



## Review Article

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### PROBABLE PHARMACOLOGY OF RASNA SAPTAK KWATH IN AMAVATA (RHEUMATOID ARTHRITIS): A REVIEW

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#### ABSTRACT

Rheumatoid arthritis (RA) is a chronic immuno-inflammatory systemic disorder of synovial joints. The major complaints for which a patient seeks medical attention are pain in and around the joints, swelling, stiffness and limited range of motion. A disease resembling clinically to RA is described in Ayurvedic texts as Amavata. The Ayurvedic treatment not only devoid such type of ill effect, but also provides a better way by treating Agni and Ama at its roots. Rasna Saptak Kwath (RSK) is a formulation which is prescribed to the patient in decoction form to treat arthritis. The description of RSK to treat amavata (Rheumatoid arthritis) is found in Bhaishajya Ratnavali. RSK is a formulation of eight herbs viz. *Pluchea lanceolata*, *Tribulus terrestris*, *Tinospora cardifolia*, *Boerrihia diffusa*, *Ricinus communis*, *Cedrus deodara*, *Cassia fistula* and *Zingiber officinale*. Researches revealed that these herbs play significant role in reducing the symptoms and to treat the RA. The herbs possess the property of anti-inflammation, analgesic, antioxidant, immunosuppressive activity. Maximum ingredients of RSK have Vatasleshmahara property which reduces Vata and Kapha Doshas from the body and reduces the symptoms of amavata. So, this paper will give a comparative view on probable pharmacology (pharmacokinetic and pharmacodynamic activity) of the formulation through Ayurvedic and contemporary approach.

**Keywords:** Amavata, Rheumatoid arthritis, Modern concept, Ayurvedic approach, Rasna saptak kwath

#### INTRODUCTION

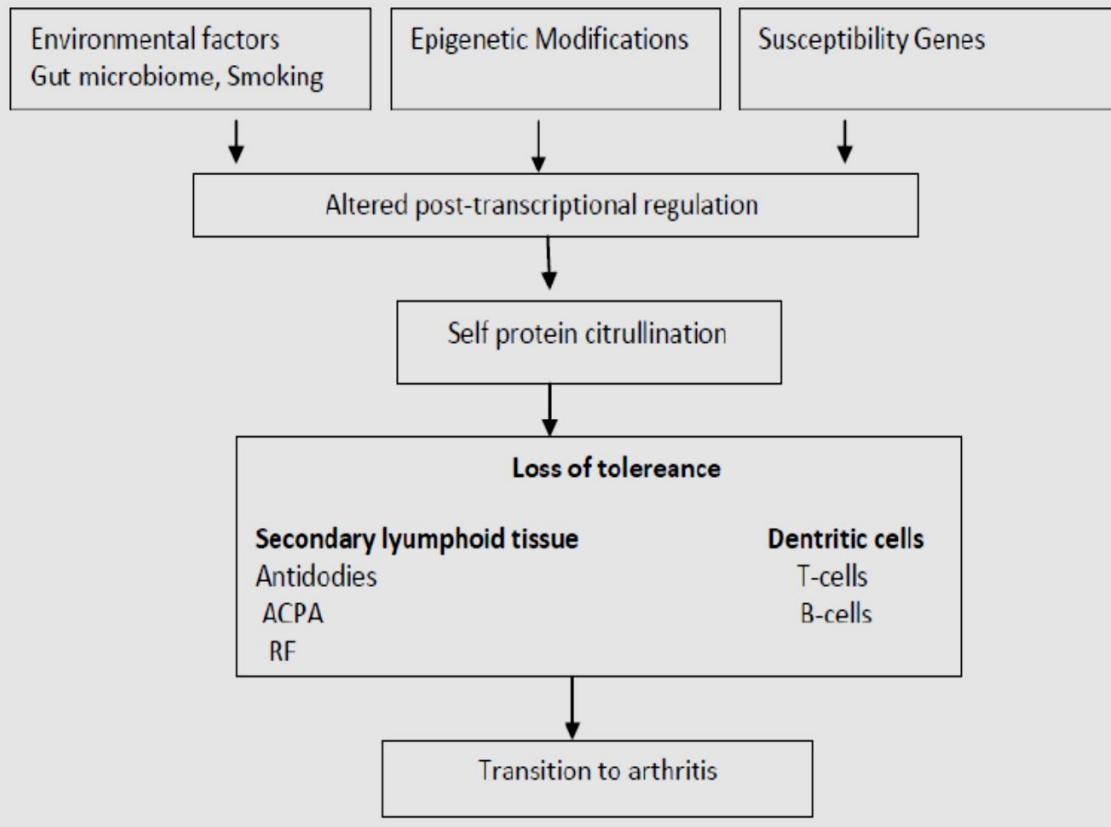
Rheumatoid arthritis (RA) is a most common immuno-inflammatory joint disorder seen in clinical practice mainly affecting synovial joints with synovial proliferation and destruction of articular cartilage<sup>1</sup>. It is estimated to affect around 1% of the Indian population<sup>2</sup>. The hallmark of the disease is chronic, symmetric, polyarthritis (synovitis) that affects the hands and feet, although any joint lined by a synovial membrane may be involved. Systemic involvement may lead to weight loss and low-grade fever in addition to the vascular destruction.<sup>3</sup>

