



## ANTIEMETIC ACTIVITY OF LEAVES EXTRACTS OF FIVE LEGUMINOUS PLANTS

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### ABSTRACT

Current study is carried out to evaluate the antiemetic activity of methanol extracts of five leguminous plants leaves viz., *Cassia siamea* Lamk., *Cyamopsis tetragonoloba* Taubert., *Delonix regia* Rafin., *Samanea saman* Merr. and *Vigna trilobata* Verdc. at a dose of 150 mg/kg body weight orally, using chick emesis model. Emesis was induced in male chicks by the oral administration of copper sulphate (50 mg/Kg body weight). The antiemetic activity was determined by calculating the mean decrease in number of retching as compare with control. All the extracts showed antiemetic activity when compared with standard drug chlorpromazine (150 mg/kg body weight orally). Among all extracts, *Delonix regia* showed highest (96.74%) and *Cassia siamea* lowest (18%) antiemetic activity.

**Keywords:** Leguminosae, Antiemetic, *Cassia siamea*, *Cyamopsis tetragonoloba*, *Delonix regia*, *Samanea saman*, *Vigna trilobata*.

### INTRODUCTION

*Cassia siamea* Lamk. and *Delonix regia* Rafin., are the medicinal plants of sub family caesalpiniaceae, *Cyamopsis tetragonoloba* Taubert., *Samanea saman* Merr. and *Vigna trilobata* Verdc. belongs to sub family papilionaceae<sup>1</sup>, comes under the family leguminosae<sup>2</sup>. The stem bark of *Cassia siamea* Lamk. is used as a mild purgative and its decoction is given in diabetes. The roots are used as antipyretic and leaves for constipation, hypertension and insomnia<sup>3</sup>. The flowers are effective against insomnia and asthma. Anthraquinones, chromone alkaloids and flavonoid glycosides have been isolated from *Cassia siamea*<sup>3,4</sup>. *Cyamopsis tetragonoloba* Taubert. is used as digestive, galactagogue, tonic, useful in anorexia, constipation, and dyspepsia<sup>5</sup>. Leaves are used in asthma, seeds to cure inflammation, sprains<sup>6</sup>, arthritis, as anti-oxidant and laxative<sup>7</sup>. *Delonix regia* Rafin. has been used in the folk medicines for the treatment of arthritis, constipation, hemiplegia, inflammation, leucorrhoea and rheumatism<sup>8,9</sup>. Its flower extract is reported to possess antioxidant property<sup>10</sup>. Seeds of *Samanea saman* Merr. are chewed for sore throat, inner bark decoction and fresh leaves are used for the treatment of colds and diarrhoea<sup>11,12</sup>. *Samanea saman* contains alkaloids, glycosides and terpenes<sup>13,14</sup>. *Vigna trilobata* Verdc. is bitter, cold and sweet on digestion and aphrodisiac. Seeds are cooling astringent used as diet in fever, to relieve thirst<sup>15</sup>. Leaves are sedative and also used in irregular fever in the form of decoction<sup>16</sup>. Chick<sup>17</sup> and frog<sup>18</sup> emesis models are used for evaluating natural antiemetics. Chick emesis model is rapid, simple and easy to handle<sup>17</sup>. This model is frequently used as antiemetic model for both terrestrial medicinal plants<sup>19,20</sup> and marine algae<sup>21</sup>. Some leguminous plants are reported to possess antiemetic potential using this model<sup>22</sup>. So, the current investigation was done to explore antiemetic potential of more leguminous plants. In present study, we determined the antiemetic activity of the methanol extracts of the leaves of these plants using chick emesis model. Effect produced by these plant extracts were

determined by the decrease in the number of retching after oral administration of copper sulphate.

### MATERIALS AND METHOD

#### Plant material

The leaves of *Cassia siamea* Lamk., *Cyamopsis tetragonoloba* Taubert., *Delonix regia* Rafin., *Samanea saman* Merr., and *Vigna trilobata* Verdc., were collected from Karachi during summer 2011 and identified by a taxonomist. Voucher specimen of *Cassia siamea* (CS-03-11), *Cyamopsis tetragonoloba* (CT-04-11), *Delonix regia* (DR-05-11), *Samanea saman* (SS-06-11) and *Vigna trilobata* (VT-07-11) were deposited in the herbarium of the department. The plant materials were soaked in methanol for seven days at room temperature then solvent was evaporated by a rotary evaporator at 40°C.

#### Animals

Young male chicks 4 days of age, weighing from 32-52 g were taken from local market. All chicks were kept under laboratory conditions at room temperature allowed free access to food and water ad libitum. The groups of animals (seven groups of six animals each) were transferred in different cages with their identification mark. Permission and approval for animal studies were obtained from Board of Advanced Studies and Research, University of Karachi [BASR.Res.No.5(4)-2007].

