



(REVIEW ARTICLE)



A review on effectiveness of selected herbal paste in the management of Rheumatoid Arthritis (*Āmavāta*)

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Abstract

Rheumatoid arthritis (RA) is a chronic, systemic autoimmune condition that causes joint abnormalities, articular tissue loss, and non-specific inflammation of peripheral joints. Rheumatoid arthritis is more prevalent in women and wealthy countries, where it affects 0.3% to 1% of the population. Ayurveda Rheumatoid arthritis (*Āmavāta*) occurs due to vitiation of *Kapha* and *Vāta Dōsha* (body humors). The purpose of this study was to determine the efficacy of a particular herbal paste in treating rheumatoid arthritis based on the pharmacological characteristics and effects of its constituent parts. Information about rheumatoid arthritis was acquired from *Ayurvedic* scriptures, contemporary texts and earlier research studies (from primary and secondary sources). Afterwards a survey of the literature was done on those five ingredients in the selected paste and then analyzed for their *Pancha Padārtha* (five elements of herb) and pharmacological qualities regarding in the management of rheumatoid arthritis. Reviewed articles have highlighted that selected herbal formula has anti-inflammatory qualities because of their compatibility with *Shōtha Hara* (reduce swelling), *Vēdanāsthāpana* (reduce pain) *Guna* (qualities). According to the literature review and *Pancha Padārtha* analysis, selected herbal formula is useful in the treatment of rheumatoid arthritis.

Keywords: *Āmavāta*; *Pancha Padārtha*; Pharmacological qualities; Rheumatoid Arthritis

1. Introduction

An autoimmune condition called rheumatoid arthritis results in systemic involvement and chronic symmetrical polyarthritis. Its course is incredibly unpredictable and is linked to non-articular characteristics. Widespread persistent synovitis (inflammation of the synovial lining of joints, tendon sheaths, or bursae) is a hallmark of rheumatoid arthritis. Although the exact causes are unknown, local immune complex development and plasma cell synthesis of rheumatoid factors in the synovium are thought to be contributing factors ^[1].

Rheumatoid arthritis has a world-wide distribution and affects 0.5-1% (with a female preponderance) of the population. Genetic and environmental variables are just two of the many contributing aspects to the reason. Women are impacted three times more frequently than males before the menopause. The frequency of onset following menopause is comparable between the sexes. Rheumatoid arthritis typically manifests as a slowly progressing, symmetrical, peripheral polyarthritis that develops over a few weeks or months (about 70% of cases). The patient reports feeling exhausted and ill; the pain and stiffness are noticeably worse in the morning and may become better with light exercise.

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It disturbs sleep. Typically, the joints are swollen, heated, and sensitive. Movement is restricted, and muscles are withering away. As the disease's prognosis changes, deformities progress. Non-articular characteristics emerge

The majority of patients express discomfort and stiffness in their feet's metatarsophalangeal joints and hands' metacarpophalangeal joints, as well as their proximal and distal interphalangeal joints. The shoulders, knees, ankles, wrists, and elbows are also impacted. Most of the time, many joints are affected, although 10% of cases only have one joint affected, usually the knee, shoulder, or carpal tunnel syndrome. Rheumatoid arthritis can result in tendons rupturing, joints rupturing (Baker's cysts), joint infections, spinal cord compression (atlantoaxial or higher cervical spine), and amyloidosis. Rheumatoid arthritis's clinical manifestations closely resemble *Āmavāta's* due to their shared clinical characteristics, such as numerous joint pain, edema, stiffness, fever, and general debility.

There is no permanent successful allopathic treatment for Rheumatoid arthritis. Non-Steroid Anti Inflammatory Drugs (NSAID) and Disease Modifying Anti Rheumatic Drugs (DMARDs) recommended as the medication for Rheumatoid arthritis in allopathic medicine. But many adverse effect can occur when use DMARDs and NSAIDs. Methotrexate is given for Rheumatoid arthritis. But Methotrexate can cause mouth sores or oral ulcers. Also suppressing immune system by Corticosteroids, DMARDs and biological may increase risk of Tuberculosis (TB), a bacterial infection of the lungs. NSAIDs may increase the risk of cardiovascular events including heart attack [2]. The prevalence of Rheumatoid arthritis varies between 0.3% and 1% and is more common in women and in developed countries. It tends to strike during the most productive years of adulthood, between the ages of 20 and 40. Within 10 years on onset at least 50% of patients in development countries are unable to hold a full time job [3].

