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Relaxant effect of *Crocus sativus* (saffron) on guinea-pig tracheal chains and its possible mechanismsBoskabady, M.H.^{ab}, Aslani, M.R.^a^a Department of Physiology, Ghaem Medical Centre, Mashhad University of Medical Sciences, Mashhad, Iran^b Department of Physiology, Ghaem Medical Centre, Mashhad, Post Code 91735, Iran

Abstract

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As indicated in ancient Iranian medical books. *Crocus sativus* has therapeutic effects on respiratory diseases. The relaxant effect of this plant has been observed also on smooth muscles in previous studies. Therefore, in this study the relaxant effects of aqueous-ethanolic extracts of *C. sativus* and one of its main constituents, safranal, were examined on guinea-pig tracheal chains. The relaxant effects of four cumulative concentrations of aqueous-ethanolic extract (0.15, 0.3, 0.45, and 0.60 g %) and safranal (0.15, 0.30, 0.45, and 0.60 mL 0.2 mg mL⁻¹ solution) in comparison with saline, as negative control, and four cumulative concentrations of theophylline (0.15, 0.30, 0.45, and 0.60 mM), as positive control, were examined using guinea-pig precontracted tracheal chains. The tracheal chains had been precontracted by three different methods. Group 1 had been precontracted using 10 μM methacholine. The other two groups had been precontracted using 60 mM KCl at two different conditions: non-incubated tissues (group 2) and tissues incubated with 1 μM propranolol, 1 μM chlorpheniramine and 1 μM atropine (group 3) (for each group, n = 6). In group 1 all concentrations of theophylline, extract and safranal showed significant relaxant effects compared with saline (P<0.05 to P<0.001). In group 2 theophylline, extract and safranal showed concentration-dependent relaxant effects also compared with saline (P<0.05 to P<0.001 for different concentrations except two low concentrations of safranal). However, in group 3 the extracts of *C. sativus* showed a weak relaxant effect (P<0.05 only for the highest concentration). The effects of the last concentration of safranal (0.60 mL 0.2 mg mL⁻¹ solution) in group 1, and all its concentrations in group 2 were significantly lower than those of theophylline (P<0.05 to P<0.001). In addition, the effects of safranal 0.45 and 0.60 mL 0.2 mg mL⁻¹ solution in groups 1 and 2 were significantly lower than that of *C. sativus* extract. There were significant correlations between the relaxant effects and concentrations for extract, safranal and theophylline in all experimental groups (P<0.001 for all cases). These results showed a potent relaxant effect of *C. sativus* on tracheal chains of guinea-pigs that was comparable to or even higher than that of theophylline at the concentrations used. The results indicated that safranal was, at least in part, responsible for the relaxant effect of *C. sativus*. © 2006 The Authors.

Reaxys Database Information

Indexed Keywords

EMTREE drug terms: alcohol; atropine; chlorpheniramine; crocin; *Crocus sativus* extract; methacholine; propranolol derivative; safranal; sodium chloride; theophylline; unclassified drug

EMTREE medical terms: animal experiment; animal tissue; article; bronchodilating activity; controlled study; drug activity; drug effect; drug mechanism; male; nonhuman; trachea

MeSH: Animals; Bronchi; Bronchodilator Agents; Carotenoids; *Crocus*; Cyclohexenes; Dose-Response Relationship; Drug; Ethanol; Guinea Pigs; Male; Muscle Relaxation; Muscle, Smooth; Phytotherapy; Plant Extracts; Sodium Chloride; Terpenes; Theophylline; Water
Medline is the source for the MeSH terms of this document.

Chemicals and CAS Registry Numbers: alcohol, 64-17-5; atropine, 51-55-8, 55-48-1; chlorpheniramine, 132-22-9; crocin, 39465-00-4, 42553-65-1; methacholine, 55-92-5; sodium chloride, 7647-14-5; theophylline, 58-55-9, 5967-84-0, 8055-07-0, 8061-56-1, 99007-19-9; Bronchodilator Agents; Carotenoids, 36-88-4; Cyclohexenes; Ethanol, 64-17-5; Plant Extracts; Sodium Chloride, 7647-14-5; Terpenes; Theophylline, 58-55-9; Water, 7732-18-5; crocin, 42553-65-1; safranal, 116-26-7

Manufacturers: Drug manufacturer: Fluka, Switzerland; Sigma, United Kingdom.

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