The antinociceptive and anti-inflammatory effects of *Salvia officinalis* leaf aqueous and butanol extracts

Esam Y. Qnais¹, Mohamed Abu-Dieyeh¹, Fuad. A. Abdulla², and Shraywy S. Abdalla³

¹Department of Biology and Biotechnology, Faculty of Science, Hashemite University, Zarqa, Jordan, ²Department of Physical Therapy, School of Health Professions, Behavioral and Life Sciences, New York Institute of Technology, Amman, Jordan, and ³Department of Biological Sciences, Faculty of Science, University of Jordan, Amman, Jordan

Abstract

**Context:** The leaf of sage *Salvia officinalis* L. (Lamiaceae) is reputed in the folk medicine of Arabia, and Jordan in particular, to relieve pain associated with gastrointestinal disturbance.

**Objectives:** Evaluation of the antinociceptive and anti-inflammatory activities of aqueous and butanol extracts of *S. officinalis* leaf.

**Materials and methods:** The analgesic effects of the aqueous extract (10, 31.6, 100, 316, 1000 mg/kg) and butanol extract (10, 31.6, 100, 316 mg/kg) were studied using the hot-plate test for mice and the formalin-induced paw licking in rats. The effects were compared to those of morphine and the influence of naloxone on these effects was also evaluated. The same concentrations of both extracts were used to evaluate their anti-inflammatory effects using the cotton pellet granuloma and carrageenan-induced paw edema in rats.

**Results:** The aqueous extract (10, 31.6, 100, 316, 1000 mg/kg) and butanol extract (10, 31.6, 100, 316 mg/kg) caused analgesic effect in the hot-plate latency assay as well as in early and late phases of formalin-induced paw licking in rats. These effects were reduced by the opioid receptor antagonist, naloxone (5 mg/kg). The same range of doses of both extracts caused dose-dependent inhibition of carrageenan-induced paw edema in rats as well as inhibition of cotton pellet granuloma.

**Discussion and conclusion:** These observations suggest that the sage leaf aqueous and butanol extracts have analgesic and anti-inflammatory effects, confirming the traditional use of this plant for pain alleviation.

**Keywords:** Naloxone; hot plate test; carrageenan-induced inflammation; formalin-induced paw edema; cotton pellet granuloma; opioid receptors.