

Anti-inflammatory and antimicrobial activity of Shikonin derivatives from *Arnebia hispidissima* (Lehm.) DC.

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Abstract

Arnebia hispidissima roots have been used traditionally for the treatment of ulcers, boils, cuts, heart ailments and headache, fever, tongue and throat troubles. The purpose of this study was to characterize the most potent phytochemicals present in the ethyl acetate extract having anti-inflammatory and antimicrobial activity using carrageenan and CFA model. The observed results revealed that shikonin isovalerate showed most potent anti-inflammatory effects (60.5%) at the dose of 5.0 mg/kg at 6 h after carrageenan injection. Moreover, the maximum inhibition rate was observed of isovaleryl shikonin (61.2%) at the dose of 10 mg/kg at 8 day after CFA injection. The strong antibacterial activity was showed by shikonin isovalerate at 20 µg/ml dose against *E. cloacae* and β,β-dimethylacryl shikonin demonstrated maximum antifungal activity against *C. albicans* at the dose of > 65 µg/ml.

Keywords: *Arnebia hispidissima*; anti-inflammatory activity; antimicrobial activity; shikonin derivatives; carrageenan and CFA models;

Introduction

Arnebia hispidissima is a perennial grass widely distributed in India, Persia, Pakistan and drier parts of Rajasthan (India). Roots are used in ulcers, boils, cuts, for heart ailments, headache, fever, water extract of flowering shoot is known for tongue and throat troubles, cardiac complaints, while the whole plant was used as a stimulant, tonic, diuretic and expectorant (Chopra et al., 1956; Kirtikar and Basu, 1967; Anonymous, 1985; Annon, 1979; Jain and Defilipps, 1991; Trivedi, 2005; Boktapa and Sharma, 2010). The phytochemical studies revealed that the roots contain a dl-alkannin, a crystalline red solid, from *A. euchroma* (Romanova et al., 1968; Fu et al., 1984; Sharma et al., 2009; Song et al., 2010), arnebin derivatives have also been isolated from *A. nobilis* (Shukla et al., 1973), β-hydroxyisovalerate and alkanin from *A. hispidissima* (Khan et al., 1983; Singh et al., 2004), and shikonin production has well documented by hairy root cultures (Choudhary and Pal, 2010; Pal and Choudhary, 2010). The ethanolic extract of *A. euchroma* provided tormentic acid, 2α-hydroxyursolic acid