**Analgesic and Anti-Inflammatory Activities of Aqueous Extracts of Fructus Ligustri Lucidi**

GUAN-JHONG HUANG¹, MING-HSING HUANG², CHUAN-SUNG CHI¹⁴, SHYH-SHYUN HUANG¹, PEI-HSIN SHIE¹, MING-TSUNG YEN³* AND BOR-SEN WANG³*

¹ School of Chinese Pharmaceutical Sciences and Chinese Medicine Resources, College of Pharmacy, China Medical University, Taichung, Taiwan, R.O.C.
² Department of Cosmetic Science and ³ Department of Applied Life Science & Health, Chia Nan University of Pharmacy and Science, Tainan, Taiwan, R.O.C.
⁴ Nursing Department, Hsin Sheng College of Medical Care and Management, Taoyuan, Taiwan, R.O.C.

(Received: November 11, 2011; Accepted: February 24, 2012)

**ABSTRACT**

*Fructus Ligustri Lucidi* has been used for its anti-inflammatory effects in traditional Chinese medicine. This study investigated the analgesic and anti-inflammatory effects of aqueous extracts of *Fructus Ligustri Lucidi* (AFLL) in mice. AFLL significantly inhibited the production of radicals and lipid oxidation in various models. The reference compounds present in AFLL, including quercetin, myricetin, caffeic acid, gallic acid and ellagic acid, exhibited the pharmacological activities by scavenging radicals and decreasing LPS-induced nitric oxide (NO) production in macrophages. Administration of AFLL showed a concentration dependent inhibition on the number of acetic acid-induced writhing responses and formalin-induced pain in the late phase, and paw edema development after Carr treatment in mice. The anti-inflammatory activities of AFLL could be via NO and tumor necrosis factor α (TNF-α) suppression and associated with the increase in the activities of catalase (CAT), superoxide dismutase (SOD) and glutathione peroxidase (GPx). Western blotting revealed that AFLL decreased Carr-induced inducible nitric oxide synthase (iNOS) and cyclooxygenase-2 (COX-2) expressions. These results suggest that anti-inflammatory mechanisms of AFLL might be correlated to the decrease in the level of malondialdehyde (MDA), iNOS and COX-2 in the edema paw via increasing the activities of CAT, SOD and GPx in the liver. Overall, the results showed that AFLL could serve as a natural source of antioxidant, analgesic and anti-inflammation.

Key words: Fructus Ligustri Lucidi, antioxidant, analgesic, NO, anti-inflammation

**INTRODUCTION**

Intracellular antioxidant mechanisms against inflammatory stresses involve antioxidant enzymes of catalase (CAT), superoxide dismutase (SOD) and glutathione peroxidase (GPx) in tissues. Recently, it has been shown that faulty cellular antioxidant systems cause organisms to develop a series of inflammatory and cancer diseases(1). However, it appears that the various roles of enzymatic antioxidants help to protect organisms from excessive generation of oxidative and nitrative stress in the inflammatory process(2). This has triggered studies focusing on the role of natural products in suppressing the production of oxidation by increasing enzymatic antioxidants in tissues(3).

Inflammation is recognized as a biological process in response to tissue injury. At the injury site, an increase in blood vessel wall permeability followed by migration of immune cells can lead to edema formation during inflammation. Meanwhile, many other mechanisms such as the production of reactive nitrogen species (RNS) and proinflammatory cytokines are activated and exacerbate the inflammatory damage. The inflammation model of a carrageenan (Carr) induced edema is usually used to assess the contribution of natural products in resisting the biochemical changes associated with acute inflammation. Carr can induce acute inflammation beginning with the infiltration of phagocytes, the production of free radicals as well as the release of inflammatory mediators(4). Therefore, free radicals are recognized as the reactive species in inflammation induced biological damage. They are generated under oxidative and nitrative stress(5). Oxidative and nitrative stress derived not only from disequilibrium cellular