

**EVALUATION OF ANTI ARTHRITIC ACTIVITY OF ETHANOLIC  
LEAF EXTRACT OF *DATURA STRAMONIUM*****DR.S. SENTHILKUMAR**

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**KEYWORDS:**

Paw volume, Anti  
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*Datura Stramonium*, Low  
dose, High dose.

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**ABSTRACT**

Rheumatoid arthritis (RA) is a systemic autoimmune disease of unknown aetiology. The disease is characterized by articular inflammation and by the formation of an inflammatory and invasive tissue, rheumatoid pannus that eventually leads to the destruction of joints. Analgesia (pain killers) and anti-inflammatory drugs, including steroids are used to suppress the symptoms, while disease-modifying anti-rheumatic drugs (DMARDs), newer therapies such as anti-tumour necrosis factor (TNF)- $\alpha$  therapy, and CD 20 therapy and abatacept are often required to inhibit or halt the underlying immune process. However, all of these agents are associated with numerous side effects. In recent days, researchers are directed towards traditional system of medicine for the discovery of drugs that are long acting anti-inflammatory with minimum side effects.

**INTRODUCTION:**

Rheumatoid arthritis is a chronic autoimmune disorder characterized by various symptoms such as inflammation with pain over joints, swelling, redness and morning stiffness. Although the cause for the disorder is unknown, the autoimmunity plays a vital role. The treatment includes NSAIDs, DMARDS and corticosteroids but results in many serious side effects of GIT and cardiac which then affects the other systems (1,2). Keeping the above points in view, we had evaluated the anti arthritic activity of our plant in various animal models which may be useful for the society if proved.

Medicinal plants are important therapeutic sources of treating different diseases at local level. It is estimated that 80% inhabitants of developing world rely on traditional medicines (3). Rheumatism is one of the diseases that causes chronic inflammation of the joints and are treated by using various ethnomedicines. Its symptoms include fatigue, loss of energy, low-grade fever, muscle joint aches and stiffness. It affects 0.5-1% of population all over the world (4).

**MATERIALS AND METHODS:****COLLECTION OF PLANT MATERIAL:**

The leaves of *Datura Stramonium* were collected from paramathi near karur District in Tamilnadu.

**PREPARATION OF PLANT EXTRACT:**

The leaves of *Datura Stramonium* were shade dried at room temperature. The dried material was then homogenized to obtain coarse powder and stored in air-tight bottles for further analysis. The shade, dried, powdered leaves were extracted with ethanol by hot extraction using soxhlet apparatus, collected and stored in a vial for further analysis.

**PROCEDURE:**

Wister albino male rats (150-200g) were divided into T groups of six animals each (n=6). Group I served as control. Arthritis was induced in raty by injecting 01.ml of 0.1% freund's complete adjuvant (FCA), (Sigma Aldrich USA) into the sub planter region in the right hint paw of group II-IV rats on the first day of the experiment . Group III was administrated with indomethacin (10mg Kg<sup>-1</sup> day<sup>-1</sup> P.O) daily for 15 days which serred as the standard reference. Group IV and V was administrated with 200mg kg<sup>-1</sup> day<sup>-1</sup> P.O and 400 mg kg<sup>-1</sup>day<sup>-1</sup> P.O of ethanolic leaf extract of *Datura Stramonium* daily for 15 days (4).

**EXPERIMENTAL DESIGN:**

The plant extract treatments were administrated as follows for 5 days

Group-I : Served as control

Group-II : Freund's complete adjuvant (FCA) in to the sub planter region in the right hind paw.

Group-III: Administrated with Indomethacin ( $10\text{mg kg}^{-1} \text{ day}^{-1}$  P.O) daily.

Group-IV:  $200\text{mg kg}^{-1} \text{ day}^{-1}$  P.O of *Datura Stramonium*

Group- V:  $400\text{mg kg}^{-1} \text{ day}^{-1}$  P.O of *Datura Stramonium*

The increase in joint diameter was measured daily starting from day 1, by using verniar caliber.

Percentage protection rendered by the plant extract is calculated using the formulae

$$\text{Difference in paw volume of Induced} - \text{difference in paw volume of standard / or treated} \times 100$$

Percentage Protection = -----

Difference in paw volume of Induced

### STATISTICAL ANALYSIS:

The data presented here are means  $\pm$  SD of 6 rats in each group. The results were analysed using one-way analysis of variance (ANOVA) and the group means were compared by Dunecan's multiple range test (DMRT) using statistical program for social sciences (SPSS Version 16.0) soft ware for windows. The findings were considered statistically significant at  $P < 0.05$  (5).

