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# Inflammation lowering property of *Pistacia atlantica* in cotton pellet granuloma

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ABSTRACT

There are few defence mechanisms by which the body identifies and recovers from any physical injuries or external damage-causing stress and stimuli. This is through inflammation wherein the pain and the healing enzymes release into the bloodstream and cause pain and swelling that causes protection from those damages. The most important of the causative factors of the inflammation is the oxidative damage and the physiological stress. There were investigations on the herbs that were used in the treatment of diseases and were claimed to contain very limited or without side effects. Thus, they gained importance these days and were used in the treatment of major diseases like cancer and heart problems. Even though their use was extended from the traditional forms to advanced medicine, their scientific establishment of the proof and validate them for their activities is utmost important. Thus there were gaining interest in the medical and research field to perform the researches on the herbs and medicinal plants to prove their activity. The plant leaves of *Pistacia atlantica* were extracted with ethanol and water mixture using an ultrasonication. It was tested for the anti-inflammatory potential in various doses like 100, 200, 400 and 600 mg.kg body weight in the swiss albino rats in the cotton pellet induced granuloma method and the extracts showed significant dose-dependent activity compared with the standard indomethacin drug.

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## INTRODUCTION

There are few defence mechanisms by which the body identifies and recovers from any physical injuries or external damage-causing stress and stimuli. This is through inflammation wherein the pain and the healing enzymes release into the bloodstream and cause pain and swelling that causes protection from those damages. The most important of the causative factors of the inflammation is the oxidative damage and the physiological stress [1]. A huge lot of population in the world has been suffering from the inflammation-mediated responses and diseases like arthritis etc. [2]. Other factors that trigger the inflammation in the body are allergens that stimulate the immune responses. This, when continued for the chronic period, causes the chronic diseases that can become hard to cure and treat [3]. It is a process that includes many events that release mediators that cause pain and other symptoms.

There are some pain mediators like Interleukins, Cytokinin and TNF that cause the inflammation process and cause the body to generate healing factors [4]. Some drugs are synthesized to treat and

suppress the inflammatory processes in the body. NSAID class of drugs occupies a significant category of those drugs. These will inhibit the inflammation and also due to the potency of those drugs, they cause many more side effects too like gastric ulcers, bleeding etc. [5].

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In this current research, plant *Pistacia atlantica* had been already evaluated for the anti-inflammatory activity in carrageenan-induced method and compared to a standard drug. But to know about the full-pledged activity of the plant, it needs to be established in various ways for its anti-inflammatory activity. So, in this method, the plant is investigated for the property in cotton pellet method with four different doses.

**MEDICINAL PLANT COLLECTION**

Leaves of the plant were collected and dried in the shade for 6days. This dried leaf material was then powdered finely with a blender, and the Powder was extracted for chemical constituents. The solvent system of ethanol and water in the ratios of 2:1 was mixed and used for extraction. 50g of the Powder was extracted using the above mixture using an ultra sonicator under ultrasound. The Powder was macerated in the above solvent for four days, and then it is filtered, and the filtrate was evaporated using a desiccator and used in the further experiments. The extracts were investigated for the anti-inflammatory activity in various doses like 100,200,400 and 600mg/kg of the extracts.

**ANIMAL GROUPING AND EXPERIMENTS**

The lab animals used for the investigation of the anti-inflammatory activity of the plant were the swiss albino rats those weigh an average weight which was not a constrain. The rats were fed properly with pellet feed, and water was given ad labitium. They were kept in the metal cages and allowed to adjust for the lab conditions. Thus, making them tolerable for the experimentation. They are divided into 6gorups of animals in which there are 6 in each group. Group I was considered as the negative control group and Group II was considered as the positive control group, and Group III-VI were considered as test groups at the dose of 100,200,400 and 600 which were given via the oral route.

