



Clinical Effect of *Ricinus communis* Linn Decoction in the Management of Rheumatoid Arthritis

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ABSTRACT

Rheumatoid arthritis is a chronic, systemic, autoimmune inflammatory disease that mainly affects the joints and periarticular soft tissues. This study was conducted to create evidence for the effect of decoction prepared from roots of *Ricinus communis* Linn for the treatment of Rheumatoid arthritis in an open interventional study in a tertiary care Ayurveda hospital of Punjab. Efficacy was checked on the basis of subjective as well as objective criteria before and after the treatment. The results had shown a significant improvement in terms of symptomatic relief in symptoms like fever, pain in joints, digestion, deformity of joints, numbness, stiffness etc. and decrease in RA Factor levels. The study clearly demonstrates the potential use of the decoction in rheumatoid arthritis.

Keywords: *Erandamool*, Joints pain, *Ricinus communis*, Rheumatoid arthritis, RA Factor

INTRODUCTION

Rheumatoid arthritis is a chronic, systemic, autoimmune inflammatory disease that mainly affects the joints and periarticular soft tissues^[1-3]. The World Health Organization (WHO) acknowledges rheumatoid arthritis (RA) as a significant contributor to the global disease burden, emphasizing its nature as a systemic autoimmune disease affecting millions^[4]. India is also witnessing an epidemic of arthritic conditions which are emerging as a challenge that requires urgent attention. In earlier times, arthritis was considered to be an old age problem but now days it poses challenge in front of younger population too, probably due to increasing sedentary lifestyle and other factors. Rheumatoid arthritis is one among these arthritic conditions with an incidence of 0.5 to 1 % of the population worldwide^[5]. Rheumatoid arthritis is a chronic autoimmune disease affecting mostly joints leading to swelling, pain, and stiffness of joints. It typically starts in small peripheral joints, is usually symmetric and progresses to involve proximal joints if left untreated. The symptoms and etiopathology of Rheumatoid arthritis clearly matches with the symptoms and progression of disease *Amavata* mentioned in Ayurveda^[6]. Etiopathological factors of Rheumatoid arthritis include mainly genetic and environmental factors like smoking, air pollution and occupational. Many other risk factors are also attached to RA like age, sex, obesity, family history etc^[7].

Changes in the composition and function of the intestinal microbiome have been related to rheumatoid arthritis as well. The composition of the gut microbiome becomes altered in patients with rheumatoid arthritis (dysbiosis), where rheumatoid arthritis patients have decreased gut microbiome diversity compared with healthy individuals^[8]. Keeping in view use as well as recommendations for use of *Erandmool kwatha* in rheumatoid arthritis, the present study was conducted to clinically evaluate the effect of *Erandamool Kwatha* (*Ricinus communis* Linn root decoction) in the management of *Amavata* (Rheumatoid arthritis).

MATERIALS AND METHODS

It was an open interventional study conducted at OPD level in 37 patients selected from Kayachikitsa OPD of Government Ayurvedic College & Hospital, Patiala (Punjab) with their informed written consent based on inclusion and exclusion criteria



designed from modern as well as Ayurvedic texts mentioned in Table.1. The study was registered with the CTRI number: CTRI/2022/07/043885.

Table 1: Inclusion Criteria and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Patients who gave written consent for the study.	Patients who did not give written consent for the study.
Patients falling between the age group of 30 and 70 years were selected irrespective of sex, religion and economic status etc.	Patients below the age of 30 and above the age of 70 years.
Patients who were having clinical features of <i>Amavata</i> .	Pregnancy and lactating mothers.
	Patients of severe <i>Amavata</i> having complications and uncontrolled co- morbidities.
	Patients with <i>Pittaj Prakriti</i> and suffering from other <i>Pittaj</i> diseases.
	Patients having history of any serious systemic illness.

ASSESSMENT CRITERIA

Subjective parameters

Contemporary correlation with Ayurveda symptoms	
1.	Pain in joints (Sandhi Shool)
2.	Swelling in joints (Shotha)
3.	Stiffness of joints (Sandhi Stabdhta)
4.	Tenderness of joints (Sandhi Sparshashatva)
5.	Body aches (Angamarda)
6.	Deformity of joints (Angavaikalya)
7.	Heaviness in body (Angagaurava)
8.	Anorexia (Aruchi)
9.	Indigestion (Apaka)
10.	Fever (Jwara)

Objective parameters

RA Factor - Qualitative and quantitative (Before and after treatment)

The decoction was prepared from coarsely ground powder of *Erandamool* (*Ricinus communis* Linn roots) which was provided to patients in a zip lock packs of 25g to be used daily. The decoction (50 ml) was given orally twice daily empty stomach in the morning and at a gap of 3 - 4 hrs before meals in the evening. The decoction was administered for 30 days and a follow up was done at D0, D15, D30 and D45 (15 days after stopping the medicine). In the present study, total 37 patients were registered out of which 30 patients completed the course of trial and 7 patients dropped out from the study at different stages due to personal reasons.

