The potential effect of the extract of *Crocus sativus* and safranal on the total and differential white blood cells of ovalbumin-sensitized guinea pigs

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Abstract

Previous studies have indicated relaxant, inhibitory effect on histamine (H1) and muscarinic receptors, and stimulatory effect on β-drenoceptor of *Crocus sativus* on guinea pig tracheal chains. In the present study, the effect of the extract of *C. sativus* and one of its constituents, safranal, on the inflammatory changes of sensitized guinea pigs was examined. Eight groups of sensitized guinea pigs to ovalbumin were studied. One group was given drinking water alone (group S), while other 7 groups were received drinking water containing; three concentrations of safranal (4, 8 and 16 µg/ml), three concentrations of extract (0.1, 0.2 and 0.4 mg/ml) and one concentration of dexamethasone (S+D group), (six animal in each group). Total and differential white blood cell (WBC) counts in blood were evaluated. Total blood WBC number, eosinophyl and lymphocyte percentage in blood were increased, but neutrophil decreased in sensitized animals compared to those of control groups (P<0.05 to P<0.001). Treatment of animals with dexamethasone, all concentrations of the extract and safranal significantly improved most types of WBCs but total WBC number was only decreased in treated groups with dexamethasone and high concentration of the extract compared to group S (P<0.05 to P<0.001). Safranal was more effective in the improvement of eosinophil and lymphocyte compared to the extracts (P<0.001 for both cases). However, the preventive effect of the extract of *C. sativus* on total WBC count was more prominent than that of the safranal (P<0.01). These results showed a preventive effect of the extract of *C. sativus* and its constituent safranal on total and differential count of WBC in blood of sensitized guinea pigs. The results also suggest that the effect of the plant is perhaps due to its constituent of safranal.

Keywords: *Crocus sativus*; Safranal; Asthma; Sensitization; Inflammation; WBC

INTRODUCTION

The main pathological characteristic feature of asthma is airway inflammation (1). Many inflammatory cells are involved in the pathogenesis of airway inflammation in asthma (2). These cells overproduce reactive oxygen species (superoxides, hydrogen peroxide and hypohalites, etc.) which lead to airway inflammation (2). Increased total WBC and eosinophil count in sensitized animals (3) and asthmatic patients (4) were also shown. Mainly two types of drugs including bronchodilators and anti-inflammatory or preventive drugs are used for the treatment of asthma. However, there is no definite treatment for this common disease.

*Crocus sativus* L, known as saffron, is a small perennial plant from the iris family (Iridaceae) which is cultivated in many regions of the globe mainly in Iran. Crocins, safranal, picrocrocin, ketoisophorone, isophorone, glycosidic terpenoids and crocetin are constituents of the stigma of the plant (5). The central part of the flower (female sexual organ) or stigma of *C. sativus* (Saffron) is used as antispasmodic and expectorant in the traditional medicine (6,7).