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EVALUATION OF THE ANTIEMETIC ACTION OF *PRUNUS DOMESTIC* – LINN

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Prunus domestica-Linn was investigated for its antiemetic action. The crude extract was found effective in controlling centrally induced emesis by apomorphine in dogs. Its action was comparable to the action of metoclopramide (Maxolon) and chlorpromazine (Largactil).

Key words: Prunus domestica-Linn; Emesis apomorphine.

INTRODUCTION

Prunus domestica Linn (Alu Bukhara) belongs to the family Rosaceae [1] and grows abundantly in the hilly areas of Pakistan. Its pulp contains maleic acid, sugar, pectin, albumin and salts while the seeds contain a fixed oil and amygdalin [2]. The kernel yields 42.92 to 46.5% of a pale yellow oil and 1.82% of amygdalin, and the residue contains 47.18% of protein and yields 5.97% ash [3].The decorticated kernel of various species of *Prunus* is rich in lipases but contains practically no dehydrogenases [4].

Prunus domestica is laxative, demulcent and nutrient. It is also effective in bilious fever, prevents nausea and vomiting and quenches the thirst [5]. The author of the Makhzun-el-adwiya describes it as subacid, cold and moist, digestive and aperient, especially when taken on an empty stomach.

Emesis (vomiting) is a common problem especially in females during pregnancy (morning sickness) and the allopathic drugs for it are costly and likely to present adverse side effects. It was, therefore, considered worth while to look for some cheap herbal medicine, capable of preventing /inhibiting emesis and which may be easily procureable in both rural and urban areas of the country. Keeping this objective in view, *Prunus domestica*-Linn (Alu Bukhara) was selected to evaluate its antiemetic action on scientific lines.

MATERIAL AND METHODS

Experimental animals – Albino mice, dogs.
Emetic drug – Apromorphine.
Antiemetic drug – Prunus domestica crude extract, metoclopramide, chlorpromazine.

from the local market. It was washed with water and soaked in 95% ethyl alcohol (3 litres). After one week, the seeds were removed and the resulting swollen flesh of the fruits was macerated with 95% ethyl alcohol (3 x 1 litre) and filtered. From the filtrate, solvent was completely removed under reduced pressure, and the resulting yellowish viscous residue was partitioned, between petroleum ether and water (1:3 v/v). The aqueous phase was withdrawn and water was removed under reduced pressure, below 70^{o} to furnish a golden yellow syrup (375 gms) having sweet and sour taste. Toxicity test performed on albino mice showed this syrupy extract to be non-toxic.

Acute toxicity test. The acute toxicity of the *Prunus domestica* extract was determined by intravenous administration in albino mice weighing between 23-25 grams. The drug was administered at a dose of 25-100 mg/kg body weight respectively to three groups of animals and fourth group was maintained as control and received normal saline. Each group comprised of 6 animals, which were observed for 24 hours. From the data recorded in Table 1. it is evident that the drug did not show any toxic effect.

Screening procedure. A simple screening method employing dogs, as reported by Piata *et al.* [6], was adopted with slight modification. The inhibition of emesis (-ve-emesis) refers to antiemetic effects while induction of emesis (+ve emesis) indicates emetic action.

In the procedure followed here, each dog was fed with 6 of bread soaked in milk alongwith the extract, 2-3 hours before subcutaneous injection of apomorphine. When parenteral route for administering the extract was adopted, the extract (sterilized aqueous solution) was given intravenously 45 minutes before injecting the apomorphine subcutaneously. The critical dose of apomorphine, which induced emesis in each dog was determind experimentally and was found to be 0.044 mg/kg body weight.

RESULT AND DISCUSSION

The results recorded in Table 1 indicate that intravenous administration of *prunus domestica* extract to three groups of albino mice in dose of 25,50 and 100 mg/kg body weight did not show any toxic effect in 24 hrs. The non-toxic nature of the extract is quite understandable, as it originates from edible fruit.

Table 1. Acute toxicity test in albino mice.

Grp. No*.	Mean weight ± S.D.	I/V dose of the extract	Toxic effects
1.	25 ± 3gm.	25 mg/kg.	Nil.
2.	23 ± 4gm.	50 mg/kg.	Nil.
3.	23 ± 4gm.	100 mg/kg.	Nil
4.	23 ± 4gm.	Normal saline.	Nil

*Each group consisted of 6 animals, the first three were test groups and received the Prunus domestica fruit extract while the fourth group was control and received normal saline.

three hours. However, when the dose was increased to 125 mg/kg body weight, antiemetic effect was observed in two dogs in two hours while in three hours emesis was controlled in all the four dogs. Further increase in dose had no appreciable effect. However, when *prunus domestica* extract was administered intravenously (Table 3) to a group of 4 dogs at a dose of 15 mg/kg body weight, antiemetic effect was observed in 2 dogs only but when the dose was increased to 20 mg/kg body weight, the antiemetic effect was found in three dogs and with a dose of 22 mg/kg body weight, emesis was controlled in all the four dogs. The efficacy of *Prunus domestica* extract, though in high

Table 2. Antiemetic effect of Prunus domestica extract administered orally on test and control dogs.