Rheumatoid arthritis's clinical manifestations closely resemble *Āmavāta's* due to their shared clinical characteristics, such as numerous joint pain, edema, stiffness, fever, and general debility *Āmavāta* has not mentioned in *Bruhatrayee* (classical texts). But as already mentioned the description of *Āma* (undigested food) and diseases caused by *Āma* in *Bruhatrayee*. The use of foods and beverages that are heavy, rough, cold, dry, disliked, distending, burning, unclean, antagonistic, and taken at the wrong time, as well as when suffering from psychic emotions like passion, anger, greed, confusion, envy, bashfulness, grief, conceit, excitement, and fear, also contribute to the over affection of *Āma*. These also lead to excessive *Āma* attachment [4]. *Vāgbhata* (teacher) described in *Dōshōpakramaniya Adhyāya* (name of a chapter of book) of *Sutra Stāna* about production of *Āma* [5].

Āma (improperly digested food) is produced in the body by engaging in unhealthy eating and lifestyle choices, skipping exercise after consuming fatty foods, and even people with normal digestive capacities who have low digestive capacity [6]. *Āmavāta* is the term for when the two (*Āma* and *Vāta*) become localized in the joints of the *Trika* (waist) and cause the body to become rigid (without movement) at the same time.

Aims and objectives

To study whether selected herbal paste is effective in the management of Rheumatoid arthritis based on the pharmacological properties and actions of the ingredients.

2. Research methodology

The literary review was referred through authentic Ayurveda classics such as, *Charaka Samhitā*, *Ashtānga Hrdaya Samhitā*, *Mādhava Nidāna*, *Bhāvaprakāshaya*, Ayurveda Pharmacopiea, Kumar and Clark's Clinical medicine. The review on rheumatoid arthritis was conducted through recent scientific explanations and findings which published in official websites and indexed journals, articles, books, reports of WHO and encyclopedias. The gathered information was compared with traditional and modern scientific explanations using based on pharmacological characteristics, *Rasa* (taste), *Guna* (quality), *Veerya* (potency), *Vipāka* (last taste) and *Prabhāva* (specific action).

2.1. Review

Herbal Formula chosen from an authentic book, *Bhāvaprakāsha* has four ingredients: (Table 1).

- *Asteracantha longifolia* (*Ahinsra*)
- *Panadanus tectorius* (*Kebuka mula*)
- *Moringa oleifera* (*Shigru*)
- *Valmika Mrutthika*
- Cow's urine (*Gomutrā*)

Table 1 Review of selected herbs

	<i>Asteracantha longifolia</i>	<i>Panadanus tectorius</i>	<i>Moringa oleifera</i>
Family	Acanthaceae	Pandanaceae	Moringaceae
Sanskrit name	<i>Ahinsra</i>	<i>Kebuka</i>	<i>Shigru</i>
Part used	Leaves, Flowers	Roots	Bark

2.1.1. *Asteracantha longifolia* (*Ahinsra*)

A perennial herb with an ascending rhizome; stems numerous, 60-120 cm tall, erect, nearly unbranched, somewhat compressed, thickened at nodes and hispid with long hair between nodes; leaves simple, sessile, whorled, 6 to a whorl, two opposite large ones 9-12 cm long, 1.3-2 cm broad; flowers large, irregular, bisexual, purplish-blue in cluster of 8 round each node in 4 pairs; fruita loculicidal, linear capsule with a few seeds. Both the roots and the leaves of the plant contain the alkaloids lupeol and hentriacontane. The roots also have minute amounts of maltose, hygrosterol, crystalline material, yellowish-green wax, volatile oil, and sticky gum. The seeds are an oil that is semi-drying and the leaves contains cholesterol.

The anti-inflammatory properties of *Asteracantha longifolia* are even comparable to butazolidine and prednisolone, according to studies on "Rheumatoid Arthritis and *Asteracantha Longifolia*." The plant's significance is tied to corticosteroids. It won't have those negative impacts. Rheumatoid arthritis symptoms will undoubtedly improve with the extraction of these medicinal compounds from the plant [7]. The anti-inflammatory effects of Petroleum ether, chloroform, alcoholic, and aqueous extracts of the leaves of *Asteracantha longifolia* in Wistar rats of both sexes were examined in the study "*Kokilāksha (Hygrofila auriculata)*: A Potential *Ayurvedic* Herb." The outcomes showed that paw oedema was dramatically reduced by chloroform and alcoholic extracts in a dose-dependent manner. The anti-inflammatory effects of petroleum ether and aqueous extracts were insignificant. *Asteracantha longifolia* leaf extracts in chloroform and alcohol show anti-inflammatory, analgesic, and antipyretic properties [8].

