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SHORT COMMUNICATION

Evaluation of Antihistaminic and Anticholinergic Activities of *Murraya koenigii* Linn.

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A B S T R A C T

This study was designed to evaluate antihistaminic and anticholinergic activities of *Murraya koenigii* leaves. To observe the activities ethanolic (Mk.Eth) and aqueous (Mk.Aq) extracts of *M. koenigii* through *in vitro* analysis, isolated guinea pig ileum, rabbit trachea and jejunum tissues were used and tissues responses were recorded by Power Lab data acquisition system connected with isotonic or isometric transducers. Mk.Eth and Mk.Aq showed rightward shift in histamine concentration response curves at 0.1-0.3mg/ml, when tested on isolated guinea pig ileums. Both extracts also relaxed carbachol (1µM) induced pre contracted isolated rabbit trachea and jejunum tissue, dose dependently but a more potent effect was observed with aqueous extract of *M. koenigii*. Keeping in view all the results, presence of antihistaminic and anticholinergic activities in aqueous and ethanolic extracts of *M. koenigii* leaves can be strongly suggested that provides sound basis for application of *M. koenigii* in airways and gastrointestinal disorders.

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INTRODUCTION

Murraya koenigii (Rutaceae) locally known as Curry Patta, used in cooking for flavor, aroma and also in many Ayurvedic and Yunani medicines (Parul *et al*., 2012). A lot of scientific studies have proven the medicinal importance of *M. koenigii* as antidiabetic, antidiarrheal, antimicrobial, antioxidant, antiulcerant, cholesterol lowering and cytotoxic agent (Handral *et al*., 2012).

The present study was undertaken to investigate antihistaminic and anticholinergic activities of *M. koenigii* by using isolated guinea pig's ileum, rabbit trachea and jejunum on Power Lab Data Acquisition System.

MATERIALS AND METHODS

Murraya koenigii leaves were collected locally and were powdered after shade drying. Ethanolic extract of *M. koenigii* (Mk.Eth) was prepared by decoction (Anupama *et al.*, 2012) and aqueous extract (Mk.Aq) by cold maceration method (Chaudhary *et al*., 2012). Rabbits and guinea pigs were housed in the animal shed of Department of Pharmacology and Toxicology, University of Veterinary and Animal Sciences (UVAS), Lahore, under the guidelines of ethical committee of UVAS. Animals were kept on fasting for 24 hours before experiment but were given access to water *ad libitum*. Minimum three animals were used with at least triplicate reproducible replications for each experimental protocol to confirm the credibility of results.

Isolated tissues of guinea pig ileum, rabbit trachea and jejunum were prepared as described by Al-Khalil *et al*. (1990). Animals were slaughtered by cervical dislocation and tissues were dissected out. Small segment of tissue were cut and hanged in tissue organ bath, filled with physiological solution, aerated with carbogen and maintained at 37±0.5°C temperature. Then tissues were left to equilibrate for half an hour under the load of 1 gram. To observe the effect, tissues were attached with the isometric or isotonic transducers, connected with Power Lab data acquisition system.

Concentration response curves of histamine in the absence and presence of Mk.Eth and Mk.Aq were constructed to observe antihistaminic activity. To observe the anticholinergic effect, Mk.Eth and Mk.Aq were administered on carbachol (1µM) induced pre contracted isolated rabbit trachea and jejunum. The data were analyzed statistically by using ANOVA and paired t-test to find out the level of significance ($P<0.05$).

RESULTS AND DISCUSSION

When tested on isolated guinea pig ileums, Mk.Eth and Mk.Aq showed dose dependent (0.1-0.3 mg/ml) rightward shift in histamine concentration response curves (Fig. 1). A dose dependent inhibitory effect was shown by Mk.Eth and Mk.Aq when tested on carbachol (1µM) induced pre contracted isolated rabbit trachea. Both extracts completely relaxed trachea on same dose 3mg/ml with EC_{50} value 0.77 mg/ml (0.62-0.96, 95% CI) and 0.19 mg/ml (0.07-0.51) (Fig. 2A). When tested on isolated rabbit jejunum, Mk.Eth and Mk.Aq showed concentration dependent inhibition of carbachol (1µM) induced contractions in isolated rabbit jejunum and complete relaxation was noted at the dose of 10 and 5 mg/ml with EC_{50} value 2.76 mg/ml (1.96-3.97) and 1.46 mg/ml (0.96-2.21) respectively (Fig. 2B).

In the view of aim of present study, the ethanolic (Mk.Eth) and aqueous extracts of *M. koenigii* (Mk.Aq) were subjected to pharmacological investigation for possible antihistaminic and anticholinergic activities. To evaluate antihistaminic activity, histamine concentration response curves were constructed in the absence and presence of Mk.Eth and results showed a rightward shift of histamine concentration response curve indicates the presence of antihistaminic activity in ethanolic extract of *M. koenigii* similar to of antihistaminic effect of ethanolic extract of *Embelia ribes*, as previously reported by Anupama *et al.* (2012). Antihistaminic results of ethanolic extract of *M. koenigii* were also found analogous to results of polyherbal formulation, in which *M. koenigii* was used in combination with three (*Solanum xanthocarpum, Aegle marmelos, Caeslpinia bonduc*) plants (Sachin *et al.*, 2010). Presence of antihistaminic effect was further strengthened when comparable antihistaminic results were shown by Mk.Aq.

