



## ANTIEMETIC ACTIVITY OF SOME AROMATIC PLANTS

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### ABSTRACT

Current study was conducted to explore the antiemetic activity of ten aromatic medicinal plants viz., *Carissa carandus* L. (fruits), *Chichorium intybus* L. (flowers), *Cinnamum tamala* L. (leaves), *Curcuma caesia* Roxb. (rhizomes), *Lallemantia royleana* Benth. (leaves), *Matricaria chamomila* L. (flowers), *Piper longum* L. (fruits), *Piper methysticum* G. Forst. (fruits), *Piper nigrum* Linn. (fruits) and *Syzygium aromaticum* (Linn.) Merr. & Perry (flowering buds) was studied using chick emetic model. The ethanol extracts of these plants were administered at 150 mg/kg body weight orally. Domperidone was given at 100 mg/kg as a reference drug. All the extracts decrease in retches induced by copper sulphate pentahydrate given orally at 50 mg/kg body weight and showed comparable antiemetic activity with domperidone. Compound targeted antiemetic activity is further suggested.

**KEY WORDS:** Anti-emetic activity, aromatic plants, chick emetic model, domperidone, peripheral emesis.

### INTRODUCTION

Emesis or vomiting is the means by which the upper gastrointestinal tract rids itself for its contents when almost any part of the upper tract becomes excessively irritated, over distended or even over excitable. Aside from the vomiting initiated by irritative stimuli of gastrointestinal tract itself, electrical stimulation of chemoreceptor trigger zone also initiates vomiting. Also rapid changing directions of motion of the body cause certain people to vomit. Various psychic stimuli, including disquieting scenes, noisome odors and other similar psychological factors, can cause vomiting. Stimulation of certain areas of the hypothalamus also causes vomiting<sup>1</sup>. Other conditions cause vomiting include gastrointestinal obstruction, hepatitis, motion sickness, myocardial infarction, peptic ulcer, pregnancy, renal failure, and administration of cancer chemotherapeutic agents<sup>2</sup>.

The purpose of present study is to investigate antiemetic activity of ten aromatic medicinal plants viz., *Carissa carandus* L. (fruits), *Chichorium intybus* L. (flowers), *Cinnamum tamala* L. (leaves), *Curcuma caesia* Roxb. (rhizomes), *Lallemantia royleana* Benth. (leaves), *Matricaria chamomila* L. (flowers), *Piper longum* L. (fruits), *Piper methysticum* G. Forst. (fruits), *Piper nigrum* Linn. (fruits) and *Syzygium aromaticum* (Linn.) Merr. & Perry (flowering buds) using chick emetic model.

### MATERIALS AND METHODS

#### Collection of Plant materials

The different parts of ten aromatic plants viz., *Carissa carandus* L. (fruits), *Chichorium intybus* L. (flowers), *Cinnamum tamala* L. (leaves), *Curcuma caesia* Roxb. (rhizomes), *Lallemantia royleana* Benth. (leaves), *Matricaria chamomila* L. (flowers), *Piper longum* L. (fruits), *Piper methysticum* G. Forst. (fruits), *Piper nigrum* Linn. (fruits) and *Syzygium aromaticum* (Linn.) Merr. & Perry (flowering buds) was purchased from local market in April 2011 and samples were deposited in the herbarium of Department of Pharmacognosy, Faculty of Pharmacy, University of Karachi for further reference.

#### Preparation of the Extracts

The different parts of *Carissa carandus* L., *Chichorium intybus* L., *Cinnamum tamala* L., *Curcuma caesia* Roxb.,

*Lallemantia royleana* Benth., *Matricaria chamomila* L., *Piper longum* Linn., *Piper methysticum* G. Forst., *Piper nigrum* L. and *Syzygium aromaticum* (Linn.) Merr. & Perry were soaked in ethanol separately for a week. Afterwards the obtaining extracts were filtered and solvent was evaporated under low pressure using rotary evaporator at 40°C.

#### Animals

Young male chicks, 4 days old and weighing from 32-52 g were obtained from Big-bird Poultry Breeders (Pvt) Ltd., Karachi, Pakistan for antiemetic activity. All chicks were kept under laboratory conditions of room temperature with 12 h light and dark cycles and were allowed free access to food and water. The animals were treated complying with the international standards for dealing the experimental animals duly approved by the legal bodies of the University of Karachi. The groups of animals were transferred in different cages and marked with their identification. Chicks were randomly divided into twelve groups of seven animals each.

#### Anti-emetic activity (Chick Emetic Model)

The anti-emetic activity was determined by calculating the mean decrease in number of retching in contrast with those of control<sup>3</sup>. Each chick was set aside for 10 minutes to stabilize in a large beaker. The extracts of *Carissa carandus*, *Chichorium intybus*, *Cinnamum tamala*, *Curcuma caesia*, *Lallemantia royleana*, *Matricaria chamomila*, *Piper longum*, *Piper methysticum*, *Piper nigrum* and *Syzygium aromaticum* were dissolved in 0.9% saline containing 5% DMSO and 1% tween 80 and administered at a dose of 150 mg / kg BW abdominally as a volume of 10 ml / kg to the test animal. Control group received only saline 0.9%. After 10 minutes copper sulphate pentahydrate as an emetic agent was administered orally at 50 mg / kg, then the number of retching (an emetic action without emitting gastric material) was observed during next fifteen minutes. Domperidone in a dose of 100 mg/kg was used as standard drug. The percentage inhibition was calculated as follows:

$$\% \text{ Inhibition} = (A-B/A) \times 100$$

Where

A= Frequency of retching in control group

B= Frequency of retching in test group

### Statistical Analysis

All numerical data are expressed as the mean  $\pm$  S.E.M. The statistical significance of the difference was determined by an unpaired student's *t*-test values.  $P < 0.05$  shows significant and  $P < 0.001$  most significant values as compare to control.

