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COMPARATIVE HAEMATOLOGICAL STUDY OF ETHANOLIC AND HYDROALCOHOLIC EXTRACT OF *ASPARAGUS RACEMOSUS* ROOTS BY FCA INDUCED ARTHRITIS IN RATS

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ABSTRACT:

Rheumatoid arthritis is a kind of chronic inflammatory autoimmune disease. Rheumatoid arthritis is a condition defined with imprecise etiology characterized by progressive joint destruction, bone deformities and can lead to premature death. The present study designed to investigate the haematological parameters like RBC, WBC, Hb, ESR of ethanolic and hydroalcoholic extract of *Asparagus racemosus* roots. There was a significant improvement in the levels of haemoglobin and RBC and significant decrease in the level of ESR and WBC.

Key Words: Rheumatoid arthritis, *Asparagus racemosus*, Haematological parameters.

INTRODUCTION

Rheumatoid Arthritis (RA) is a chronic, destructive inflammatory polyarticular joint and systemic autoimmune disease of unknown cause. The prevalence of RA is consistent worldwide affecting, about 0.5-1.0% of the population.[1] Arthritis causes disability, compromised quality of life, and premature mortality.[2] Osteoarthritis, rheumatoid arthritis and gout are common types.[3]

Amongst the various experimental animal models of arthritis, induction of arthritis by Freund's complete adjuvant (FCA) is one of the standardized method which mimics the human pathophysiological state including chronic swelling in multiple joints due to accumulation of inflammatory cells, joint cartilage erosion, bone destruction and used to investigate the activity of various potent anti-inflammatory and anti-arthritic agents.[4]

Although a number of drugs (non-steroidal or steroidal anti-inflammatory agents and immunosuppressants) used in the treatment of RA have been developed over the past few decades, there is still an urgent need for more effective drugs with lower side effects.[5] But these drugs produce some unwanted side-effects such as gastrointestinal ulcergenicity and renal morbidity. So, nowadays medicinal herb in the treatment and prevention of diseases is attracting attention by scientists worldwide.[6] Attention is being focused on the investigation of efficacy of plant based drugs used in the traditional medicine because they are economy, have a little side effects and according to W.H.O, about 80% of the world population rely mainly on herbal remedies.[7] India is known as the "Emporium of Medicinal plants" due to availability of several thousands of medicinal plants in the different bioclimatic zones anti-inflammatory diseases including rheumatoid arthritis are still one of the main health problems of the world's population.[8] Knowledge of herbs has been handed down from generation to generation for thousands of years. Herbal drugs constitute a major part in all traditional systems of medicines. Numerous types of herbs have been well recognised and catalogued by botanist from the high ranges of the Himalayan tract up to the sea-shores of Kanyakumari.[9] *Asparagus racemosus* commonly known as Satavari belonging to family Liliaceae is a herbal plant useful in various diseases. The present study compare the effect of various extract of *Asparagus racemosus* roots on haematological parameter in FCA induced arthritis.

MATERIALS AND METHOD

Collection of plant

The part of the plant (roots) has been collected from local market of Lucknow (U.P) and identified by the University of Rajasthan, Jaipur. After procurement, the roots were dried in shade and ground mechanically into a coarse powder and kept into an air-tight container for use in the study.

Preparation of extract

The powdered plant material was successively extracted using ethanol and hydroalcohol (70% Ethanol and 30% Water) in a soxhlet extraction apparatus. The extract was concentrated and traces of the solvent were completely removed under reduced pressure and stored in vacuum desiccators for further use.

Chemicals

Freund's Complete Adjuvant was purchased from UGO Basil, Sigma Aldrich (USA) and the entire reagents used in the study were analytical grade.

Selection of Animals

Wistar rats (150-200 g) of either sex, procured from Jaipur College of Pharmacy, Jaipur . Animals were housed at 25 ± 1°C and at standard environmental conditions (12 h light and 12 h dark cycle) in the institutional animal house. The animals were fed with standard pellet rodent diet and water was provided *ad libitum*. All the experiments were carried out approved by Institutional Animal Ethical Committee of Jaipur College of Pharmacy, Jaipur.

PHARMACOLOGICAL STUDY

FCA induced arthritis

Arthritis was induced by a single intra-dermal injection (0.1 ml) of Complete Freund's adjuvant (CFA) containing 1.0 mg dry heat-killed *Mycobacterium tuberculosis* per milliliter sterile paraffin oil into a foot pad of the left hind paw of rats.[10] The animals were divided into 7 groups of 6 animals each (one normal, one control, one standard and four test groups).

