential oils beta-sesquiphellandrene and zingiberene decompose on drying^[15].

Analgesic Activity: The extract (50 and 100 mg/kg b.w) produced significantly (P<0.05) inhibition of the carrageenan – induced rat paw oedema and a reduction in the number of writhing induced by acetic acid in mice.

Antioxidant Activity: The pungent principles including gingerol and zingerone, demonstrated in vitro effects in scavenging the superoxide and hydroxyl-radicals and inhibiting lipid peroxidation.

Conclusion: As arthritis is now targeting young generations also having good sharing of senior citizens. Now the Ayurveda is gaining attention all over the world, especially in treating chronic or lifestyle disorders. Different polyherbals formulation of ayurveda playing dynamic role in treating various disease. RSK is on the formulations showing the same effect. Through various researches it has been prove now that various herbs of RSK have the potential to arthritis and its various symptoms like inflammation, pain, stiffness etc. An Ayurvedic formulation which was beautifully designed by Ayurvedic acharyas with the help of combination of these herbs which treat the arthritis at all parameters holds its effectiveness

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