

ANTI ANEMIC ACTIVITY OF FRUIT OF *PRUNUS DOMESTICA* IN PHENYLHYDRAZINE INDUCED ANEMIC RAT

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ABSTRACT

The present study was conducted to verify the effect of *Prunus domestica* on experimentally induced anemia in wistar strain albino rats. 24 no of rats were divided into 4 groups and 6 no of rats each group. Group I received 0.1% CMC solution and served as control, all other groups were given 40 mg/kg of phenyl hydrazine intra peritoneal for 2 days to induce anemia. Group II received 40 mg/kg phenylhydrazine and served as anemic control, Group III received standard drug (vitamin B₁₂) (100mg/kg), Group IV received fruit extract of *Prunus domestica* (100mg/kg) for 15 days the standard and test drug was given orally. On completion of activity blood was collected through tail vein in EDTA coated tubes for further determination of parameters i.e., RBC count, Hemoglobin count & percentage hematocrit.

Keywords: Anemia, Anti-anemic, Phenylhydrazine, Vit. B₁₂, *Prunus domestica*.

INTRODUCTION

Anemia is blood disorder which develops when lacks of blood enough healthy red blood cells or hemoglobin. Anemia affects the lives of more than 2 billion people globally, accounting for over 30% of the world's population which is the most common public health problem particularly in developing countries occurring at all stages of the life cycle¹. Iron deficiency is the most common nutritional disorder in the world which may lead to Anemia. Iron-deficiency anemia is a significant problem and especially in developing countries it is widespread yet the most neglected micronutrient deficiency disorder among children, adolescence girls, and pregnant women². Iron deficiency is the most common nutritional disorder in become depleted restricted supply of iron to various tissues becomes apparent. This may result in depletion of Hemoglobin and iron dependent intra- cellular enzymes participating in many metabolic pathways. Therefore, there is the need for prop management of micronutrient deficiencies most especially irons deficiency. Over the years, medicinal plants have been recognized to be of great importance to the health of individuals and communities. In many developing countries, herbal medicines are assuming greater importance in primary health care³.

MATERIALS AND METHODS

FRUIT DESCRIPTION

Plum or *Prunus domestica* (Genus: *Prunus*, Family: *Rosaceae*), a fruit is known as dried plum in its dehydrated state. It is deciduous vegetation, with trees ranging from (39 feet) to (32 feet), which flowers in April and the seed ripens during July to November. Suitable Indian terrain for the fruit is Himachal Pradesh and Nilgiris with production of plums in 2010 nationally reaching 200,000 metric tonnes⁴.

Plant Material: Fruit

Botanical Name:- Common plum L.

Synonym:- *P. domestica*

Family:- *Rosaceae*



Fig. I –*Prunus domestica* fruit.

COLLECTION AND IDENTIFICATION

- ❖ Collection Time: August,2017
- ❖ From:- Departmental store of local market of city, Indore, (M.P.).
- ❖ Identified and authenticated by: Prof. Prof. **Dr. S.B. Singh Assistant Professor**,College of agriculture, Indore
- ❖ Specimen was submitted in Department of Pharmacognosy, MIPS, Indore, (M.P.)

EXTRACTION

Fruits was collected from departmental store of local market of city, Indore Madhya Pradesh, during August 2017. Pulp was collected from the fruit and juice was screened out with the help of muslin cloth. The juice was weighed and used for Decoction for extraction, and the concentrate was dried over water

bath. % yield was calculated for extract after drying. The collected extract was stored in desiccators and used for further pharmacological study ⁵.



Fig. II – Extract of *Prunus domestica* fruit.

PHYTOCHEMICAL SCREENING ⁶

The extract of *Prunus domestica* showed the presence of alkaloids, flavonoid, iron, carbohydrates, amino acids, glycoside and proteins.

Table 1. Various chemical compounds identified in *Prunus domestica*.

S.no.	Phytochemical Compound	Fruit
1.	Carbohydrates	+
2.	Proteins	+
3.	Amino acids	+
4.	Fixed oil & fats	-
5.	Steroidal	-
6.	Glycoside	+
7.	Saponins	-
8.	Flavonoids	+
9.	Alkaloids	+
10.	Tannis & phenolics	-
11.	Iron	+

Signs: + = Present; - = Absent

ANIMALS

Wistar Male albino rats weighing between 150 – 180 g were obtained from animal house, Department of Pharmacology Modern institute of Pharmaceutical sciences, Indore (M.P). All the procedures and protocols were reviewed and approved by the Institutional Animal Ethics Committee of MIPS, Indore. These animals were used for the Anti-Anemic Activity. The animals were stabilized for 1 week. They were maintained in standard condition at room temperature $60 \pm 5\%$ relative humidity and 12 h light dark cycle. The animals were handled gently to avoid giving them too much stress, which could result in an increased adrenal output.

