

Anti-Anemic Activity of Hydro-Alcoholic Extract of Fruit of *Allium tricoccum* in Phenylhydrazine Induced Anemic Rats

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ABSTRACT

This current research was done to bring out the anti-anemic activity in hydro-alcoholic extract of fruit of *Allium tricoccum* in phenylhydrazine induced anemic rats. The anemia was induced by the administration of Phenylhydrazine (60mg/kg) intraperitoneally in rats for two days. The animals were divided into 5 groups containing 6 animals each. 1st group was served as normal control group, 2nd group was served as anemic control, 3rd group was served as standard reference control administered with Vit. B12 complex, 4th group was served as test control-I administered with 100mg/kg of hydro-alcoholic extract of fruit of *Allium tricoccum* and 5th group was served as test control-II administered with 200mg/kg of hydro-alcoholic extract of fruit of *Allium tricoccum*. All the test drugs were given for 28 days daily through oral route. On 29th day blood was withdrawn, through tail puncture and subjected to the estimation of RBC, Hb and percentage Haematocrit. Both the hydro-alcoholic fruit extract of *Allium tricoccum* and Vit. B12 significantly increase the Haemoglobin, Red Blood Cells & percentage Haematocrit level which conclude that *Allium tricoccum* fruit exhibits the anti-anemic activity.

Keywords: Anemia, anti-anemic activity, hydro-alcoholic extract, *Allium tricoccum*, Vit. B₁₂.

INTRODUCTION

Iron deficiency is the most common nutritional disorder in which there is a depleted and a restricted supply of iron to various tissues which becomes apparent. Anemia is a condition that develops when blood lacks enough healthy red blood cells or haemoglobin. According to WHO, 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 which there is a depleted and a restricted supply of iron to various tissues which 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 proper management of micronutrient deficiencies most especially iron 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 care. In the present study, the goal was to evaluate the anti-anemic activity of fruit of *Allium tricoccum* against phenyl hydrazine induced anemic rats (Mohan, 2005; www.who.int; Tortora, 2015).

MATERIALS & METHODS

Plant profile

Table 1 - Plant profile

Plant taken	Spring onion
Part used	Fruits
Kingdom	Plantae
Order	Asparagales
Genus	Allium
Species	A. tricoccum
Family	Amaryllidaceae
Origin	North America



Fig. I - Fruit of *Allium tricoccum*



Fig. II - Plant of *Allium tricoccum*



Fig. III - Soxhlet apparatus

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 (Khandelwal 2013).

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 was done under the approval of Institutional Animal Ethical Committee (IAEC) of Modern Institute of Pharmaceutical Sciences, Indore the approval no. is IAEC/MIPS/01/2017/01 (Hussain *et al*, 2017).

Anti-anemic activity

- Anemia was induced by intra peritoneal injection of phenyl hydrazine at 60 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 (60 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 *Allium tricoccum* (100 mg/kg) per day for 28 days.
- Group V-Phenyl hydrazine treated rats with a single dose of fruit extract of *Allium tricoccum* (200 mg/kg) per day for 28 days.
- On 29th day, the blood was collected in EDTA coated tube under by tail puncture under phenobarbitone (45mg/kg, ip) anaesthesia. The estimation of various biochemical parameters like Haemoglobin, RBC and percentage Haematocrit were evaluated.

Statistical Analysis

Data's were expressed as mean \pm SEM. The data were analysed by using one way analysis of variance (ANOVA) followed by Dunnet's 't' test. P values < 0.05 were considered as significant (Joshi Ankur *et al*, 2017; Joshi Ankur *et al*, 2017, Gupta Deepanshu *et al*, 2018).

RESULTS**Table 2** - Effect of Fruits of *Allium tricoccum* on haemoglobin, RBC and percentage haematocrit.

S. No	Drug Treatment	RBC (106 μ L-1)	Hb (g dL-1)	HCT %
1.	Normal Control (0.1% CMC)	8.81 \pm 0.65	13.72 \pm 0.65	48.78
2.	Anemic Control Phenylhydrazine (60mg/kg)	4.71 \pm 0.14	6.42 \pm 0.22	27.44
3.	Reference control Vit. B ₁₂	8.34 \pm 0.42***	13.19 \pm 0.73***	47.33**
4.	Test Control – I <i>Allium tricoccum</i> (100 mg/kg)	8.32 \pm 0.51***	13.24 \pm 0.70***	46.57**
5.	Test Control - II <i>Allium tricoccum</i> (200 mg/kg)	8.53 \pm 0.34***	13.41 \pm 0.62***	49.82**

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 *Allium tricoccum* showed the presence of alkaloids, flavonoid, iron, saponins, carbohydrates, amino acids, glycoside, proteins and fixed oil & fats. Anti-anemic activity of *Allium tricoccum* fruit extract on Phenylhydrazine induced haemolytic anemia in rats was studied and the results were shown on table 2. The anti-anemic activity of *Allium tricoccum* fruit extract was assessed by determining the red blood cell count, haemoglobin and haematocrit 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 *Allium tricoccum* fruit extract against phenylhydrazine provocation. Also there was significant (P<0.01) increase in % HCT with both Vitamin B₁₂ and *Allium tricoccum* fruit extract. This shows that *Allium tricoccum* fruit have anti anemic activity against phenylhydrazine induced haemolytic anemia in rats and it has comparable effect as that of the standard drug Vitamin B₁₂.

CONCLUSION

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

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