Kokilāksha Ksheeravasti (a type of enema) was successful in lowering the clinical signs and symptoms of rheumatoid arthritis, according to research published in "A Clinical Study of *Kokilāksha Ksheenavasti* in Rheumatoid Arthritis" [9]. *Asteracantha longifolia* dried leaves include alkaloids, steroids, phenolic compounds, and saponins in aqueous and methanol extracts, respectively. Both extracts contain tannins, flavonoids, carbohydrates, glycosides, proteins, and amino acids. Alkaloids have effects that are anti-inflammatory, antiprotozoal, cytotoxic, and diabetic. Saponins have anti-inflammatory, antioxidant, and cancer prevention properties. In addition to their analgesic and cardiotoxic effects, steroids also have antibacterial and anti-inflammatory properties. According to Doss and Anand, tannins have anti-inflammatory, anti-diabetic, antibacterial, and anticancer properties [10].

2.1.2. *Pandanus tectorius* (*Kebuka*)

A 5-7 m tall shrubby plant with branches that are 2.5 cm in diameter and stems that root above ground. Spandices are solitary, terminal, flowers are unisexual, dioecious, without perianth, and the seeds are fusiform. The leaves are simple, very long, spirally arranged at the ends of branches, 1-1.6 m long, ensiform, caudate-acuminate, coriaceous, and have marginal spines that point forward or backward. It contains phytochemicals, namely, lignans and isoflavones, coumestrol, alkaloids, steroids, carbohydrates, phenolic compounds, glycosides, proteins, amino acids as well as vitamins and nutrients.

Rheumatic fever, arthritis, and rheumatism have all been treated with *Pandanus tectorius*. Significant anti-inflammatory activity had been observed in *Pandanus tectorius* methanolic and hydro-alcoholic extracts. Painkiller action Traditional medicine advocates the use of aqueous extract in the treatment of rheumatism and rheumatoid arthritis because it has strong analgesic action that is comparable to that of codeine and aspirin [11]. Both methanolic and aqueous extracts of *Pandanus tectorius* demonstrated anti-inflammatory action when compared to control in carrageenan-induced paw edema and albumin-induced edema, according to research on the "Anti-inflammatory activity of *Pandanus tectorius* Lam." In the management of carrageenan-induced paw oedema, the methanolic extract outperformed the aqueous extract [12]. According to Adkar and Bhaskar, aqueous extract of *Pandanus tectorius* had significant analgesic activity by both central and peripheral mechanisms in this study, which is comparable to that of codeine and aspirin and can be used in rheumatism and rheumatoid arthritis [13].

2.1.3. *Moringa oleifera* (Shigru)

A small tree with corky bark and soft wood, with young parts that are tomentose; leaves that are alternate, typically 3-pinnate, 45 cm long, with rachis that are slender, thickened, and articulated at the base; pinnae and pinnules that are opposite; they are deciduous, with rachides that are very slender, articulated, and have glands at the articulations; and ultimate leaflets that are opposite, with measurements. The alkaloids moringine and moringinine, two resins, mucilage, and an inorganic acid are all found in the bark. The seeds contain traces of an acrid acid, a pungent alkaloid, and ben oil, and the root produces an essential oil. A traganth-like gum that is used for tanning is exuded from the bark. The leaves and fruits are excellent providers of phosphorus, calcium, and iron. The fruit also contains a lot of protein.

The findings of the current study supported the widespread opinion held in traditional medicine all over the world that *Moringa oleifera* methanolic extract is useful in the treatment of rheumatoid arthritis [14]. Rats' paw edema could be significantly reduced when given ethanolic leaf extracts of *Moringa oleifera* at a dose of 500 mg/kg and aqueous extracts of *Moringa oleifera* at a dose of 300 mg/kg, according to research on "Pharmacological screening for anti-arthritis activity of *Moringa oleifera*" [15].

Using acetic acid-induced writhing in mice and the tail flick test in rats, researchers studying the "Anti-inflammatory and Analgesic activity of stem bark of *Moringa oleifera*" investigated the analgesic effect of the stem bark of *Moringa oleifera*. According to the findings, the herb *Moringa oleifera* has analgesic and anti-inflammatory properties, supporting its traditional use as a remedy [16].

