

Anti-Anemic Activity of Hydro-Alcoholic Extract fruit of *Physalis minima* in Phenylhydrazine Induced Anemic Rats

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Abstract:

The aim of this research was to evaluate the anti-anemic activity in hydro-alcoholic extract of fruits of *Physalis minima* in phenylhydrazine induced anemic rats. Phenylhydrazine (40mg/kg) was given intraperitoneally in rats for two days to induce anemia. The animal were divided into 5 groups of 6 animal each. Group 1 was known as normal control group, Group 2 was known as anemic control group, Group 3 was known as standard reference control group given with Vit. B₁₂, Group 4 was known as test control-I given with 100mg/kg of hydro-alcoholic extract of fruits of *Physalis minima*, Group 5 was known as test control-II given with 200mg/kg of hydro-alcoholic extract of fruits of *Physalis minima*. All the test drugs were given for 28 days through oral route once in a day. On 29th day blood was taken out through tail puncture and was subjected to the determination of RBC, Hb and percentage Hematocrit. Both the hydro-alcoholic fruit extract of *Physalis minima* and Vit. B₁₂ significantly increase the HB, RBC & percentage Hematocrit level which shows that *Physalis minima* fruit exhibits the anti-anemic activity.

Keywords

Anemia, anti-anemic activity, hydro-alcoholic extract, *Physalis minima*, Vit. B₁₂.

1. Introduction

Anemia is a condition that develops when blood lacks enough healthy red blood cells or haemoglobin. 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 Cycle. Iron deficiency is the most common nutritional disorder in become depleted and a 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. Plant and plant products are being utilized as a source of medicine since long. Plant extracts are used as phototherapeutics and are still a large source of natural antioxidants.

Particularly, flavonoids and phenolics are considered as potential therapeutic agents. In the present study, the goal was to evaluate the anti-anemic activity of fruit of *Physalis minima* against phenyl hydrazine induced anemic rats. In many developing countries, herbal medicines are assumed as greater importance in health care [1, 2, 3].

2. Materials & Methods

2.1 Plant profile

Table 1. Plant profile

Plant taken	Cape Gooseberry
Part used	Fruit
Kingdom	Plantae
Order	Solanales
Genus	<i>Physalis</i>
Species	<i>P. minima</i>
Family	Solanaceae
Origin	Sub-tropical region



Figure 1. Fruit of *P. minima*

Figure 1. Plant of *P. minima*



2.2 Preparation of extract

The fruits were collected, shade dried and then converted into coarse powder. The powder was then filled in a Soxhlet apparatus for extraction by 70:30 hydro-alcoholic as a solvent. The Hydro-alcoholic extract was concentrated by vacuum distillation to dry. The collected extract was stored in suitable container and used for further pharmacological studies [4].

2.3 Animals

Wistar strain male albino rats, weighing 100–150 g were selected for the study. The animals were housed individually in polypropylene cages under hygienic and standard environmental conditions ($22 \pm 3^\circ\text{C}$, humidity 30–70%, 12 h light/dark cycle). The animals were allowed to have standard feed and water *ad libitum*. They were acclimated to the environment for one week prior to experimental use. All the animal testing were done under the approval of Institutional Animal Ethical Committee (IAEC) of Modern Institute of Pharmaceutical Sciences, Indore [5].

2.4 Anti-anemic activity

Anemia was induced by intra peritoneal injection of phenyl hydrazine at 40 mg/kg for 2 days, Following the injections, rats were divided into five groups of six rats each. Group I-Control rats received 0.1% Carboxy methyl cellulose. Group II-Phenyl hydrazine treated rats (40 mg/kg per day for 2 days). Group III-Phenyl hydrazine treated rats with Vitamin B₁₂ per day for 28 days. Group IV-Phenyl hydrazine treated rats with a single dose of fruit extract of *Physalis minima* (100 mg/kg) per day for 28 days. Group V-Phenyl hydrazine treated rats with a single dose of fruit extract of *Physalis minima* (200 mg/kg) per day for 28 days. On completion of the experimental period, the blood was collected with EDTA as an anticoagulant. Plasma was separated by centrifugation. Then

Plasma was used for the estimation of various biochemical parameters like Haemoglobin, RBC and percentage Hematocrit [6, 7, 8].