GroupI-normal saline solution of 1.2ml/kg 0.95%w/v of saline Oral route of administration

GroupII-Standard drug (Indomethacin)-10mg/kg Oral route

GroupIII-drug extract at 100mg/kg oral route

GroupIV-Drug extract at 200mg/kg oral route

GroupV-Drug extract at 400mg/kg oral route

GroupVI-Drug extract at 600mg/kg oral route

**INVIVO SCREENING**

The induction of the inflammation is done through the method of cotton pellet induced granuloma method [6, 7]. In this method, 30min after administration of the drugs and extracts, the induction of inflammation is done. 30mg of the cotton pellet was weighed and sterilized using an oven. These pellets were put in the oven for 3hrs. Animals were anaesthetized, and four cotton pellets were introduced into the axillae and the groin area on both side. The drugs and extracts were administered orally for seven days at one dose per day on the last day, the animals were sacrificed, and the cotton pellets were taken out and cleaned properly. The weight gain in the cotton pellets was measured, and the % granuloma inhibition was calculated using the below formula.

percentage Inhibition=( Control Group-Test group)/Control group$\times$100

**COMPARISON OF ACTIVITY**

The cotton pellet granuloma is a perfect example of the inflammation that resulted due to the synthesis of prostaglandins and Interleukins. The inflammations were calculated by accessing the weight of the cotton pellets that are segregated due to the weight of the body enzymes and granulomatous growth and cell debris that had aggregated in the pellet [8]. This was also a measure for the inflammation wherein the weight gain in the cotton pellet was directly proportional to the inflammation of the body. This was treated successfully with the help of standard drug and extracts. If it was not treated, this inflammation might turn itself into chronic inflammation, and it affects other organs and organ systems in the body resulting in further damage [9], Table 1 and Figure 1.

The extract at all the doses showed activity comparable to the standard by it showed the best activity at 600mg/kg, and it was higher than the standard

**Table 1: Effect of the extract on the cotton pellet induced inflammation**

| S.No | Groups | Dose (mg/kg) | Cotton pellet Weight (mg) |
|---|---|---|---|
| **1** | Saline Control | 1.2ml | 110.49±0.98 |
| **2** | Indomethacin | 10 | 56.02±0.64* |
| **3** | PA Extract | 100 | 87.91±0.57 |
| **3** | PA Extract | 200 | 86.84±0.52 |
| **4** | PA Extract | 400 | 65.12±0.79* |
| **2** | PA Extract | 600 | 55.03±0.67* |

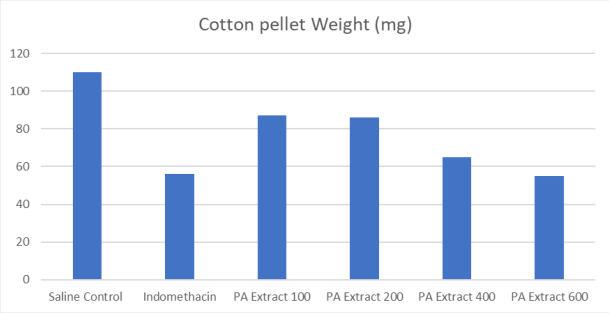


**Figure 1: Effect of the extract on the cotton pellet induced inflammation**

too. This can be supported by the high potency of the drug. As the indomethacin caused the reduction in the weight gain by suppressing the inflammation, this mechanism was due to the inhibition of the prostaglandin synthesis in the site of inflammation that was induced by the cotton pellets [10, 11]. When the extract lowered the inflammation in the same activity, it can be assumed that the extract also acted similarly and the mechanism was also assumed to be the same as compared to the indomethacin which is the inhibition of the synthesis of PG and cytokinin [12, 13].

## CONCLUSION

The plant leaves of *Pistacia atlantica* were extracted with ethanol and water mixture using an ultrasonication. It was tested for the anti-inflammatory potential in various doses like 100, 200, 400 and 600 mg.kg body weight in the swiss albino rats in the cotton pellet induced granuloma method and the extracts showed a significant dose-dependent activity compared with the standard indomethacin drug.

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## Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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