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In vivo Studies on Antiarthritic Activity of *Cissus quadrangularis* against Adjuvant Induced Arthritis

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Abstract

Objective: Arthritis is a chronic crippling, skeletal and muscular disorder having quite similar symptoms as that of rheumatoid arthritis (RA) for which currently there is no medicine available for permanent cure. Even modern drugs used for the amelioration of the symptoms, offer only temporary relief but produce severe side effects. In the indigenous system of medicine, *Cissus quadrangularis* (CQ) has been reported to be useful in the treatment of arthritis. However, no systematic study had been reported regarding its anti-arthritic activity. Hence, this work has been aimed at the scientific validation of its ethno-pharmacological claim about anti-arthritic efficacy.

Methods: In the present study, anti-arthritic activity of AFCQ (Active Fraction of *Cissus quadrangularis*) obtained from acetone extract of *Cissus quadrangularis* has been reported by employing CFA (Complete Freund's Adjuvant) induced arthritis model in Wistar rats as an *in vivo* experimental model. Rat paw edema was induced by carrageenan and altered hematological and biochemical parameters were determined.

Results: AFCQ at the dose of 100 mg/kg body weight was found to be more efficient in inhibiting the rat paw edema as comparable to standard drugs celecoxib and methotrexate. The results had indicated that AFCQ possesses a significant anti-arthritic activity against CFA induced arthritis. Results were analyzed through histopathology and radiography.

Conclusion: The results of above experiments revealed that AFCQ was more effective as anti-arthritic drug as compared to celecoxib and methotrexate, in CFA induced arthritic rats.

Keywords: *Cissus quadrangularis*; Antiarthritic activity; CFA; DMARDs; NSAIDs

Introduction

Arthritis is one of the most common medical problems in the world. Many people throughout the world are affected with arthritis and other rheumatic conditions. At present there exists only treatment for arthritis, but no permanent cure. Osteoarthritis is a degenerative form of arthritis which occurs when the cartilaginous lining that cushions the ends of bones in joints get deteriorated, leaving bones to rub against each other. RA on the other hand, is not associated with wear and tear. It is an autoimmune disease in which an autoimmune response gets stimulated against the joints [1,2]. The inflammatory mediators digest the cartilages, bones, tendons and ligaments. These mediators are inhibited by many or various families of anti-inflammatory drugs, which include the non-steroidal anti-inflammatory drugs (NSAIDs). This class of drug, of which aspirin is a member, inhibits inflammation by interfering with an inflammatory mediator enzyme known as cyclooxygenase (COX). Cyclooxygenases are of two types; cyclooxygenase-1 (COX-1) and cyclooxygenase-2 (COX-2). Out of these, COX-2 has been considered to be more dangerous than COX-1. Clinical trials demonstrate that although NSAIDs are effective in decreasing the symptoms associated with arthritis but they increase the gastrointestinal ulcerations [3]. Another very common COX-2 inhibitor is Vioxx (Rofecoxib) which specifically inhibits COX-2, but Vioxx was verified to increase the risk of heart attack, stroke and serious cardiovascular problems [4]. The current treatment of RA is intended to minimize the associated pain and inflammation using non-steroidal anti-inflammatory drugs (NSAIDs) as well as to decelerate the progress of the disease by using disease-modifying anti rheumatic drugs (DMARDs). DMARDs suppress the immunological reactions involved in the progression of RA. Drugs that manifest the effects of both DMARDs and NSAIDs will be more effective in the treatment of RA, but there is a scarcity of such drugs acting through multiple mechanisms to bring about the cure of RA. Hence, the treatment of RA involves the combined use of NSAIDs and DMARDs [5]. RA is an autoimmune disease, which is chronic, affecting the people of all ethnic groups worldwide. Even though various categories like immunosuppressants, NSAIDs, steroidal anti-inflammatory drugs are being used till now, but due to severe adverse effects of these drugs, the development of new anti-arthritic drugs are aimed towards the discovery of safe, potent drugs with minimal side effects. Hence, complementary and alternative medicines are commonly preferred in this context [6]. In Indian system of traditional medicine, employment of medicinal plants, as a re-emerging health aid, has been fuelled by the rising costs of prescription drugs in the maintenance of personal health and well-being and the bio prospecting of new plant derived drugs has been taken up seriously [2]. This fact improves the thought that believes the emergence of serious infectious diseases that might best be met with new anti-infective agents from traditional plant remedies [7]. This has greatly