In modern medicine system, drugs are available to reduce the symptoms of arthritis, like inflammation and pain in the form of non steroid anti-inflammatory drugs (NSAIDS) and the long term suppression is achieved by the disease-modifying anti-rheumatic drugs (DMARDs).

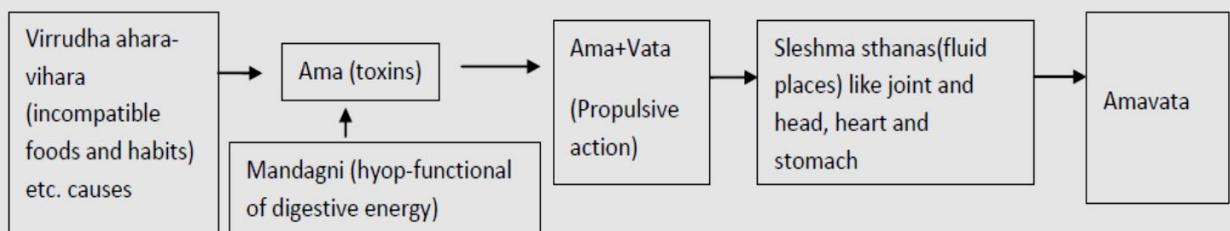
These medications have shown their best results to reduce symptoms of arthritis, but at the same time they have also shown remarkable side effects which may cause some complications in body. Most of the NSAIDs have gastrointestinal side effects whereas DMARDs cause marrow, renal and hepatic suppression<sup>4</sup>. Thus, it is a demand of time, now to approach for alternative therapy. Consequently, there is much scope in traditional medicines system. i.e Ayurveda, Unani, Siddha. In ayurveda there is description of disease amavata, in which symptoms of disease resemble clinically to RA. The term Amavata comprises of two vital words AMA & VATA i.e. ama(an endogenous toxic substance) associated with vata dosha, causing an acute disease mainly affecting various kapha dosha sites like joints and later on heart. The ancient Ayurvedic treatment not only devoid such type of ill effect, but also provides a better way by treating Agni and Ama at its cause.