**Table -1. Antiarthritis activity of Ethanolic leaf extract of *Datura Stramonium***

Paw volume (mm)					
Days	Control	Induced	Standard	Low dose	High dose
0.	3.28 $\pm$ 0.16	3.15 $\pm$ 0.12	3.40 $\pm$ 0.08	3.14 $\pm$ 0.05	3.20 $\pm$ 0.08
1.	3.28 $\pm$ 0.16	6.96 $\pm$ 0.24	6.60 $\pm$ 0.21	7.61 $\pm$ 0.16	7.59 $\pm$ 0.22
2.	3.28 $\pm$ 0.16	7.45 $\pm$ 0.23	7.27 $\pm$ 0.14	7.77 $\pm$ 0.18	7.80 $\pm$ 0.22
3.	3.28 $\pm$ 0.16	7.95 $\pm$ 0.02	7.83 $\pm$ 0.06	7.85 $\pm$ 0.18	7.74 $\pm$ 0.22
4.	3.28 $\pm$ 0.16	8.60 $\pm$ 0.09	8.38 $\pm$ 0.09	7.98 $\pm$ 0.19	7.55 $\pm$ 0.23
5.	3.28 $\pm$ 0.16	9.32 $\pm$ 0.05	8.16 $\pm$ 0.04	8.11 $\pm$ 0.17	7.35 $\pm$ 0.23
6.	3.28 $\pm$ 0.16	9.92 $\pm$ 0.04	7.89 $\pm$ 0.05	8.01 $\pm$ 0.17	7.15 $\pm$ 0.21
7.	3.28 $\pm$ 0.16	10.25 $\pm$ 0.09	7.73 $\pm$ 0.11	7.81 $\pm$ 0.20	6.96 $\pm$ 0.22
8.	3.28 $\pm$ 0.16	10.77 $\pm$ 0.04	7.23 $\pm$ 0.06	7.62 $\pm$ 0.23	6.75 $\pm$ 0.24
9.	3.28 $\pm$ 0.16	11.44 $\pm$ 0.08	6.89 $\pm$ 0.10	7.40 $\pm$ 0.22	6.55 $\pm$ 0.23
10.	3.28 $\pm$ 0.16	11.85 $\pm$ 0.06	6.52 $\pm$ 0.12	7.32 $\pm$ 0.20	6.18 $\pm$ 0.41
11.	3.28 $\pm$ 0.16	11.23 $\pm$ 0.07	6.15 $\pm$ 0.05	7.02 $\pm$ 0.22	5.98 $\pm$ 0.41
12.	3.28 $\pm$ 0.16	10.73 $\pm$ 0.06	5.73 $\pm$ 0.06	6.80 $\pm$ 0.21	5.86 $\pm$ 0.41
13.	3.28 $\pm$ 0.16	10.11 $\pm$ 0.04	5.43 $\pm$ 0.06	6.60 $\pm$ 0.22	5.69 $\pm$ 0.39
14.	3.28 $\pm$ 0.16	9.85 $\pm$ 0.08	5.25 $\pm$ 0.08	6.38 $\pm$ 0.26	5.59 $\pm$ 0.40
15.	3.28 $\pm$ 0.16	9.31 $\pm$ 0.08	5.11 $\pm$ 0.04	6.22 $\pm$ 0.08	5.44 $\pm$ 0.07

Values are expressed as mean  $\pm$ SD (n=6)

Table-2. Percentage protection of *Datura stramonium* against FCA induced arthritis

Groups	Initial paw volume (mm)	Final paw volume (mm)	Difference	Percentage protection (%)
Control	3.28 ± 0.16	3.28 ± 0.16	-----	----
Induced	3.15 ± 0.12	9.30 ± 0.08	6.15 ± 0.19	----
Standard	3.40 ± 0.08	5.11 ± 0.05	1.71 ± 0.09	72.20
Low dose	3.14 ± 0.05	6.22 ± 0.09	3.09 ± 0.10	49.82
High dose	3.20 ± 0.08	5.44 ± 0.07	2.24 ± 0.13	63.59

Values are expressed as mean ± SD (n=6)

### RESULTS AND DISCUSSION:

The carrageenan induced paw edema inflammation has been accepted as a useful phlogistic tool for investigating systemic anti-inflammatory agent (7). The edema induced by carrageenan is highly sensitive to NSAIDS and has been accepted as a useful indicator for identifying the new anti-inflammatory molecules (8). Local injection of carrageenan in to rat hind paw induces a cute inflammatory responses such edema (9). The carrageenan induced edema has been described as a biphasic event, a rapid early phase (up to 2h) friggered by the concerted release of histamine, bradykinin, 5-hydroxyptamine, or cyclo oxygenase products and a more systained late phase (2 to 5h) regulated by neutrophill infiltration and sustained production of arachidonic metabolites or nitric oxide from inducible nitric oxide synthase (10). (Table 1,2)

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