#### Antiemetic activity

The antiemetic activity was determined by using chick emesis model following the protocols of Akita et al, 1998<sup>17</sup>. The extracts of *Cassia siamea* Lamk., *Cyamopsis tetragonoloba* Taubert., *Delonix regia* Rafin., *Samanea saman* Merr. and *Vigna trilobata* Verdc. were dissolved in 0.9% saline containing 5% DMSO and 1% tween 80. All tested extracts were administered at a dose of 150 mg / kg body weight orally. Control group received normal saline solution. After 10 minutes copper sulphate was administered orally at 50 mg / kg, then the number of retching was observed during next ten minutes. Chlorpromazine (150 mg/kg. b.w) was used as standard antiemetic drug.

The percent inhibition was calculated by the following formulae:

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

Where, A = Frequency of retching in control group,  
B = Frequency of retching in test group.

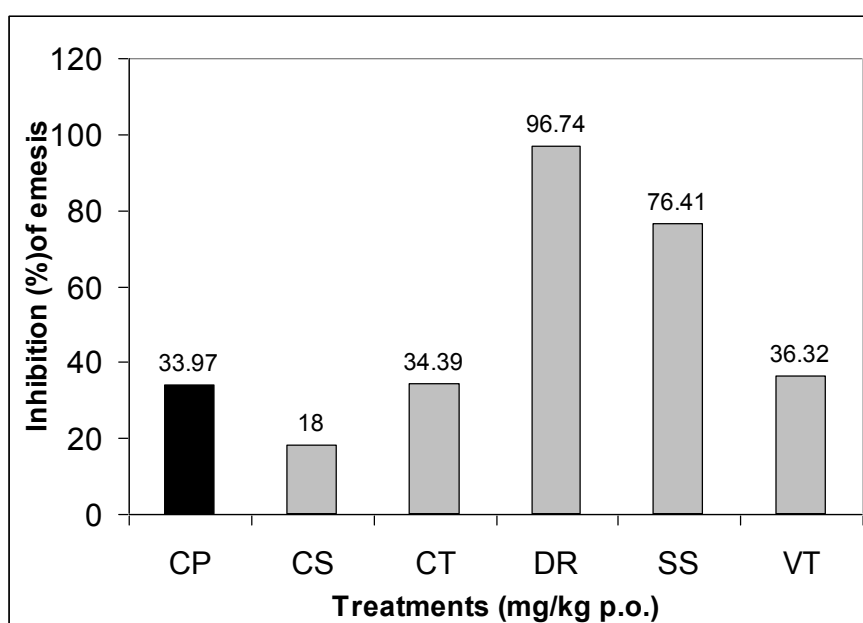
### Statistical Analysis

Antiemetic activity is expressed as mean ± S.E.M (Table 1). Statistically significant difference  $p < 0.05$  and  $p < 0.01$  shows significant and most significant values respectively using unpaired student's t-test.

**Table 1: Antiemetic effect of five leguminous plants**

| Treatments (mg/kg p.o.) | Mean No. of retches ± S.E.M. | Inhibition of emesis (%) |
|-------------------------|------------------------------|--------------------------|
| Normal saline solution  | 69.10±2.16                   | -                        |
| CP (150)                | 45.62±3.84*                  | 33.97                    |
| CS(150)                 | 56.66±2.41*                  | 18.00                    |
| CT (150)                | 45.33±2.97*                  | 34.39                    |
| DR(150)                 | 2.25±1.00**                  | 96.74                    |
| SS (150)                | 16.30±2.67*                  | 76.41                    |
| VT (150)                | 44.00±3.82*                  | 36.32                    |

Key-CP-Chlorpromazine, CS-Cassia siamea, CT-Cyamopsis tetragonoloba, DR-Delonix regia, SS- Samanea saman, VT-Vigna trilobata, N-6 for each group, p.o.-per oral, S.E.M.-Standard Error of Mean, \* $p < 0.05$  & \*\* $p < 0.01$  vs. control showing significant and most significant values using unpaired students' t-test



**Figure 1: Antiemetic effect of five leguminous plants**

### RESULTS AND DISCUSSION

The methanolic extracts of the leaves of *Cassia siamea* Lamk., *Cyamopsis tetragonoloba* Taubert., *Delonix regia* Rafin., *Samanea saman* Merrill, *Vigna trilobata* Verdc. showed antiemetic effect. After administration of 150 mg/kg b.w., of chlorpromazine and plant extracts, the numbers of retches were reduced. Group of chicks treated with chlorpromazine was found to have 45 retches as compared to the 69 retches of control group, thus chlorpromazine reduced the retches by 33.97 %. The extracts of *Cassia siamea* Lamk., *Cyamopsis tetragonoloba* Taubert., *Delonix regia* Rafin., *Samanea saman* Merr. and *Vigna trilobata* Verdc. showed 18, 34.39, 96.74, 76.41 and 36.32% inhibition of emesis (Table 1 and Figure 1). All extracts significantly ( $p < 0.05$  and  $p < 0.01$ ) suppressed the frequency of copper sulfate-induced retching in young chicks. Oral copper sulfate induces emesis by peripheral action through excitation of visceral afferent nerve fibers of GIT<sup>23</sup> and all tested extracts have protective effects against copper sulfate induced retching, possibly by peripheral action. However, investigation of responsible antiemetic compounds is

further needed.

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