## DISEASE REVIEW

### Pathogenesis of Rheumatoid arthritis<sup>5</sup>:



### Pathophysiology of Amavata (RA):



### Rheumatoid Arthritis vs Amavata

The symptoms of Amavata mentioned in Ayurveda are found slightly identical and very much similar symptomatically to Rheumatoid arthritis. Its detail description of aetiopathogenesis, signs & symptoms, and prognosis of disease are very well explained in Ayurvedic classics. However, disease Amavata is described the first time as a separate entity by Acharya Madhavakara<sup>6</sup>. Ayurveda described the pathogenesis of Amavata by production of Ama (Apakwa Annarasa or undigested food) due to Mandagni (weak digestive power), which vitiated Vata Dosha. Thus, Vata dosha takes the ama into systemic circulation and into the body tissue, where Ama and accumulated in the joints and vitiated the Shleshaka Kapha (synovial membrane of joint) and produces the symptoms like Sandhisotha (Swelling of joints), Sandhi Shula (joint Pain),

Stabdhatra (stiffness of joint). This condition leads to freting type of pain with inflammation in multiple joints(i.e at kapha site). Another prodromal symptoms are Agnidaurbalya (loss of appetite), Nidra Viprayay (disturbed sleep), Gauravam (heaviness), Jwara (fever), Angamarda (body aches), Karmahani (loss of physical activity), Jadta (stiffness)<sup>7</sup>.

Ayurveda has described a very systemic and approachable way of treatment for such types of disease. The classical Ayurvedic treatment includes several pharmacological forms of internal herbal medicines viz. arishta and asava (hydro-alcoholic preparations), Churna (powder), Ghrita and Tail (medicated oil preparations), Gutika (pills & tablet), Kashaya (decoction), which eliminates the toxins and returning back to the balance to Vata Dosha in the body<sup>8</sup>.

## TREATMENT MODALITIES

### Contemporary management for rheumatoid arthritis

The motives of drug therapy in RA are<sup>9</sup>

- 1) Ameliorate pain, swelling and joint stiffness
- 2) Prevent articular cartilage damage and bony erosions
- 3) Prevent deformity and preserve joint function
- 4) Drugs employed in the management of RA are NSAIDs, corticosteroids and DMARDs, Analgesic agents, antioxidants.

### Ayurvedic approach

Line of Treatment of Aam-vata is given by the following verse:

**"Langhanamswedanamtiktamdepananikatunich....."**

(B.R. 29/1)<sup>10</sup>

The causative factor behind this disease is ama(endogenous toxins), therefore the first line of treatment in the management of amavata should be removal of already formed ama. The line of treatment given in ayurvedic text is as follows:

- Langhana(Fasting)
- Swedana(Fomentation)
- Use of katu and tikta drugs for ama shodhana(detoxification)
- Virechana i.e. purgation (Shodhana Chikitsa - Purification Process)
- Abhyantara sneha (internal medicine)

The line of treatment given in ayurvedic classics to treat amavata, basically is to achieve the following targets:

- Removal of ama dosha already accumulated in the body.
- To prevent the further formation of ama.
- Srotoshodhana (Cleansing the circulatory channels)
- Pacifying the vitiated vata and kapha dosha.

Rasna Saptak Kwath is a liquid dosage form i.e. decoction, which contains 8 herbs (Table 1) having the anti-inflammatory, analgesic, antioxidant, immunosuppressive activity. The present reference of RSK is taken from Bhaishajya Ratnavali. In Sharangdhar Samhitा the process of preparing the RSK is presented in detail<sup>11</sup>. Researches revealed that these herbs play significant role in reducing the symptoms and to treat the RA. This review paper gives an idea about comparative pharmacological action of eight herbs of RSK from Modern as well as Ayurveda approach to treat RA or amavata.

## A COMPARATIVE PHARMACOLOGICAL OVERVIEW OF RASNA SAPTAKA KWATHA

### Rasna

Rasna (*Pluchea lanceolata*) is a major ingredient of the famous anti-inflammatory ayurvedic decoction "Maharasnadi Kwath" and "Rasna Saptak Kwath". It is used to treat various painful afflictions and swelling of joints. Tribally, the poultice of the leaves is applied to the inflamed areas of the body.

