

UGC MAJOR RESEARCH PROJECT
(2012 – 2015)
FINAL REPORT

“Purification, Crystallisation and Pharmacological Evaluation of isolated compounds from *Delonixelata*. Linn and *Clerodendrumphlomidis*.Linn for Anti-Arthritic Activity”

Principal Investigator

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FACULTY OF ENGINEERING AND TECHNOLOGY
ANNAMALAI NAGAR - 608 002, TAMIL NADU, INDIA

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EVALUATION OF ISOLATED COMPOUNDS FROM *DELONIXELATA. LINN*
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SUMMARY OF THE FINDINGS

INTRODUCTION

Arthritis is a chronic auto immune disorder that may affect many tissues and organs, blood vessels, heart, lungs, skin, and muscles but principally attack the joints, producing a non suppressive proliferative and inflammatory synovitis that often progress to destruction of the articular cartilage and ankylosis of the joints (Mottonen, 1988). Although the cause of arthritis remains unknown, auto immunity plays a pivotal role in its chronicity of and progression.

SCOPE AND OBJECTIVE

The present study is focused to screen antinociceptive, anti-inflammatory and anti-arthritic activities of *Delonix elata* and *Clerodendrum phlomidis* belonging to the family Caesalpiniaceae and Verbenaceae respectively. The plant material extracted with suitable solvent system and chromatographic methods were employed in the separation of compounds from the extract. The isolated compound possesses analgesic, anti-inflammatory and anti-arthritic activity in order to verify the traditional uses of these ethnomedical plants.

The specific objectives of this study are as follows:

- i. Identification, authentication and collection of *Delonix elata* and *Clerodendrum phlomidis*.
- ii. Extraction of the powdered leaves of the plant using ethanol by hot continuous extraction method.
- iii. Preliminary phytochemical screening of the crude extracts. Isolation of phytoconstituents responsible for anti-arthritic activity by column chromatography and further separation by thin layer chromatography.
- iv. Characterization of anti-arthritic compounds using modern analytical techniques such as IR, NMR and Mass spectra.
- v. Acute and subacute toxicity studies For isolated compound from *Clerodendrum phlomidis*. From the literature the compound DEC1 showed maximum dose on 500 mg/kg.
- vi. Evaluation of antinociceptive and anti-inflammatory activities of DEC1 and CPC1 in mice and rat.

- vii. Evaluation of anti-arthritic activity of DEC1 and CPC1 from *Delonix elata* and *Clerodendrum phlomidis*. for Biochemical evaluation of blood serum of test animals.
- viii. Histopathological evaluation of the specimens (hind limb paw) of animals.
- ix. Radiological evaluation to assess the anti-arthritic activity DEC1 and CPC1 from *Delonix elata* and *Clerodendrum phlomidis*.

SUMMARY OF THE WORK

- Acute toxicity studies of CPC1 showed no mortality upto 2000 mg.kg⁻¹body weight of mice. The sub-acute toxicity studies with rats showed no changes in hematological and biochemical parameters for CPC1. From the literature the compound DEC1 showed maximum dose observed in 500 mg/kg.
- The isolated compounds of DEC1 and CPC1 acting through centrally stated that the analgesic effect of the isolated compounds create in both the models suggests that they have been acting through central and peripheral mechanism.
- Anti-inflammatory of DEC1 & CPC1 effect may be via the inhibition of the synthesis of kinins and prostaglandins in phase II and phase III respectively, since the extract produced its effect after 2 hrs.
- DEC1 and CPC1 on complete Freund's adjuvant induced arthritic rat model and the study also evaluated the possible mechanism involved in the inhibition of arthritis by the active principles. The results of the study showed that both DEC1 and CPC1 significantly reduced the inflammation and arthritis at doses of 50 and 100 mg.kg⁻¹body weight.
- DEC1 and CPC1 on complete Freund's adjuvant induced arthritic rat model inflammation and arthritis was also evaluated using histopathological and radiological examination. The results of histopathological study showed that the DEC1 and CPC1 prevented cartilage erosion and bone destruction. Radiological examinations supported the results of histopathological study. Since the results of radiological study showed that the DEC1 and CPC1 prevented cartilage erosion, bone destruction and the degree of swelling, the changes in the bone and cartilages destruction were estimated as a measure of X-ray film density.

CONTRIBUTION TO THE SOCIETY

Hence, in the present investigation an attempt has been made to find out safe, cheap and natural phytomedicines which are available in the environment of the diseased itself. These phytomedicines are used as nutritive supplements in a very simple way to find out their therapeutic efficacies, in order to do away with the synthetic modern medicines. The results are supposed to be contributing to the health of everybody suffering from arthritis in India.

ACHIEVEMENTS FROM THE PROJECT

In accordance with widely believed concept that the isolated compound from the plant gives a balanced biological effect than a synthetic drug, the present study also revealed that the isolated compound (DEC1&CPC1) have anti-arthritic activity as well as anti-inflammatory and analgesic activity. However there is no report of anti-arthritic activity rfor above selected plants. This may be due to the fact the plants have various chemical constituents, some may act as an anti-arthritic activity.

The mechanism in which, the anti-arthritic and anti-inflammatory activities produced by the DEC1 and CPC1 were analyzed using indomethacin as a standard drug. Since it reduces the production of prostaglandin by blocking the cyclooxygenase (COX-1, COX-2), which leads to reduction of pain and inflammation. The herbal formulation and standard drug indomethacin showed almost same for anti-arthritic and anti-inflammatory activity with respect to the paw volume.