INDUCTION OF ANAEMIA

Anaemia was induced in rats by intraperitoneal administration of 40 mg / kg of phenylhydrazine (PHZ) for two days. The treated rats with phenylhydrazine whose haemoglobin concentration <13 g / dl were considered as anemic and included for the study ⁷.

TREATMENT OF ANIMALS

Four groups of six rats were formed and treated daily for 15 days as follows:

- Group I-Control rats will receive 0.1% Carboxy methyl cellulose (CMC).
- Group II-Rats will be treated by Phenyl hydrazine (40 mg/kg per day for 2 days).
- Group III-Phenyl hydrazine treated rats will be given Vitamin B₁₂ single dose (1 ml/rat) per day for 15 days (standard).
- Group IV-Phenyl hydrazine treated rats will be given extract of herbal drug (100mg/Kg) (1ml/rat) per day for 15 days (test).
- On completion of the activity, blood was collected in EDTA coated tubes, by tail puncture under phenobarbitone (45mg/kg, i.p) anaesthesia. The following parameters like, Red Blood Cell count (RBC), Haemoglobin (Hb) and Haematocrit percentage (HCT) were evaluated in blood ⁷.

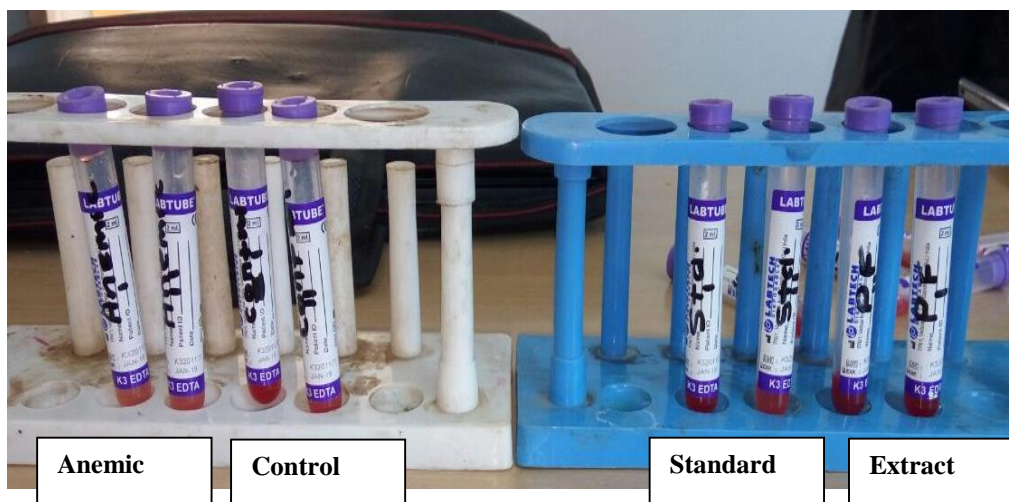


Fig. III Blood sample of rats in EDTA coated tubes.

STATISTICAL ANALYSIS

The data were expressed as mean \pm SEM. The data of anti-anemic activity were analyzed by one way analysis of variance (ANOVA) followed by Dunnet's-'t' test. A *p* value less than 0.05 was considered as statistically significant.

RESULTS

The Aqueous extract of fruits of plant *Prunus domestica* was used for the experiment. A standard drug Vitamin B₁₂ was also used for the detailed evaluation of anti-anemic activity.

Phenylhydrazine causes anemia in normal rats as phenylhydrazine form superoxide anion & phenyl radical which modify Heme group of Haemoglobin, which leads to destruction of RBC. The rats of group III, are treated with the Vitamin B₁₂& rats of group IV & are treated with fruit extract of *Prunus domestica* at different dose levels showed significant reduction in anemia caused by phenylhydrazine. The results obtained so are statistically significant and comparable to the treated Vitamin B₁₂.