### Ayurvedic pharmacology

It is indicated in Sothahara (anti-inflammatory), Sheethara and Vednashamak (analgesic) & in Nervous system as an analgesic (Uttam Vedanashamak), in Digestive system as Aampachan(aid in digestion), Shoolprashaman (alleviates intestinal spasms), Rasayan (rejuvenative), and Vrishya (increases sexual potency). It is useful for kaphaj and vataj disorders and is tested by the patient of Sotha Roga (Inflammatory disease). Rasna along with the Guggul is given for the treatment of sciatica. It is widely used in the treatment of rheumatoid arthritis in the indigenous systems of medicine. This plant is indicated in Ayurvedic texts for its therapeutic usefulness in diseases similar to rheumatoid arthritis and other afflictions of the joints.

### Contemporary Pharmacology<sup>12,13</sup>

The leaves of *Pluchea lanceolata* are aperients and used as a laxative, analgesic and antipyretic. The anti-inflammatory potential of *Pluchea lanceolata* leaves extract prepared through Ayurvedic decoctions method showed marked anti-inflammatory activity on experimental animals for arthritis and granuloma pouch.

It was already investigated that Rasna has the immune suppressive property. The immunosuppressive potential of 50% ethanolic extract of *Pluchea lanceolata* and its bioactive chloroform fraction (PLC) was investigated with basic models of immunomodulation, such as, the humoral antibody response (hemagglutination antibody titers), cell-mediated immune response (delayed-type hypersensitivity), skin allograft rejection test, in vitro and in vivo phagocytosis (carbon clearance test). The findings revealed that *Pluchea lanceolata* causes immunosuppression by inhibiting Th1 cytokines<sup>14</sup>.

### Gokshura<sup>15</sup>

This spiky fruit looks like the cloven hoof of a cow and hence the name of a go-ksura (cow-hoof). 'Kshura' means scratcher.

### Ayurvedic Pharmacology

It is a rejuvenative and vatashamak. It specifically moves Apaṇa Vayu downwards. The fruit aerial parts and root are used in ayurveda. The aerial parts appear to have the widest spectrum of rejuvenative activity

### Contemporary Pharmacology<sup>16,17,18</sup>

An important mechanism of anti-arthritis activity is the membrane stability modulating effect. The activity is probable due to the presence of flavonoids. These flavonoids are having the surface charge neutralizing effect. It was found that the administration of *Tribulus terrestris* (200 and 300 mg/kg bodyweight) leads to inhibition of leukocyte migration which may have beneficial effects for joint preservation. The activity may be due to the presence of steroidal glycoside.

### Guduchi

It is bitter, astringent, pungent yet heating and also sweet post-digestively action. Its bitter and astringent quality clears pitta and kapha, its heating energy burns ama while its enduring sweet effect regulates vata and gives it an aphrodisiac that nourishes reproductive fluids. Its prabhava (effect) is to clear ama (toxins)<sup>19</sup>

### Ayurvedic Pharmacology

**Joints:** It is used in gout (vata-rakta), arthritis (ama-vata), and other inflammatory joint conditions. It acts by clearing pitta and uric acid via the urinary system that have accumulated in raktavahasrotas(circulatory channels). It also removes ama toxins from the system without destabilizing any of the other dosha.

### Contemporary Pharmacology<sup>20</sup>

The aqueous extract has significant anti-inflammatory activity. It significantly reduces the pain and morning stiffness in patients having rheumatoid arthritis. Guduchi has active principles which have anti-inflammatory and anti-arthritis activity. 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. When C3 convertase is inhibited, pro inflammatory anaphylactic peptides are not released with the result that no inflammation is observed

### Punarnava

It is the main ingredient in Punarnavadi Guggulu the famous Ayurvedic formulation for reducing water retention, congestive heart conditions, and treating oedematous inflammatory joint disease.