Treatment groups

Normal: 1% aqueous solution of Tween80

Control: FCA + 2% Tween80 (10ml/kg).

Standard: FCA + Dexamethasone (5mg/kg)

Test group (Low dose): FCA + *Asparagus racemosus* Ethanolic Extract [AREE] (200mg/kg)

Test group (High dose): FCA + *Asparagus racemosus* Ethanolic Extract [AREE] (400mg/kg)

Test group (Low dose): FCA + *Asparagus racemosus* Hydroalcoholic Extract [ARHE] (200mg/kg)

Test group (High dose): FCA + *Asparagus racemosus* Hydroalcoholic Extract [ARHE] (400mg/kg)

The dosing of all the groups was started from day 12th once daily orally. Various parameters i.e. body weight, joint diameter, paw volume, arthritic score, motor incordination, analgesic have been evaluated on day 0th, 4th, 7th, 10th, 12th, 14th, 17th, 19th, 21th, and day 28th. On last day (day 28th), blood was withdrawn by retro-orbital puncture for assessment of hematological parameters i.e. WBC, RBC, Hb, ESR.

RESULTS

There was decrease in RBCs along with Hb and increase in WBCs in control rats as compared to normal animals. Animals treated with Standard drug Dexamethasone (5 mg/kg) showed significant decrease ($P < 0.01$, $P < 0.001$) in WBCs and ESR when compared to control group animals whereas significantly increase ($P < 0.001$) in the RBCs and Hb level as compared to control group animals. There was significant decrease in ESR and WBC in animals treated with ARHE (200 mg/kg), ($P < 0.05$) as compared to control group animals. Whereas significantly increases ($P < 0.05$ and $P < 0.001$) in the RBCs and Hb level. Treatment with ARHE (400 mg/kg) significantly increases ($P < 0.01$) in the RBCs and Hb level and significant decrease ($P < 0.01$, $P < 0.001$) in ESR and WBC as compared to control group animals. Treatment with AREE (200 mg/kg) significantly increases ($P < 0.01$, $P < 0.001$) in the RBCs and Hb level and significant decrease ($P < 0.05$, $P < 0.01$) in ESR and WBC as compared to control group animals. Treatment with AREE (400 mg/kg) significantly increases ($P < 0.01$, $P < 0.001$) in the RBCs and Hb level and significant decrease ($P < 0.05$, $P < 0.01$) in ESR and WBC as compared to control group animals. (**Table: 1 and Fig: 1**)

Table: 1. Effect of chronic treatment of AREE and ARHE on haematology and ESR

S.No.	Group	RBC (mil/mm^3)	WBC (thous/mm^3)	HGB (gms/dl)	ESR (mm/1 hr)
1.	Control	1.88 ± 0.060	7.20 ± 0.058	4.95 ± 0.198	6.66 ± 0.333
2.	Normal	2.66 ± 0.186	6.20 ± 0.577	6.93 ± 0.219	6.00 ± 1.155
3.	Standard	2.8 ± 0.058***	4.667± 0.088***	7.50 ± 0.153***	3.33 ± 0.333**
4.	ARHE (200mg/kg)	2.33± 0.088*	5.83 ± 0.176*	6.70 ± 0.404***	4.33± 0.33*
5.	ARHE (400mg/kg)	2.50± 0.153**	4.83± 0.203***	6.10 ± 0.173*	3.66 ± 0.666**
6.	AREE (200mg/kg)	2.36± 0.066**	5.86± 0.617*	6.63± 0.296***	4.00± 0.00**
7.	AREE (400mg/kg)	2.46± 0.088**	5.90± 0.153*	7.30± 0.153***	3.66± 0.33**

Values were expressed Mean ± SEM

*P < 0.05; **P < 0.01 and ***P < 0.001 significant as compared to control group.

