

## **Mistletoe fig (*Ficus deltoidea* Jack) leaf extract prevented postmenopausal osteoarthritis by attenuating inflammation and cartilage degradation in rat model**

### ABSTRACT

#### Objective:

*Ficus deltoidea* Jack (mistletoe fig) is an ornamental plant found in various parts of the world and used as traditional herbal medicine in some countries. This study investigated the potential use of *F deltoidea* leaf extract to mitigate osteoarthritis (OA) in ovariectomized (estrogen-deficient postmenopausal model) rats and the mechanisms involved. Diclofenac was used for comparison.

#### Methods:

Sprague-Dawley female rats (12 weeks old) were divided randomly into five groups (n = 6): healthy; nontreated OA; OA + diclofenac (5 mg/kg); OA + extract (200 mg/kg); and OA + extract (400 mg/kg). Two weeks after bilaterally ovariectomy, OA was induced by intra-articular injection of monosodium iodoacetate into the right knee joints. After 28 days of treatment, the rats were evaluated for knee OA via physical (radiological and histological observations), biochemical, enzyme-linked immunosorbent assay, and gene expression analysis, for inflammation and cartilage degradation biomarkers.

#### Results:

The osteoarthritic rats treated with the extract, and diclofenac showed significant reduction of cartilage erosion (via radiological, macroscopic, and histological images) compared with untreated osteoarthritic rats. The elevated serum interleukin-1 $\beta$ , prostaglandin E<sub>2</sub>, and C-telopeptide type II collagen levels in osteoarthritic rats were significantly reduced by *F deltoidea* leaf extract comparable to diclofenac. The extract significantly down-regulated the interleukin-1 $\beta$ , prostaglandin E<sub>2</sub> receptor, and matrix metalloproteinase-1 mRNA expressions in the osteoarthritic cartilages, similar to diclofenac.

#### Conclusions:

*F deltoidea* leaf extract mitigated postmenopausal osteoarthritic joint destruction by inhibiting inflammation and cartilage degradation enzymes, at an effective extract dose equivalent to about 60 mg/kg for humans. The main bioactive compounds are probably the antioxidative flavonoids vitexin and isovitexin.

**Keyword:** Articular cartilage; *Ficus deltoidea*; Inflammation; Osteoarthritis; Ovariectomy; Rat