### Ayurvedic Pharmacology

**Arthritis:** It can effectively treat swollen joints with fluid retention with pitting from a kapha imbalance by moving toxic accumulations out of joints and tissues and excreting them via the kidneys and urine.

### Contemporary Pharmacology<sup>21,22</sup>

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. The aqueous and acetone extracts of the root, showed significant anti-inflammatory activity against carrageenan-induced paw edema and formaldehyde induced arthritis in albino rats. The water insoluble alcoholic extract of different parts of the plant was studied for anti-inflammatory activity against carrageenan-induced paw edema in rats. The root and leaves were found to be most active.

### Eranda

Castor oil is superb for pain and congestion. An important ingredient in Simhanada Guggulu an Ayurvedic formulation for treating arthritis. The leaf and root also prized medicines for arthritis.

### Ayurvedic Pharmacology

**Arthritis:** Traditionally used for all conditions where both ama and vata mix. This manifests as pain, swelling, deformations of the joints and bones. The oil is externally applied and taken internally for sciatica, arthritis, gout and paralysis.

### Contemporary Pharmacology<sup>23,24</sup>

Extract produced an inhibition of aryl hydrocarbon hydrooxygenase(AHH) activity and H<sub>2</sub>O<sub>2</sub> production by lindane-induced mouse Hepatic microsomes, indicating the antioxidant activity of the plant. Petroleum ether extract of the root bark shows anti-inflammatory activity against formaldehyde induce arthritis. It significantly reduces the edema when administered up to 15 days. It is known to inhibit the primary and secondary phase of inflammation. The anti-inflammatory effect produced is potent as compared with betamethazone. As it inhibits the secondary phase of inflammation and it is known that only specific anti-inflammatory agent act on secondary phase, it is considered as specific anti-inflammatory agent.

### Devadaru

This hardy tree thrives in the high altitudes of the western Himalayas. It means wood of the gods. The inner wood is aromatic and is also distilled into essential oils. The outer bark is astringent and is used for diarrhea and pain. The essential oil usually comes from the uprooted stumps of felled trees.

### Ayurvedic Pharmacology

**Pain:** It is an excellent anti-inflammatory that relieves cold, spasm and contraction in the muscles. Its pungent and warm properties increase circulation and relax muscular tension. Use in arthritis, sciatica, headache and pain from high vata.

**Digestions:** Used to enhance the digestive power. As it alleviates vata it can reduce intestinal spasms and cramping by relaxing the nervous system and easing flatulence. It's hot resinous nature is beneficial for reducing ama (toxins) from the intestines and excess weight and cholesterol from medas dhatus (fat tissues)

### Contemporary Pharmacology<sup>25</sup>

The anti-inflammatory activity was attributed to its membrane stabilizing action. An aqueous extract of the air dried stem bark showed anti-inflammatory and antiarthritic activity against acute and chronic inflammation in carrageenan-induced edema, cotton pellets, granuloma pouch and formalin and adjuvant arthritis in albino rats. The volatile oil from wood exhibited anti-inflammatory activity against exudative proliferative and chronic phases of inflammation in adjuvant arthritis in rat. The oil also showed analgesic activity against acetic acid- induced writhing and hot plate reaction in mice.

### Aragvadha

It pacifies vata and purges pitta and kapha. A gentle laxative used to clear pitta from the intestines

### Ayurvedic Pharmacology

**Digestion:** Specific for high pitta in the intestines where pacaka(digestive) and ranjaka pitta are aggravated. It descends apana vayu and clears flatulence.

**Fever:** The Ayurvedic adage is to purge a fever after it breaks, and aragvadha is specifically indicated for cleansing the bowel after a fever.

### Contemporary Pharmacology<sup>26</sup>

The immunomodulatory activity of methanolic extract in rats was evaluated by administered doses of 100 and 200 mg kg<sup>-1</sup> 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

Dry ginger being hot is better for stimulating agni(digestive power) and cleansing kapha, it dries water in the colon(grahi) but it still removes constipation as its penetrating quality breaks up impacted faeces(Vibandhabhedin)..