Grp No.	Time in hrs. between *Prunus* extract and apomorphine administration.	Mean body weight ±S.D.	Dose of extract mg/kg.	Experimental animals		Control	
				Emesis +ve	Emesis -ve	Emesis +ve	Emesis -ve
1.	2	16±0.5 kg	100 mg/kg	3	1	1	–
2.	3	16±0.5 kg.	100 mg/kg	1	3	1	–
3.	2	16±0.5 kg	125 mg/kg	2	2	1	–
4.	3	16±0.5 kg	125 mg/kg	–	4	1	–
5.	3	16±0.5 kg	150 mg/kg	–	4	1	–

*Each group consisted of 5 dogs. Out of these 4 were test dogs and received Prunus domestica extract orally while the fifth one was control and received only distilled water. 0.044 mg/kg body weight apomorphine was given subcutaneously to all animals.

Table 3. Antiemetic effect of *Prunus* extract administered intravenously on test and control dogs.

Grp. No*	Mean body weight ±S.D.	Dose of *Prunus* extract in mg/kg body weight	Results			
			Experimental animals		Control	
			emesis +ve	Emesis -ve	Emesis +ve	Emesis -ve
1.	16 ± 0.5 kg	15	2	2	1	–
2.	16 ± 0.5 kg	17.5	1	3	1	–
3.	16 ±0.5 kg	20	1	3	1	–
4.	16 ± 0.5 kg	22	–	4	1	–
5.	16 ± 0.5 kg	24	–	4	1	-

*Each group consisted of 5 dogs. Out of these 4 were experimental dogs which received Prunus extract intravenously while the fifth one was control dog and received only distilled water. 0.044 mg/kg body weight apomorphine was given subcutaneously to all animals. The interval between Prunus extract administration and apomorphine injection was kept constant i.e. 45 minutes.

It has shown that for controlling emesis, *prunus domestica* extract can be administered both by oral as well as parenteral routes. The results presented in Table-2 show that oral administration of the extract to a group of four dogs in dose of 100 mg/kg body weight caused anti-emetic effect in one dog only in two hours and in three dogs in dosage, was also found comparable to maxolon and largectil (Table 4).

The antiemetic drugs prevent/inhibit the vomiting by two ways: (a) Central action and/or (b) local action. In the present studies the apomorphine stimulates the Chemo-receptor Trigger Zone (CTZ) which causes vomiting [7,8],

Table 4. Comparative assessment of the action of the *Prunus* extract and standard antiemetic drugs (metoclopramide and chlorpromazine)

S. No.	drug	Initial dose mg/kg body weight	Minimum dose mg/kg body weight	*Results
1.	Prunus extract	30	22	+ ve
2.	Chlorpromazine	1	0.66	+ ve
3.	Metoclopramide	0.34	0.066	+ ve

*The animals received standard drugs and extract intravenously 45 minutes prior to the injection of 0.044 mg/kg body weight apomorphine subcutaneously.

while the extract antagonises the action of apomorphine, thus confirming the ability of *Prunus domestica* extracts to inhibit/prevent centrally induced emesis.

The extract is also supposed to inhibit/prevent locally induced emesis. This is due to the presence of amygdalin, a cyanogenetic glycoside which splits up enzymatically into glucose, benzaldehyde and hydrocyanic acid. Dilute hydrocyanic acid is known to act as locally acting antiemetic [8]. In addition, the extract also contains an agent which increases both tonus and amplitude of contraction. The extract thus increase propulsive movement of the gut and enhances gastric emptying and may get rid of stomach by overdistension, irritation and excitation by its contents which cause local emesis [9].

Repeated vomiting (as in morning sickness) causes loss of acid, salts and water which results in metabolic alkalosis and dehydration. As the *Prunus* extract contains acids and salts, it can make up the losses. The extract prevents vomiting, enhances emptying of stomach and improves appetite and body weight. During the experiments it was observed that after the administration of extract, the dogs consumed more food and with much faster speed compared to normal.

CONCLUSION

Prunus domestica dried fruit extract is non toxic as it originates from edible fruit. For controlling/preventing emesis, *prunus domestica* extract can be administered both by oral as well as parenteral routes. Results in Table 2 show that a dose of 125 mg/kg body weight of the extract given orally causes antiemetic effect in 3 hours. However, when the extract was administered through parenteral route (Table 3), only 22 mg/kg body weight of the extract was sufficient to prevent emesis in 45 minutes. This shows that administration of the extract by parenteral route is more effective than by oral route. The efficacy of *prunus domestica* extract, though in high dosage, was also found comparable to maxolon and largectil.

REFERENCES

1. R.N. Chopra, S.L. Nayyer, and L.C. Chopra, Glossary of Indian Medicinal Plants, Council of Scientific & Industrial Research, (New Delhi, India, 1956) p. 205.
2. A.K. Nadkarni, *Indian Materia Medica,* Vol. I, p 10-15, (Popular Book Depot, Bombay, India, 1954) Vol. I, pp 10-15
3. C. Kassner, Arch. Pharm, **252**, 402 (1914).
4. C. Gurchot, Proc. Soc. Biol., **33** 785 (1935).
5. Hakim M. Said, *Hamdard Pharmacopoeia of Eastern Medicine,* (Hamdard National Foundation, Karachi, Pakistan, 1969) p 170
6. J.J. Piala, J.P. High, G.L. Jr. Hassert, J.C. Burke, and B.N. Craver, J. Pharmacol. Exptl. Therap., **127**, 55 (1959).
7. Gilman and Goodman, The Pharmacological Basis of Therapeutics, (Macmillan Publishing Co., Inc. 1980, 6th Edition, p p 62, 509.
8. Ghosli, R., Materia Medica and Therapeutics, (Hilton and Company, Calcutta, India, 1981). 25th Edi p 442.
9. A.G. Emerson, Proc. Soc. Expt. Biol. Med., **28**, 1403, (1933).