



## EVALUATION OF ANTI-ASTHMATIC ACTIVITY OF *FERONIA ELEPHANTUM* BARK LINN

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### INTRODUCTION

#### *Feronia Elephantum*

#### Syn-Limonia Acidissima L

Kingdom	Plantae
Division	Embryophyta
Subdivision	Angiospermae
Class	Dicotyledoneae
Subclass	Archichlamydeae
Order	Plantae
Family	Rutaceae
Genus	Feronia
Species	Feroniaelephantum

#### Synonyms

- Limoniaacidissmia
- Feronialimonia
- Hesperethusacrenulata
- Schinuslimonia

**Description:** The wood-apple, *Feronialimonia Swingle* (syn. *F. elephantum* Correa; *Limonia acidissima* L.; *Schinuslimonia* L.) is the only species of its genus, in the family Rutaceae. Besides wood-apple, it may be called elephant apple, monkey fruit, curd fruit, kathbel and other dialectal names in India. In Malaya it is *gelinggai* or *belinggai*; in Thailand, *ma-khwit*; in Cambodia, *kramsang*; in Laos, *ma-fit*. In French, it is *pomme d'elephant*, *pomme de bois*, or *citron des mois*.

**Objective:** The main objective is to screen antiasthmatic herbal drug from medicinal plant which is potent and non toxic. The asthma is disease of respiratory tract, average 180000 deaths occur annually according to survey of W.H.O. Thus considering severity of asthma the main objective of the present study.

**Extraction methodology:** Hot continuous extraction (Soxhalation)-The use of commercially Soxhlet extractor is a convenient way to prepare crude plant extracts. This procedure is used mainly with pure solvent. The Soxhlet

process is useful where exhaustive sequential extraction with series of solvent of increasing polarity is desired.

**Procedure:** Successive solvent extractions of *Feronia elephantum bark* by using petroleum ether, ethyl acetate, methanol and ethanol as a solvent was done in Soxhlet apparatus.

**Pharmacological activity:** The pharmacological activity was assessed by following models

**i. Milk Induced Leukocytosis in Mice:** This model was used to evaluate the protective effect of bark of *F. elephantum* extract against milk-induced leukocytosis. Subcutaneous injection of milk in dose of 4 ml/kg, produced a significant ( $p < 0.0001$ ) increase in the leukocyte count after 24 hr of its administration. Mice pre-treated with petroleum ether, ethanol methanol ethyl acetate extract *F. elephantum* bark of have exhibited significant difference in total leukocytes before and after drug treatment. Petroleum ether extract of *F. elephantum*

has inhibited the milk induced leukocytosis ( $p < 0.05$ ) with dose of 50 mg/kg, (i.p.).

#### Effect of *Feronia elephantum* bark extracts on Milk induced Leukocytosis in mice.

Group	Pretreatment	Number of Leukocytes /Cu.mm.		
		Before treat ment	After treat ment	Difference
Group-I	DW (10 ml/kg, p.o.) +Milk (4 ml/kg, s.c.)	8100 ±121	9700 ±120	1600 ±121
Group-II Petroleum ether extract	(PEE) (50 mg/kg, i.p.)+ Milk (4 ml/kg, s.c.)	9200 ±121	9650 ±120	450 ±121
Group-III Ethyl acetate extract	(ETA) (50mg/kg, i.p.) +Milk (4ml/kg, s.c.)	9450 ±121	10600 ±121	1150 ±118
Group-IV Methanol extracts	(MET) (50 mg/kg, i.p.) +Milk (4 ml/kg, s.c.)	9300 ±119	10250 ±118	950 ±116
Group-V Ethanol extract (ETHE)	(50 mg/kg, i.p.) +Milk (4ml/kg, s.c.)	8000 ±121	9700 ±124	1700 ±121

\* $P < 0.0001$  compared to vehicle treated group (One way ANOVA followed by Dunnett's test)

**ii. Milk Induced Eosinophilia in Mice:** Eosinophilia is an abnormal increase in peripheral eosinophil count to more than 4 % of total leukocytes (Brigden, 1999).