### Ayurvedic Pharmacology

**Anti-inflammatory:** Basically prabhava is the causative factor for its anti-inflammatory property. It's vipaka is madhur therefore it has the nourishing phenomena.

**Digestion:** Its virya is ushna therefore it aids in digestion and hence clearing ama which is better for kledaka kapha aggravations .

**Arthritis:** As it has prominent role in digestion and have anti-inflammatory property. Thus, it aid in arthritis also. Fresh ginger is more peripherally active while dry ginger is more centrally stimulating and warming<sup>27</sup>

### Contemporary Pharmacology<sup>28</sup>

It is considered as effective as acetylsalicylic acid in reducing carrageenan induced edema in rats. It is thought that these anti-inflammatory actions are the result of inhibition of prostaglandin release and hence ginger may act in a similar manner as NSAID, which interfere with prostaglandin and leukotriene biosynthesis. It is found that 6-gingerol and 6-shagol have analgesic and antipyretic activities. According to a study on rat models ginger oil effectively reduced swelling and inflammation in the arthritic joints.

**Table 1: Ingredients of Rasana Saptak Kwath**

S.no	Plant Name	Scientific Name	Part Used
1	Rasna	<i>Pluchea lanceolata</i> Clarke.	Leaf
2	Gokshura	<i>Tribulus terrestris</i> Linn.	Fruit
3	Guduchi	<i>Tinospora cardifolia</i> (Wild) Miers	Stem
4	Punarnava	<i>Boerhavia diffusa</i> Linn	Root
5	Eranda	<i>Ricinus communis</i> Linn	Root
6	Devdaru	<i>Cedrus deodara</i> (Roxb.) Loud	Stem
7	Aragvadha	<i>Cassia fistula</i> Linn	Fruit
8	Sunthi	<i>Zingiber officinale</i> Rosc.	Rhizome(dry)

**Table 2: Ayurvedic pharmacology of herbs of Rasna Saptaka Kwatha**

	<b>Rasa</b>	<b>Guna</b>	<b>Virya</b>	<b>Vipaka</b>	<b>Doshagnata</b>	<b>Karma</b>
<b>Rasna</b>	Tikta,	Guru	Usna	Katu	Kaphavatahara,	Amapacana
<b>Gokshura</b>	Madhur	Guru, Snigdha	Sita	Madhur	Vtahara,	Bramhana
<b>Guduchi</b>	Tikta, Kasaya	Laghu	Usna	Madhur	Tridoshashamaka,	Balya, Dipana, Rasayana, Raktashodhaka, Jvaraghna, Amavataghna: Reliver of gout/arthritis
<b>Punarnava</b>	Madhur, Tikta, Kasaya	Ruksa	Usna	Madhur	Vatasheleshmahara,	Shothahara, Anulomana, Mutrala
<b>Eranda</b>	Madhur, Katu, Kasaya	Snigdha, Tiksna, Suksma	Usna	Madhur	Kaphavatasamaka	
<b>Devdaru</b>	Tikta	Laghu, Snigdha	Usna	Katu	VataKaphahara,	Vranashodhaka
<b>Aragvadha</b>	Madhur, Tikta	Guru	Usna	Madhura	Tridoshahara	Rechana
<b>Sunthi</b>	Katu	Laghu, Snigdha	Usna	Madhura	Vatakaphahara	Dipana, Pacana, Anulomana, Amadosahara,

\*The properties shows in above table are denoting the Ayurvedic pharmacology in disease Amavata specially.