### RESULTS AND DISCUSSION

Aromatic plants have tendency to relief from nausea. *Alpinea offinarum*<sup>4</sup>, *Zingiber officinale*, *Mentha piperita*, *Mentha spicata* and *Lavandula angustifolia*<sup>5</sup> are aromatic plants reported to possess antiemetic activity. So, present investigation was done to evaluate more aromatic plants regarding their antiemetic activity. Results of the antiemetic activity of the ethanol extracts of *Carissa carandus*, *Chichorium intybus*, *Cinnamum tamala*, *Curcuma caesia*, *Lallemantia royleana*, *Matricaria chamomila*, *Piper longum*, *Piper methysticum*, *Piper nigrum* and *Syzygium aromaticum* are shown in the Table. All the extracts showed antiemetic activity comparable with domperidone. The % inhibition was recorded as *Carissa carandus* (68.29), *Chichorium intybus* (73.86), *Curcuma caesia* (89.97), *Cinnamum tamala* (70.64), *Lallemantia royleana* (83.61), *Matricaria chamomila* (59.92), *Piper longum* (81.65), *Piper methysticum* (80.03), *Piper nigrum* (89.48) and *Syzygium aromaticum* (87.81). The highest % inhibition was shown by *Curcuma caesia* (89.97) and the lowest by *Matricaria chamomila* (59.92), where as domperidone showed 80.18 % inhibition of emesis (Figure).

On the basis of these results it may be said that all the extracts have anti-emetic potential and are comparable with domperidone. Although the results are significant but the mode of action is not known. However, as the oral copper sulphate induces emesis by peripheral action<sup>6</sup> and the extracts were able to effectively prevent its effect, it could be implied that these extracts have a peripheral antiemetic action.

### CONCLUSION

In conclusion it may be said that all investigated aromatic plants have peripheral antiemetic effect. Further studies are required to determine exact mode of action and the compounds involved in the activity.

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Table : Antiemetic effect of some aromatic plants

Groups	Parts of plant used	Mean number of Retches $\pm$ S.E.M	Inhibition (%) of emesis
Vehicle Control	-----	68.12 $\pm$ 3.88	-----
Std. (DM) 100 mg/kg p.o.	-----	13.5 $\pm$ 1.02	80.18
CC 150 mg/kg p.o.	Fruits	21.6 $\pm$ 1.09	68.29
CI 150 mg/kg p.o.	Flowers	17.8 $\pm$ 0.98	73.86
CUC 150 mg/kg p.o.	Rhizomes	6.83 $\pm$ 0.60	89.97*
CT 150 mg/kg p.o.	Leaves	20.0 $\pm$ 0.72	70.64
LR 150 mg/kg p.o.	Leaves	11.16 $\pm$ 1.17	83.61*
MC 150 mg/kg p.o.	Flowers	27.3 $\pm$ 1.45	59.92
PL 150 mg/kg p.o.	Fruits	12.5 $\pm$ 1.16	81.65**
PM 150 mg/kg p.o.	Fruits	13.6 $\pm$ 1.09	80.03*
PN 150 mg/kg p.o.	Fruits	7.16 $\pm$ 0.97	89.48*
SA 150 mg/kg p.o.	Flowering buds	8.3 $\pm$ 1.09	87.81*

DM= Domperidone, CC= *Carissa carandus*, CI= *Chichorium intybus*, CUC= *Curcuma caesia*, CT= *Cinnamum tamala*, LR= *Lallemantia royleana*, MC= *Matricaria chamomila*, PL= *Piper longum*, PM= *Piper methysticum*, PN= *Piper nigrum*, SA= *Syzygium aromaticum* ; N = 7 for each group, p.o.= per oral, S.E.M.= Standard Error of Mean, \* $P < 0.05$  & \*\* $P < 0.001$  vs. control showing significant and most significant values.

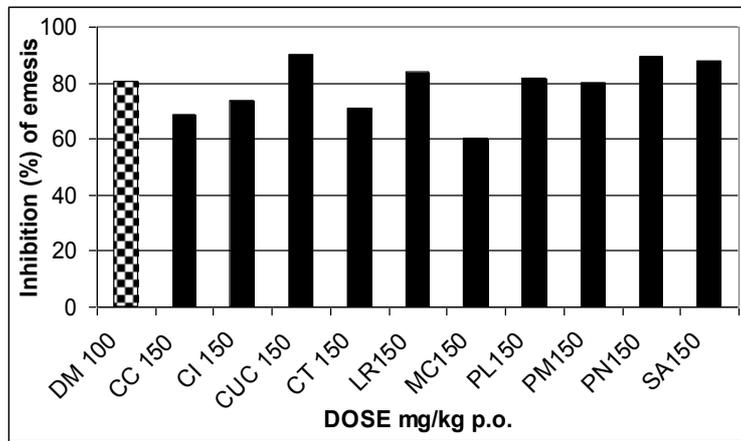


Figure: Antiemetic effect of some aromatic plants by using chick emetic model

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