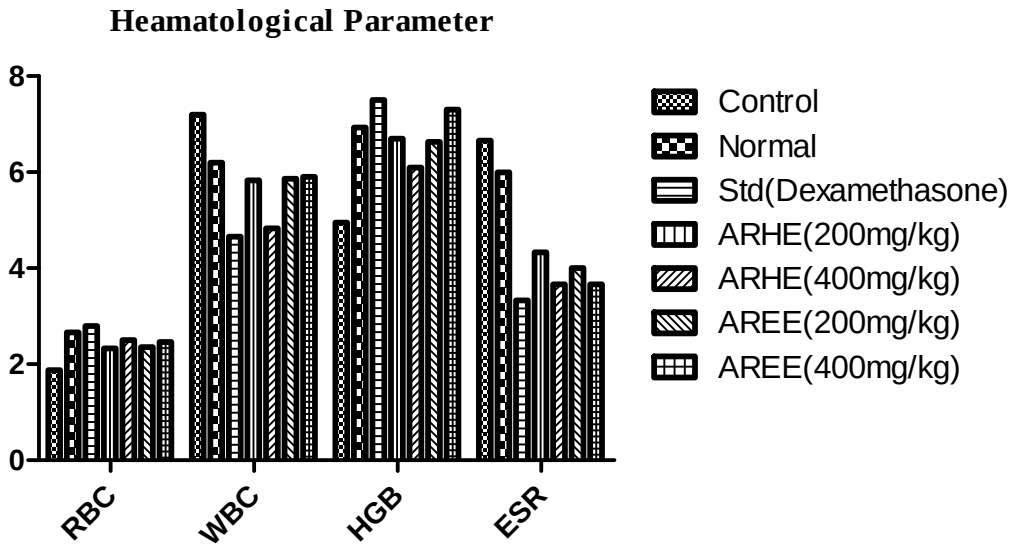

Fig.1: Effect of *A. racemosus* root extract on haematology parameter

CONCLUSION

From this study we conclude that both the extract of (Ethanolic and Hydroalcoholic) *Asparagus racemosus* show significant effect on haematological parameter in FCA induced arthritis.

REFERENCES

1. Manvi FV, Nanjawade BK, Shing S. Pharmacological screening of combined extract of *Annona squamosa* and *Nigella sativa*. International Journal of Pharma and Bio Sciences, 2011; 2(2): 520-529.
2. Kyei S, Koffuor GA, Boampong JN. Antiarthritic effect of aqueous and ethanolic leaf extracts of *Pistia stratiotes* in adjuvant-induced arthritis in Sprague-Dawley rats. Journal of Experimental Pharmacology, 2012; 4: 41–51.
3. Ramesh Petchi R and Vijaya C. Anti-diabetic and anti-arthritic potential of *Glycosmis pentaphylla* stem bark in FCA induced arthritis and streptozotocin induced diabetic rats. International Journal of Pharma and Bio Sciences, 2012; 3(3): 328-336.
4. Patel RG, Pathak NL, Rathod JD, Jivani NP, Thaker RU, Bhatt NM. Anti-arthritic and anti-inflammatory activity of methanolic extract of *Randia dumetorum* fruits in freund's complete adjuvant induced arthritis. World Journal of Pharmaceutical Research, 2012; 1(2): 309-325.

5. Amresh G, Singh PN, Rao CV. Antinociceptive and antiarthritic activity of *Cissampelos pareira* roots. Journal of Ethnopharmacology, 2007; 111: 531–536.
6. Patel P, Patel D, Patel N. Experimental investigation of anti-rheumatoid activity of *Pleurotus sajorcaju* in adjuvant-induced arthritic rats. Chinese Journal of Natural Medicines, 2012; 10(4): 0269-0274.
7. Purushoth Prabhu T, Panneerselvam P, Vijaykumar R , Clement Atlee W, Balasubramanian S. Anti-inflammatory, anti arthritis and analgesic effect of ethanolic extract of whole plant of *Merremia Emarginata* Burm.F. Central European Journal of Experimental Biology, 2012; 1(3): 94-99.
8. Kore KJ, Shete RV, Desai NV. Anti-Arthritic activity of Hydroalcoholic extract of *Lawsonia innermis*. International Journal of Drug Development & Research, 2011; 3(4): 217-224.
9. Dixit PK, Mittal S. A Comprehensive Review on Herbal Remedies of Diuretic Potential. International Journal of Research in Pharmacy and Science, 2013; 3(1): 41-51.
10. Mishra NK, Bstia S, Mishra G, Chowdary KA, Patra S. Anti-arthritic activity of *Glycyrrhiza glabra, Boswellia serrata* and their synergistic activity in combined formulation studied in freund's adjuvant induced arthritic rats. J Pharm Educ Res, 2011; 2(2): 92-98.