The results were assessed on the basis of improvement in score mention for all symptoms as mentioned in Table 2.



Table 2: Assessment scale for different symptoms of RA

S. No.	Parameter	Findings	Scoring
1.	Pain in joints (<i>Sandhi Shool</i>)	No pain	0
		Pain but tolerable	1
		Pain difficult to tolerate taking analgesic once a day	2
		Intolerable pain, taking analgesic twice a day	3
2.	Swelling in joints (<i>Shotha</i>)	No swelling	0
		Feeling of heaviness + swelling	1
		Apparent swelling	2
		Prominent swelling	3
3.	Stiffness of joints (<i>Sandhi Stabdhta</i>)	No stiffness	0
		Stiffness upto one hour in morning	1
		Stiffness lasting for 2-3 hour in morning	2
		Stiffness persistent up to mid-day	3
4.	Tenderness of joints (<i>Sandhi Sparshashatva</i>)	No tenderness	0
		Mild tenderness	1
		Moderate tenderness	2
		Severe tenderness	3
5.	Body aches (<i>Angamarda</i>)	No body aches	0
		No body aches but feeling uncomfortable	1
		Body aches but tolerable	2
		Body aches hindering activity	3
6.	Deformity of joints (<i>Angavaikalya</i>)	No deformity	0
		Mild deformity of single joint	1
		Deformity of 2-3 joints	2
		Deformity of many joints	3
7.	Heaviness in body (<i>Angagaurava</i>)	No heaviness in body	0
		Heaviness but not obstructing daily routine	1
		Heaviness with slight obstruction in daily routine	2
		Heaviness obstructing normal activities	3
8.	Anorexia (<i>Aruchi</i>)	Normal desire for food	0
		Eating timely without much desire	1
		Desire for food only after long intervals	2
		No desire at all	3
9.	Indigestion (<i>Apaka</i>)	No indigestion	0
		Food digests but take longer time	1
		Feeling of Heaviness in stomach after meals	2
		Felling of fullness all the time	3
10.	Fever (<i>Jwara</i>)	No fever	0
		Occasional fever subsides by itself	1
		Daily once but subsides by itself	2
		Daily once but subsides after medicine	3

Improvement in terms of lab investigations i.e. decreases in RA Factor quantitative.

For comparing categorical data Wilcoxon signed rank test was performed and for quantitative data paired Student 't'- test was applied.



RESULTS AND DISCUSSION

Demographic data was collected to know about any out of box results/observations. In this study it was observed that 40% patients fell in the range of 50-59 years, 93.3% patients were females out of which 83.3% patients were Housewives, 60% patients were having education up to senior secondary level, 100% patients were married, 83.3% of patients lived in the urban area. With the advent of science prakriti has also become an important parameter hence prakriti of patients was also noted and it was found that 46.7% patients in *Amavata* were of *Vata Kaphaj Prakriti*. Maximum patients (93.3%) were vegetarian in dietary habits.

Maximum patients 86.7% enrolled for the treatment was doing no exercise and 80% of patients had disturbed sleep during night due to pain. Maximum 60% patients were addicted to tea. Only 33.3 % patients had positive family history of *Amavata*.

Disease related data shows that there was a decrease in pain (73.9%), Stiffness in joints (70%), Tenderness of joints (62.2%), Generalized body ache (62.2%), Deformity of joints (38.5%), Feeling of heaviness in body (64%), Anorexia (74%), Indigestion (80%), Fever (80%) and Swelling of the joint (66.4%) which was statistically highly significant (p-value 0.001) as mentioned in Table 3.

Free radicals are known to play a role in etiopathogenesis of rheumatoid arthritis^[9]. The literature survey shows that Germanicol ester derivative and an unidentified triterpene (root); inorganic material like potassium, sodium, magnesium, chloride, nitrate, iron, aluminum, manganese, calcium, carbonate and phosphate including gallotannins (root, root bark) are found in roots^[10]. Roots of the plant also contain Indole-3-acetic acid^[11]. Gallotannins have been shown to scavenge free radicals^[12].