**Table 3: Comparative evaluation of herbs on therapeutic effect**

S.no	Ingredient	Ayurvedic Pharmacology	Modern Pharmacology
1.	Rasna	Rasayana, Sothara, Vednasthapana	Anti-inflammatory, Anti-arthritis
2.	Gokhsura	Vednasthapana,Sothara,	Anti-inflammatory, Analgesic, Anti-arthritis activity
3.	Guduchi	Rasayana,Amavataghana,Vednasthapana,	Antinflammatory, Immunomodulatory
4.	Punarnava	Sothghana,Rasayana	Rejuvenator, anti-inflammatory
5.	Eranda	Amapachana,Vatasamana,vadnasthapana	Anti-inflammatory, Analgesic activity
6.	Devdaru	Vednasthapan,Sothara,Vataanulomana	Anti-inflammatory and analgesic
7.	Aragvadha	Anulomana,Amanashaka	Anti-inflammatory and antioxidant
8.	Sunthi	Vednasthapan,aamnashaka,Vatanulomana	Anti-inflammatory and analgesic

## DISCUSSION

### Ayurvedic concept of treatment for RSK

The main causative factor of the disease is Ama (Undigested food or toxins), which is caused due to malfunctioning of the digestion and metabolism. The disease is found mainly in person with continuous indulgence in consumption of viruddha ahara (incompatible food) in the presence of mandagni (weak digestive power). Ama (Undigested food) and Vata are mainly held responsible for the disease, derangement of the kapha dosha, especially shleshmak kapha, which produces joint pain and swelling with tenderness, can be correlated with rheumatoid arthritis and with ama taking shelter in the avalambak kapha sthana.<sup>29</sup>

Tikta and katu rasa drugs have dipana and pachana properties which have a significant role in clearing ama from body. Katu rasa is also known for improving intestinal motility acting as Vatanulomka. In terms of guna, these drugs have Laghu (light), ushna (hot), and tikshnaguṇa which are the cause of agnivardhaka(digestive stimulant) property and therefore after clearing ama from body, these drugs clear excess kapha and vata from the body. These drugs further prevent the production of ama and clear blocked channels i.e. srotoavarodha and help to move pakva dosha from Sakha tokostha for removal from the body. Maximum ingredients of RSK have vatasheleshmahara

property which reduces doshic vata and kapha from the body and reduces the symptoms of amavata. (Table 2).

### Contemporary concept of treatment for RSK

Different researches revealed the anti-inflammatory, analgesic and other properties As autoimmune disorders, the immunosuppressive activity of Rasna has a big role in it. Some ingredients like Rasna, Guduchi, Punarnava, Eranda, Aragvadha and Sunthi have antioxidant role. These rasayan (anti-oxidant) drugs are inhibitors of lipid peroxidation and the generation of superoxide and hydroxyl radicals and decrease the free radicals in the blood. The inhibition of aryl hydrocarbon hydroxylase (AHH) activity and H<sub>2</sub>O<sub>2</sub> production, indicating the antioxidant activity of the plant. Guduchi extract showed the anti-inflammatory actions by blocking inflammatory prostaglandins, thromboxane . It occurs due to the inhibition of C3 convertase and serine protease. When C3 convertase is inhibited, pro inflammatory anaphylactic peptides are not released with the result that no inflammation is observed. The aqueous extract of punarnava inhibited the increased serum amino transferase activity in arthritic animals similar to hydrocortisone, The flavonoid present in gokshura extract might be responsible for the membrane stability modulating effect which is responsible for anti-arthritis activity. Presence of steroidal glycoside in some drugs leads to inhibition of leukocyte migration which may have beneficial effects for joint preservation.

## CONCLUSION

As RSK is a formulation, which possess the property of analgesic, anti-inflammatory, immunosuppressive and have antioxidant property too. From Ayurvedic point of view these herbs work on ama and agni and reduces the symptoms of amavata (Table 3). These all together with less or no side effects help in the treatment of RA. Hence, the management of this disease is merely insufficient in other systems of medicine and Ayurveda can do a lot to overcome the challenge in treating rheumatoid arthritis.

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