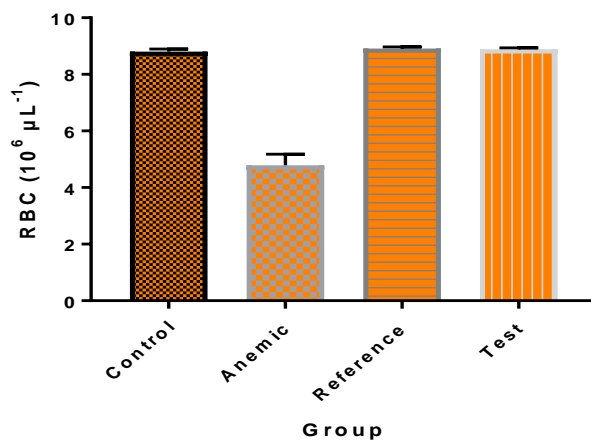
Evaluation of Red blood cell

Table 2. Effect of Fruit extract of *Prunus domestica* on RBC count

S.No	Groups	Drug treatment	RBC ($10^6 \mu\text{L}^{-1}$)
1	Normal control	0.1% CMC	8.807±0.03
2	Anemic control	Phenylhydrazine 40 mg/kg	4.783±0.16
3	Reference control	Vitamin B ₁₂	8.912±0.02
4	Test control	<i>Prunus domestica</i> fruit 100mg/kg	8.888±0.02

Values are expressed as Mean SEM (n = 6). *P <0.05, **P <0.01 & ***P<0.001

Fig. IV Effect of fruit of *Prunus domestica* on RBC

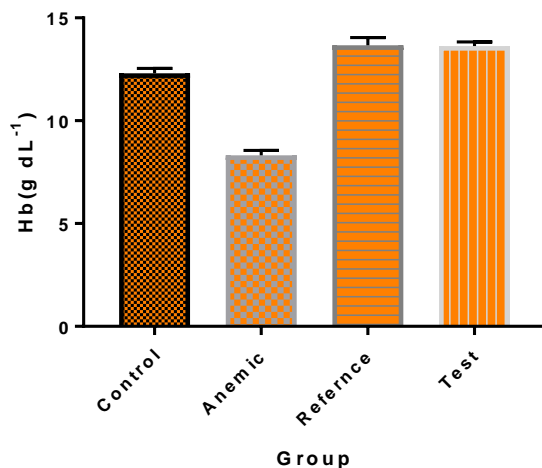


Evaluation of Haemoglobin

Table 3. Effect of Fruit extract of *Prunus domestica* on Hb

S.No	Groups	Drug treatment	Hb(g dL ⁻¹)
1	Normal control	0.1% CMC	12.31±0.09
2	Anemic control	Phenylhydrazine 40 mg/kg	8.323±0.09
3	Reference control	Vitamin B ₁₂	13.68±0.14
4	Test control-I	<i>Prunus domestica</i> fruit 100mg/kg	13.63±0.08

Values are expressed as Mean SEM (n = 6). *P <0.05, **P <0.01 & ***P<0.001

Fig. V Effect of fruit extract of *Prunus domestica* on Hb

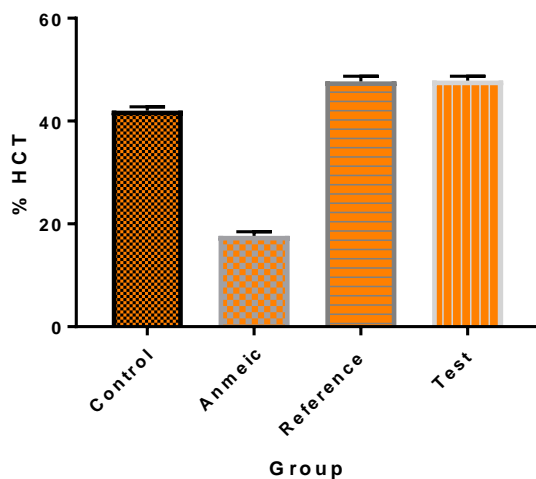
Evaluation of % Haematocrit

Table 4. Effect of Fruit extract of *Prunus domestica* on % HCT count.

S.No	Groups	Drug treatment	HCT %
1	Normal control	0.1% CMC	12.31±0.09
2	Anemic control	Phenylhydrazine 40 mg/kg	8.323±0.09
3	Reference control	Vitamin B ₁₂	13.68±0.14
4	Test control-I	<i>Prunus domestica</i> fruit 100mg/kg	13.63±0.08

Values are expressed as Mean SEM (n = 6). *P <0.05, **P <0.01 & ***P<0.001

Fig. VI Effect of fruits of *Prunus domestica* on % HCT



CONCLUSION

The extract of *Prunus domestica* exhibits anti-anemic activity against phenylhydrazine induced anemia in rats. The anti-anemic effect produced by the *Prunus domestica* fruit may be due to its high content of iron which is present in the plant.

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