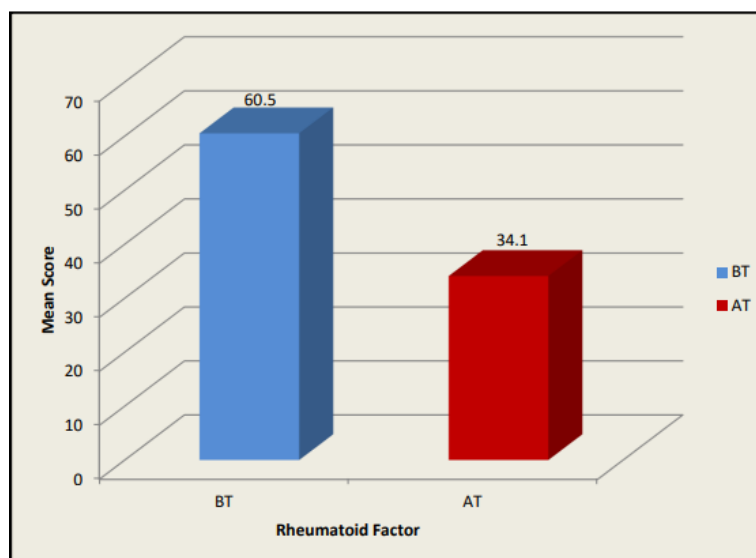
The study has shown that inflammation has been significantly reduced in patients taking the treatment. This has been clearly supported by a study in which *R. communis* was assessed for anti-inflammatory action using ethanolic, methanolic or hexane and acetone fractions. Flavonoids presence is the reason why the methanolic extract showed a remarkable activity^[13]. Another study, where macrophage cell lines were tested with the methanolic extract showed 95% scavenging activity pointing its anti-inflammatory action^[14]. The result of a different research pointed out Ricinolein for anti-inflammatory activity^[15]. Another in vivo study, for anti-inflammatory action of *R. communis* was carried out against histamine or carrageenan-induced edema in guinea pigs or mice respectively. Edema was reduced by 58% after *R. communis* extract. Ricinoleic acid administered topically for 8 d (0.9 mg/mouse). The result confirmed the anti-inflammatory potential of ricinoleic acid (new capsaicin-like substance). Thus the presence of Flavonoids and Ricinoleic acid helped to reduce the inflammation in RA.

This study also demonstrated a potent relief in pain in the joints which could be attributed to the component ricinin in the decoction. A recent study has shown that *R. communis* extracts contains alkaloid Ricinine which is responsible for the potent central analgesic activity according to the results of different studies. It acts as a stimulant for central nervous system, memory improvement, hyperactivity, clonic seizures and neuroleptic effects. Ricinine does not reduce the explorational brain behavior hence it is a non-anxiogenic^[16].

The study has also shown a significant decrease in bone degenerative changes in patients under treatment. This can be attributed to the presence of calcium phosphate and other minerals needed for bone formation/ for avoiding degeneration. In an animal study on rats and rabbits, *R. communis* regenerated bones without the formation of scar, promote neo-formation of fibroblast, promote formation of polyurethane resin, delays inflammatory response. The mixture of calcium phosphate with *R. communis* polyurethane promotes mineralization of bone matrix when looking into biocompatible materials and bone that lacks minerals. There is slower reabsorption of *R. communis* polyurethane making it useful in the treatment of osteoarthritis^[17]. There is a remarkable decrease in quantitative RA factor titeras shown in Figure 1.

**Table 3: Shows the mean change with % change and respective z and p values**

S. No.	Symptoms	Mean BT	Mean AT	Mean change	%change	z value	p-value
1.	Joints pain/ <i>Sandhi Shool</i>	2.36	0.56	1.7	73.9%	4.860	<0.001
2.	Swelling/ <i>Shotha</i>	2.56	0.86	1.7	66.4%	4.956	<0.001
3.	Numbness of joints/ <i>Sandhi Stabdhat</i>	2.56	0.76	1.8	70%	5.031	<0.001
4.	Tenderness of joints/ <i>Sandhi Sparshasahatva</i>	2.78	1.03	1.7	62.2%	4.976	<0.001
5.	Body aches/ <i>Angamarda</i>	2.50	0.8	1.7	68.8%	4.976	<0.001
6.	Deformity/ <i>AngaVaikalya</i>	0.70	0.43	0.27	38.1%	2.828	<0.001
7.	Heaviness/ <i>AngaGaurava</i>	2.25	2.23	0.27	64%	4.893	<0.001
8.	Anorexia/ <i>Aruchi</i>	1.80	0.47	1.33	74%	4.777	<0.001
9.	Indigestion/ <i>Apaka</i>	2.03	0.57	1.46	72.13%	4.932	<0.001
10.	Fever/ <i>Jwara</i>	1.80	0.34	1.46	77.7%	4.853	<0.001

**Figure 1: Level of RA factor in patients of Rheumatoid Arthritis Before and after Treatment**

CONCLUSION

Amavata which comes under *Sandhigat Roga* in the Ayurveda classics is correlated with RA and manifests symptoms resembling RA. Rheumatoid arthritis being a chronic inflammatory disease affects the joints and periarticular soft tissues. This study which was conducted to create evidence for the effect of decoction prepared from roots of *Ricinus communis* Linn. for the treatment of Rheumatoid arthritis shown a significant improvement in terms of symptomatic relief in symptoms like fever, pain in joints, digestion, deformity of joints, numbness, stiffness etc. and decrease in RA Factor levels. The study clearly demonstrates the potential use of the decoction in rheumatoid arthritis. From the results it may be concluded that *R. communis* root decoction could be a good remedy to fight with Rheumatoid arthritis.

