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Antarthritic effects of *Solanum nigrum* in CFA-induced rat model - a histological analysis

Haroon ur Rasheed^{1*}, Kauser Ismail¹, Muhammad Owais Ismail², Akhtar Ali¹, Humaira Arif³, Syeda Zehra Ahmed⁴

ABSTRACT

Background and Objective: Conventional disease-modifying anti-rheumatic drugs used for the treatment of rheumatoid arthritis are known for their steady onset of action and multiple adverse effects. The objective of this study was to evaluate the anti-arthritis activity of the ethanolic extract of *Solanum nigrum* in the complete Freund's adjuvant-induced arthritic rat model.

Methods: A total of 30 male Wistar albino rats were used in a 4-week pre-clinical experimental study. The animals were divided into 5 groups; Group-I negative (healthy) control (0.9% normal saline), Group-II positive (diseased) control (0.9% normal saline), Group-III standard group (Methotrexate 1.5 mg/kg), Group-IV (*Solanum nigrum* 100 mg/kg), and Group-V (*Solanum nigrum* 200 mg/kg). To develop arthritis, 0.1ml of complete Freund's adjuvant was administered intraarticularly in the right knee joints of all groups except Group-I at day 0. Knee joint circumference was assessed by using a Vernier calliper once weekly for 4 weeks. For euthanasia, 100 mg/kg pentobarbital was injected intraperitoneally in all animals on the 29th day for the assessment of histopathological changes in knee joints. SPSS version 22 was used to analyse the results, and ANOVA was applied for intergroup and intragroup comparisons.

Results: Edema in the positive controls (Group-II) increased continuously throughout the study duration. While Group-III (MTX) showed an initial increase in edema, but slight reduction was observed in the last 2 weeks. Group-V (SN200) with a higher dose of herbal extract showed maximum reduction in edema. Histological assessment showed maximum arthritic score (3) in Group-II. While 66% of animals in Group-III (MTX) and Group-IV (SN100) showed mild scoring exhibiting scattered inflammatory cells, Group-V showed maximum improvement in the histopathological changes, and 66% of animals showed normal scoring, while 33% animals showed few inflammatory cells ($p < 0.05$).

Conclusion: Ethanolic extract of *Solanum nigrum* demonstrated decreased knee joint edema and improved histopathological outcomes, suggesting therapeutic potential for arthritis management.

Keywords: Arthritis, histology, edema, *Solanum nigrum*.

Received: 31 August 2024

Revised (1): 02 November 2024

Revised (2): 13 December 2024

Accepted: 28 December 2024

Correspondence to: Haroon ur Rasheed

*Assistant Professor, Department of Pharmacology, Ziauddin Medical College, Ziauddin University, Karachi, Pakistan.

Email: haroon.rasheed@zu.edu.pk

Full list of author information is available at the end of the article.

Authors' Details

Haroon ur Rasheed¹, Kauser Ismail¹, Muhammad Owais Ismail², Akhtar Ali¹, Humaira Arif³, Syeda Zehra Ahmed⁴

1. Assistant Professor, Department of Pharmacology, Ziauddin Medical College, Ziauddin University, Karachi, Pakistan

2. Professor, Department of Pharmacology, Ziauddin Medical College, Ziauddin University, Karachi, Pakistan

3. Lecturer, Department of Pharmacology, Baqai University, Karachi, Pakistan

4. Assistant Professor, Department of Pathology, Ziauddin Medical College, Ziauddin University, Karachi, Pakistan