Carbachol binds to muscarinic receptors to express its cholinergic effects and to get its antagonistic effects extract have to compete for the same receptors (Brown and Laiken, 2011). So when subjected to charbachol (1 µM) induced contractions in isolated rabbit tracheal tissue, Mk.Eth showed a dose dependent inhibition (0.01-3mg/ml), indicates the presence of anticholinergic effect in ethanolic extract of *M. koenigii*. Whereas Mk.Aq also relaxed the pre contracted tracheal tissue at the same does (3mg/ml) but with more suppression of curve as compare to Mk.Eth, raised the assumption that perhaps aqueous extract contain more potent anticholinergic constituent(s). This hypothesis was strongly supported by the results, when extracts were tested on isolated rabbit jejunum, where Mk.Aq completely relaxed tracheal tissue at earlier does (5mg/ml) than Mk.Eth (10mg/ml).

Among inflammatory mediators, histamine has important role. It acts as mucus production inducer and significantly contributes to bronchial obstruction (Shioya *et al*., 2004). Secondly, cholinergic activation can cause bronchoconstriction (Rehman *et al*., 2012) and also responsible for hyperactive GI disorders like diarrhea and abdominal cramps (Chaudhary *et al*., 2012). So the present study provides sound basis for application of *M. koenigii* in airways and gastrointestinal disorders. Keeping in view the results it can be strongly suggested that further work regarding isolation of the constituents and determining the mechanism of action may be a good addition in future.

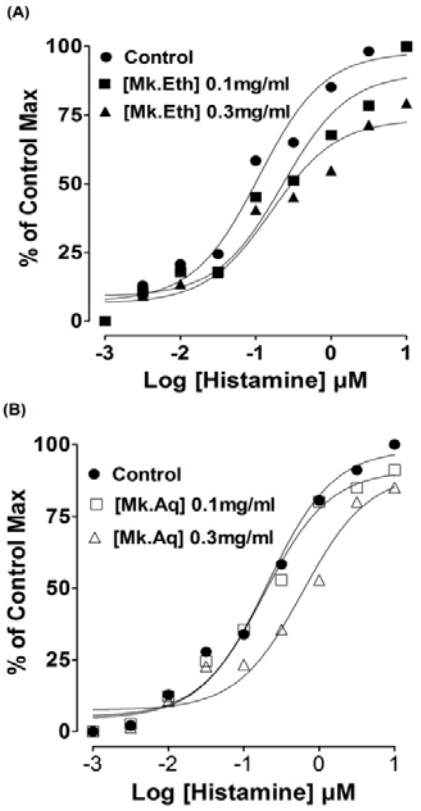

Fig. 1: Concentration response curves of histamine in the absence and presence of (A) ethanolic (Mk.Eth) and (B) aqueous (Mk.Aq) extract of *M. koenigii* on isolated guinea pig ileum.

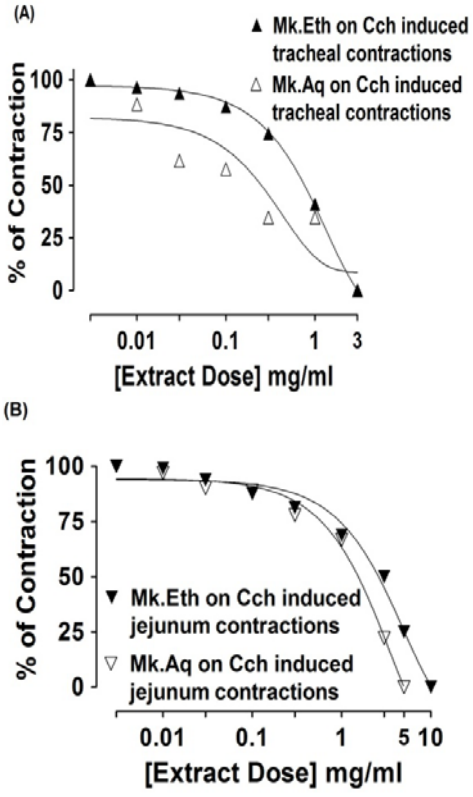

Fig. 2: Dose dependent inhibitory effect of ethanolic (Mk.Eth) and aqueous (Mk.Aq) extracts of *M. koenigii* on carbachol (1µM) induced contractions in isolated rabbit (A) trachea and (B) jejunum.

Conclusion: The data strongly suggest the presence of antihistaminic and anticholinergic activities in aqueous and ethanolic extracts of *M. koenigii* leaves, which can be useful in the management of gastrointestinal and airway disorders.

Author's contribution: HMQ, MOO, MA executed and designed the experiments. AB and MAC executed the data from Power Lab Data Acquisition System. MSI dissected out the tissues and preserved for data analysis.

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