2.5 Statistical Analysis

Data's were expressed as mean \pm SEM. The data were analyzed by using one way analysis of variance (ANOVA) followed by Dunnet's 't' test. P values < 0.05 were considered as significant.

3. Results & Discussion

Table 2. Effect of fruit of *Physalis minima* on Red blood cell (RBC)

S.No	Drug Treatment	RBC ($10^6 \mu\text{L}^{-1}$)
1.	Normal Control (0.1% CMC)	8.91 \pm 0.61
2.	Anemic Control Phenylhydrazine (60mg/kg)	4.81 \pm 0.14
3.	Reference control Vit. B ₁₂	8.25 \pm 0.42***
4.	Test Control - I <i>Physalis minima</i> (100 mg/kg)	8.14 \pm 0.54***
5.	Test Control - II <i>Physalis minima</i> (200 mg/kg)	8.33 \pm 0.39***

Data were expressed as Mean \pm SEM (n=6) *P<0.05, ** P<0.01 and *** P<0.001 vs. Anemic Control

Table 3. Effect of fruit of *Physalis minima* on Haemoglobin (Hb)

S.No	Drug Treatment	Hb (g dL ⁻¹)
1.	Normal Control (0.1% CMC)	13.52 \pm 0.55
2.	Anemic Control Phenylhydrazine (60mg/kg)	6.22 \pm 0.23
3.	Reference control Vit. B ₁₂	13.03 \pm 0.73***
4.	Test Control - I <i>Physalis minima</i> (100 mg/kg)	13.01 \pm 0.74***
5.	Test Control - II <i>Physalis minima</i> (200 mg/kg)	13.25 \pm 0.68***

Data were expressed as Mean \pm SEM (n=6)*P<0.05, ** P<0.01 and *** P<0.001 vs. Anemic Control

Table 4. Effect of fruit of *Physalis minima* on

Hematocrit % (%HCT)

S.No	Drug Treatment	HCT %
1.	Normal Control (0.1% CMC)	47.88
2.	Anemic Control Phenylhydrazine (60mg/kg)	28.42
3.	Reference control Vit. B ₁₂	43.29**
4.	Test Control - I <i>Physalis minima</i> (100 mg/kg)	41.61**
5.	Test Control - II <i>Physalis minima</i> (200 mg/kg)	46.35**

Data were expressed as Mean \pm SEM (n=6)*P<0.05, ** P<0.01 and *** P<0.001 vs. Anemic Control

The hydro-alcoholic extract of fruit of *Physalis minima* showed the presence of alkaloids, flavonoid, iron, saponins, carbohydrates, amino acids, glycoside, proteins and fixed oil & fats. Anti-anemic activity of *Physalis minima* fruit extract on Phenylhydrazine induced hemolytic anemia in rats was studied and the results were shown on table 2, 3, 4. The anti-anemic activity of *Physalis minima* fruit extract was assessed by determining the red blood cell count, haemoglobin and hematocrit percentage. Phenylhydrazine decreased the RBC, Hb and % HCT as compared with normal control. There was significant (P<0.001) increase in RBC and Hb with both Vitamin B₁₂ and *Physalis minima* fruit extract against phenylhydrazine provocation. Also there was significant (P<0.01) increase in % HCT with both Vitamin B₁₂ and *Physalis minima* fruit extract. This shows that *Physalis minima* fruit have anti anemic activity against phenylhydrazine induced hemolytic anemia in rats and it has comparable effect as that of the standard drug Vitamin B₁₂.

4. Conclusion

It has been concluded that the Hydro-alcoholic fruit extract of *Physalis minima* exhibits anti-anemic activity against phenylhydrazine induced anemia in rats. The anti-anemic effect produced by the *Physalis minima* fruit may be due to its high content of iron which is present in the plant.

IRON 1.4 mg (17.5 %) per 100 g

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