REFERENCES

1. Finckh A, Gilbert B, Hodkinson B, Bae SC, Thomas R, Deane KD, Alpizar-Rodriguez D, Lauper K. Global epidemiology of rheumatoid arthritis. *Nature Reviews Rheumatology*. 2022;18(10):591-602.
2. Gravallese EM, Firestein GS. Rheumatoid arthritis—common origins, divergent mechanisms. *New England Journal of Medicine*. 2023;388(6):529-42.



3. Alivernini S, Firestein GS, McInnes IB. The pathogenesis of rheumatoid arthritis. *Immunity*. 2022;55(12):2255-70.
4. Wang Y, Chen S, Du K, Liang C, Wang S, Boadi EO, Li J, Pang X, He J, Chang YX. Traditional herbal medicine: Therapeutic potential in rheumatoid arthritis. *Journal of ethnopharmacology*. 2021;279:114368.
5. Chopra A, Abdel-Nasser A. Epidemiology of rheumatic musculoskeletal disorders in the developing world. *Best Practice & Research Clinical Rheumatology*. 2008;22(4):583-604.
6. Bhoite VD, Ostwal AS, Mahendra B. A Review of Amvata. *World Journal of Pharmaceutical Research*. 2023;13(2): 345-350
7. Scherer HU, Häupl T, Burmester GR. The etiology of rheumatoid arthritis. *Journal of autoimmunity*. 2020;110:102400.
8. Chen J, Wright K, Davis JM, Jeraldo P, Marietta EV, Murray J, Nelson H, Matteson EL, Taneja V. An expansion of rare lineage intestinal microbes characterizes rheumatoid arthritis. *Genome medicine*. 2016;8:1-4.
9. Lin S, Wang D, Xu C, Zhang P, Gao K, Liu C, Mei X. Therapy of rheumatoid arthritis by reactive oxygen species-responsive celastrol-loaded nanomedicines via targeting macrophages apoptosis. *Materials & Design*. 2022;224:111298.
10. Sharma PC, Yelne MB, Dennis TJ. Database on medicinal plants used in Ayurveda. New Delhi: Central Council for Research in Ayurveda and Siddha; 2000.
11. Abomughaid MM, Teibo JO, Akinfe OA, Adewolu AM, Teibo TK, Afifi M, Al-Farga AM, Al-kuraishy HM, Al-Gareeb AI, Alexiou A, Papadakis M. A phytochemical and pharmacological review of *Ricinus communis* L. *Discover Applied Sciences*. 2024;6(6):315.
12. Molino S, Francino MP, Henares JÁ. Why is it important to understand the nature and chemistry of tannins to exploit their potential as nutraceuticals?. *Food research international*. 2023: 113329.
13. Abomughaid MM, Teibo JO, Akinfe OA, Adewolu AM, Teibo TK, Afifi M, Al-Farga AM, Al-kuraishy HM, Al-Gareeb AI, Alexiou A, Papadakis M. A phytochemical and pharmacological review of *Ricinus communis* L. *Discover Applied Sciences*. 2024;6(6):315.
14. Nemudzivhadi V, Masoko P. In vitro assessment of cytotoxicity, antioxidant, and anti-inflammatory activities of *Ricinus communis* (euphorbiaceae) leaf extracts. *Evidence-Based Complementary and Alternative Medicine*. 2014;2014(1):625961.
15. Vieira C, Evangelista S, Cirillo R, Lippi A, Maggi CA, Manzini S. Effect of ricinoleic acid in acute and subchronic experimental models of inflammation. *Mediators of inflammation*. 2000;9(5):223-8.
16. Ferraz AC, Angelucci ME, Da Costa ML, Batista IR, De Oliveira BH, Da Cunha C. Pharmacological evaluation of ricinine, a central nervous system stimulant isolated from *Ricinus communis*. *Pharmacology Biochemistry and Behavior*. 1999;63(3):367-75.
17. Ziaei A, Sahranavard S, Gharagozlou MJ, Faizi M. Preliminary investigation of the effects of topical mixture of *Lawsonia inermis* L. and *Ricinus communis* L. leaves extract in treatment of osteoarthritis using MIA model in rats. *DARU Journal of Pharmaceutical Sciences*. 2016;24:1-0.

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