2.1.4. *Valmiika mrutthika/ Valmiika mrutwika* (Hubas Meti)

Ayurveda pharmacopoeia mention that *Hubas meti pralēpaya* can be applied in *Āmavātaja Sandhi Shōta* (swelling of joints). *Meti* is most composed by Aluminium silicate. *Meti* is a mixture of Sodium, Potassium, Magnesium, Iron and Calcium. According to research on "Mud compress therapy for the hands of patients with rheumatoid arthritis," mud compress therapy can help patients with rheumatoid arthritis relieve their pain in their hands and reduce the number of swollen and tender joints in their hands [17].

2.1.5. *Gōmutra* (Cow's urine)

Cow's urine is pungent, penetrating, hot in potency, alkaline, bitter and astringent in taste, easily digestible, kindles digestive fire, improves intelligence, aggravates pitta, mitigates *Kapha* and *Vāta*. In a healthy cow's pee, there is 95% water and 2.5% urea, respectively. Present in 2.5% are minerals, salts, hormones, and enzymes. Healthy cow pee has a volume of 17 to 45 ml per kilogram per day with a specific gravity of 1.025 to 1.045. Seasonal changes affect its pH, which ranges from 7.4 to 8.4. The daily amounts of urea nitrogen and total nitrogen range from 23 to 28 ml/kg and 40 to 45 ml/kg, respectively. *Gōmutra* has *Vēdanāhara* (reduce pain), *Swāsahara* (reduce asthma), *Pittakara* (increase Pitta), *Agnidipana* (increase digestive power), *Mēdha* (intelligence) and *Kāsahara* (reduce cough) *Karma*. Cow's urine can reduce pain due to presence of *Vēdanāhara Karma*.

The findings of this investigation showed that cow's urine had strong anti-oxidant and anti-inflammatory properties, and adult distilled cow's urine had less efficacy compared to adult row cow's urine [18]. Phytochemical screening revealed that presence of alkaloids, carbohydrates, phenolic flavonoids, proteins, steroids, terpenoids and cardioglycosides in cow's urine and absence of flavonoids, phlobatannins, anthocyanins, anthraquinone, tannins and saponins [19].

3. Results and Discussion

Rheumatoid arthritis is a chronic, inflammatory disorder that may affect many tissues and organs, but principally attacks flexible (synovial) joints. The process produces an inflammatory response of the capsule around the joints, secondary swelling of the synovial cells. Collected data reveals that most of the ingredients have similar properties. The ingredients of the paste predominantly possess *Tikta*, *Katu Rasa* and followed by *Madhura*, *Amla*, *Kashāya Rasās*. Three ingredients have *Tikta* and *Katu Rasās*. As a percentage, *Tikta* and *Katu Rasās* have 60%, *Madhura Rasa* has 40%, *Amla*, *Kashāya Rasās* have 20% in selected herbal paste.

Paste predominantly possesses *Laghu Guna* and followed by *Snigdha*, *Sara*, *Thikshna*, *Rūksha*, *Pichchila*. Three ingredients have *Laghu Guna*. As a percentage *Laghu Guna* has 60%, *Snigdha* and *Sara Gunās* have 40%, *Thikshna*, *Rūksha*, *Pichchila Gunās* have 20% in selected herbal paste.

Two ingredients had *Sheeta Virya*. Another two ingredients had *Ushna Virya*. One ingredient had *Anushna Veerya*. The majority of ingredients having *Katu Vipāka* while other ingredient having *Madhura Vipāka*. Two ingredients have *Vāta* and *Kapha Shāmaka Karma*. One ingredient has *Vāta* and *Pitta Shāmaka Karma*. *Kapha* and *Pitta Shāmaka Karma* have another one ingredient. According to Ayurveda *Āmavāta* occur due to vitiation of *Kapha* and *Vāta Dōsha*. *Katu-Tikta-Kashāya Rasa*, *Laghu-Thikshna-Rūksha Guna*, *Ushna Veerya*, *Katu Vipāka* can subside aggravated *Kapha Dōsha*. *Madhura-Amla Rasa*, *Snigdha Guna*, *Ushna Veerya*, *Madhura Vipāka* can relieve aggravated *Vāta Dōsha*. *Vāta Hara* and *Kapha Hara* action present in 60%. *Pitta Hara* action present in 40%. (Table 2)

