

The Contribution of Water and Lipid Soluble Substances in the Relaxant Effects of *Nigella sativa* Extract on Guinea Pig Tracheal Smooth Muscle (*in vitro*)

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Abstract

Objective

In previous studies, the relaxant, anticholinergic (functional antagonism), antihistaminic and its stimulatory effects on β -adrenoceptors of *Nigella sativa* have been demonstrated on guinea pig tracheal chains. In the present study, the relaxant effects of hydro-ethanolic, macerated aqueous (MA) and lipid-free macerated aqueous (LFMA) extract of *Nigella sativa* on tracheal chains of guinea pigs were examined.

Materials and Methods

The relaxant effects of four cumulative concentrations of each extract (0.8, 1.2, 1.6 and 2.0 g%) was compared with saline as negative control and four cumulative concentrations of theophylline (0.2, 0.4, 0.6 and 0.8 mM) on precontracted tracheal smooth muscle of guinea pig (60 mM KCl in group 1 and 10 μ M methacholine in group 2, n=6 for each group).

Results

In group 1 all concentrations of theophylline, the last two concentrations of MA and the last three concentrations of LFMA extracts showed significant relaxant effects compared to that of saline ($p < 0.05$ – $p < 0.005$). Two final concentrations of hydro-ethanolic extract caused contraction in comparison with saline in this group. In group 2 all concentrations of theophylline, MA and LFMA and the last three concentrations of hydro-ethanolic extracts showed significant relaxant effects relative to that of saline ($p < 0.005$ – $p < 0.001$). The relaxant effect of different concentrations of MA, the last three concentrations of hydro-ethanolic and LFMA extract was significantly greater in group 2 as compared with group 1. However, there was no significant difference in the relaxant effect of different concentrations of theophylline, between group 1 and 2. In both groups, the relaxant effect of most concentrations of MA, hydro-ethanolic LFMA extracts was significantly less than those of theophylline ($p < 0.05$ – $p < 0.001$). In group 1 and 2, the relaxant effect of all concentrations of hydro-ethanolic extract was significantly lower than most concentrations of others ($p < 0.05$ – $p < 0.01$). There was a significant positive correlations between the relaxant effects and concentrations for theophylline and all extracts (except hydro-ethanolic extract in group 1) in both groups ($p < 0.05$ – $p < 0.001$).

Conclusion

These results showed that mainly water soluble substances of *Nigella sativa* were responsible for the relaxant effect of the plant on tracheal chains of guinea pigs.

Keywords: Guinea pig, Hydro-ethanolic extract, Lipid-free macerated aqueous extract, Macerated aqueous extract, *Nigella sativa*, Relaxant effect, Trachea

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