Subcutaneous injection of milk in dose of 4 ml/kg, produced a significant ( $p < 0.0001$ ) increase in the eosinophil count after 24 hr of its administration. Mice

pretreated with petroleum ether, ethanol and aqueous extract of bark of *f.elephantum* have exhibited significant difference in eosinophil count before and after drug treatment. Petroleum ether extract of *F. elephantum* has inhibited the milk induced eosinophilia ( $p < 0.05$ ) with dose of 50 mg/kg, (i.p.). The results are as summarized in table.

Group	Pretreatment	Number of Leukocytes /Cu.mm.		
		Before treat ment	After treatment	Difference
Group-I	DW (10 ml/kg, p.o.) +Milk (4 ml/kg, s.c.)	379±11.22	515±29.0	136±0.87
Group-II	Petroleum ether extracts (PEE) (50 ml/kg, i.p.) +Milk (4 ml/kg, s.c.)	395±9.8	434±10.3	39±0.30
Group-III	Ethyl acetate extract(ETA) 50 ml/kg, i.p.) +Milk (4 ml/kg, s.c.)	405±9.8	455±10.3	50±0.30
Group-IV	Methanols extract (MET) (50 ml/kg, i.p.) +Milk (4 ml/kg, s.c.)	460±13.0	525±26.10	65±0.40
Group-V	Ethanol extract (ETHE) (50 ml/kg, i.p.) +Milk (4 ml/kg, s.c.)	460±13.0	525±26.10	65±0.40

#### iii. Effect of Histamine on Isolated guinea pig ileum

Evaluation of the effect of the extracts on histamine-induced contractions of the isolated guinea pig ileum showed that they exhibited a dose-dependent inhibition of contractions of the guinea pig ileum induced by histamine. The PE extract caused 83.55%, 71.62%,

64.52%, and 52.40% (at dose of 0.1, 0.2, 0.3 and 0.4 mg/ml extract respectively) inhibition of maximal contraction produced by histamine at a concentration of 2 µg/ml. So PE extract as compare to other extracts of *F. elephantum* bark indicating antiasthmatic action.

#### Effect of *Feronia elephantum* bark extracts on Histamine on Isolated guinea pig ileum

Extract	% Relaxation
<b>PEE-100 mg/kg</b>	
<b>Dose-0.1</b>	83.55
<b>0.2</b>	71.62
<b>0.3</b>	64.52
<b>0.4</b>	52.40
<b>ETE-100 mg/kg</b>	
<b>0.1</b>	78.39%
<b>0.2</b>	33.49

<b>0.3</b>	17.4
<b>0.4</b>	10.3
<b>MET-100 mg/kg</b>	
<b>0.1</b>	73.67
<b>0.2</b>	64.85
<b>0.3</b>	56.57
<b>0.4</b>	45.54
<b>ET-100 mg/kg</b>	
<b>0.1</b>	70.74
<b>0.2</b>	64.85
<b>0.3</b>	56.53
<b>0.4</b>	44.57

**iv. Mast Cell Degranulation:** Present study showed the mice pretreated with standard drug Disodium cromoglycate and PEE significantly prevent degranulation of mast cells ( $P < 0.01$ ) as compared to

control group, While EET, ME and ET extracts failed to show statistically significant prevention of mast cell degranulation.

#### Effect of *Feronia elephantum* extracts on Mast cell stabilizing activity

Group	% of complete Granulation	% of partial of Incomplete granulation	% of non granulation
S S (std)	21	19	60
SV (cont)	28	24	48
I (PEE-50)	24	21	55
II (ETE-50)	25	26	49
III (MET -50)	26	22	52
IV (ET-50)	24	23	47

The antiasthmatic potency of *Feronia elephantum* bark was studied by above mentioned models. The petroleum ether extract of *Feronia elephantum* bark shows significant antiasthmatic activity as compare to other extract. The activity of pet. ether extract is due to nonplar constituent may be used as antiasthmatic agent and showed protective effect.

#### CONCLUSION

*Feronia elephantum* bark was extracted by using pet ether, ethyl acetate, methanol and ethanol as solvents. Antiasthmatic activity of *Feronia elephantum* bark was performed by various models. The petroleum ether extract shows significant activity as compared to other extracts. All these findings reveal the antiasthmatic activity of petroleum ether extract of *Feronia elephantum* bark may be due to the presence of rich contents flavonoids and phenolic constituents.

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