Table 2 *Pancha Padārtha* analysis of selected herbal formula

Drug	Rasa	Guna	Veerya	Vipāka	Dōshakarma
1. <i>Asteracantha longifolia</i> (<i>Ahinsra</i>)	<i>Madhura</i> , <i>Amla</i> , <i>Tikta</i>	<i>Snigdha</i> , <i>Pichchila</i>	<i>Sheetha</i>	<i>Madhura</i>	<i>Vata Pitta Shāmaka</i> (<i>Mutrala Prabhāva</i>)
2. <i>Panadanus tectorius</i> (<i>Kebuka mula</i>)	<i>Tikta</i> , <i>Madhura</i> , <i>Katu</i>	<i>Laghu</i> , <i>Snigdha</i>	<i>Anushna</i>	<i>Katu</i>	<i>Thridōsha Shāmaka</i>
3. <i>Moringa oleifera</i> (<i>Shigru</i>)	<i>Katu</i>	<i>Laghu</i> , <i>Rūksha</i> , <i>Thikshana</i> , <i>Sara</i>	<i>Ushna</i>	<i>Katu</i>	<i>Kapha Vāta Hara</i>
4. <i>Valmika Mrutthika</i>	<i>Katu</i>	<i>Sara</i>	<i>Sheetha</i>	<i>Katu</i>	-
5. Cow's urine (<i>Gomutra</i>)	<i>Katu</i> , <i>Tikta</i> , <i>Kashāya</i>	<i>Laghu</i>	<i>Ushna</i>	-	<i>Kapha Vāta Hara</i> , <i>Pitta Vardhaka</i>

Three ingredients have *Shōtahara* action and *Vēdanasthāpana* action. As a percentage *Shōtahara Karma* has 60% and *Vēdanasthāpana Karma* has 60% in this paste. So can relieve swelling of the joints due to *Shōtahara* action. Also can relieve pain due to *Vēdanasthāpana* action. So these paste can break down the *Sthānik Samprāpti* (pathogenesis) of *Āmavāta*. (Table 3)

Table 3 *Karma* of ingredients of the paste

Ingredients	Shōtahara	Vēdanasthāpana
<i>Asteracantha longifolia</i> (<i>Ahinsra</i>)	+	-
<i>Pandanus tectorius</i> (<i>Kebuka</i>)	-	+
<i>Moringa oleifera</i> (<i>Shigru</i>)	+	+
<i>Valmika mrutthika</i>	+	-
Cow's urine (<i>Gomutra</i>)	-	+

Asteracantha longifolia constitutes from phytochemicals likewise alkaloids, flavonoids, saponins, steroids, tannins, phenolic compounds and carbohydrates. *Pandanus tectorius* constitutes from alkaloids, flavonoids, saponins, tannins, steroids, phenolic compounds. *Moringa oleifera* constitutes from alkaloids, flavonoids, saponins, steroids, phenolic compounds, tannins. Cow's urine constitutes from alkaloids, steroids, phenolic compounds.

Among these selected chemicals, Alkaloids, Phenolic compounds and Steroids present in highest concentration in the paste. Alkaloids, Phenolic compounds and Steroids present in 80%. Flavonoids, Saponins and Tannins present in 60% of the paste. Flavonoids, Alkaloids, Tannins, Phenolic compounds, and Saponins are important to manage the rheumatoid Arthritis because they have anti-inflammatory activity. Steroids are known to important for rheumatoid arthritis because there have anti-inflammatory and analgesic properties. Carbohydrates important to manage the rheumatoid Arthritis because it has analgesic activity. Anti-inflammatory and Analgesic activities present in all ingredients of this paste (as a percentage 100%). Anti-inflammatory and Analgesic activities are beneficial for the management of Rheumatoid arthritis.

Anti-inflammatory action reduce inflammatory sign like pain, swelling, redness, heating and loss of function. Pain can reduced by analgesic action. All ingredients of this paste have anti-inflammatory and analgesic properties. So it is clear this paste can be used to reduce joints pain, swelling and inflammation.

4. Conclusion

This review proves that *Vātahara*, *Kaphahara*, *Shōtahara* and *Vēdanasthāpana Karma* are included in the selected herbal paste. Symptoms of rheumatoid Arthritis especially pain and swelling of joints can relieve due to *Vātahara*, *Kaphahara*, *Shōtahara* and *Vēdanasthāpana Karma*. Thus this paste consists with Flavonoids, Alkaloids, Tannins, Phenolic compounds, Steroids and Saponins. These chemical responsible for anti-inflammatory, analgesic activities. Inflammation condition of the joints can reduced due to anti-inflammatory action significantly. According to this studies revealed that anti-inflammatory, analgesic activities and *Shōtahara*, *Vēdanasthāpana Karma* present in the paste. Based on these evidences can be concluded that, this selected herbal paste is effective to manage the Rheumatoid arthritis.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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