

## EVALUATION OF ANTI-ARTHRITIC ACTIVITY OF *BOSWELLIA SERRATA* METHANOL EXTRACT IN EXPERIMENTALLY INDUCED ARTHRITIS ANIMALS

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**ABSTRACT :** Arthritis is a term often used to mean any disorder that affects the joints. *Boswellia*, also known as Indian frankincense is an herbal extract taken from the *Boswellia serrata* tree, appears to be a novel inhibitor of a pro-inflammatory enzyme called 5-Lipoxygenase and may possess other anti-inflammatory effects. The present study was conducted to evaluate the anti-inflammatory activity for the gum of the plant, *Boswellia serrata*, extracted by employing the following: water, methanol, n-hexane and petroleum ether. Rats of both sexes, in separate cages were given a single oral limit dose of 5,000 mg/kg body weight of the different *Boswellia serrata* gum resins extracts while a control animal received distilled water. Collagen-induced arthritis was used as the method to induce rheumatoid arthritis in the rats by a single injection with an emulsion that contained type II collagen and complete Freund's adjuvant. Plethysmometer was used to detect the paw volume of the animals as a sign of rheumatoid arthritis. This appears after 10–14 days depended the age of animal, the signs included. Statistical analysis was employed by using One-Way ANOVA. In order to determine the *in-vivo* changes, the Assessment of the biochemical markers such as Lipid peroxidase (LPO), Glutathione (GSH), Catalase (Cat), Superoxide dismutase (SOD) and Nitric oxide (NO). Immunological changes that occurred due to the inflammation was estimated by the Assessment of inflammatory markers such as Interleukin 1 Beta (IL-1  $\beta$ ), Interleukin 6 (IL-6), Tumor Necrosis Factor-alpha (TNF- $\alpha$ ), Interleukin 10 (IL-10) and Interferon gamma (IF- $\gamma$ ) using Enzyme-Linked Immunosorbent Assay.

**Key words :** *Boswellia serrata*, arthritis and anti-inflammatory.

### INTRODUCTION

Arthritis is a painful case characterized by inflammation, which leads to pain and toughness in most of the moveable joints of the human body. i.e arthritis is a widespread joint disorder that occurs due to an inflammation (Blackham *et al*, 2017). There are more than 100 diagnosed kinds of arthritis in the world, the most common forms are osteoarthritis and rheumatoid arthritis (Hayer *et al*, 2016). The illness mostly occurs during age and affects moving parts such as fingers, knees and hips. Rheumatoid arthritis is a widespread autoimmune disorder that predominately that affects the moving parts of the human body, for instance hands and feet (Ashbrook, 2016). In order to investigate the importance of such non-steroidal future drugs, it had been decided to study the *Boswellia serrata* various crude extracts on animals that induced by arthritis. To achieve such a purpose, *Boswellia serrata* needs to undergo quantitative and qualitative tests such as TLC, HPLC and GC-MS investigations to evaluate all of the extracts, then evaluation to be done on animals already induced by arthritis using collagen induced arthritis model. Both of

*in-vitro* (human red blood cell membrane stabilization method) and *in-vivo* (Biochemical and immunological tests) examinations have been employed to compare between various animals that were divided into different groups using several scientific criteria.

The treatment of arthritic rats with *Boswellia serrata* and diclofenac sodium has shown noticeable improvement, which is obvious from the reduced pro-inflammatory cytokine and increased enzyme levels. This may be attributed to the potent anti-inflammatory fractions of the pharmacologically active principles present in the plant extract.

In the histopathological study, it had been observed sub-plantar injection of collagen induced arthritis in the form of accumulation of inflammatory cells like neutrophils whereas *Boswellia serrata* treated rats decreased the cellular infiltrates.

### MATERIALS AND METHODS

#### 1. Extraction of natural plant products

All the extracts were screened using phytochemical tests for the existence of different secondary metabolites