



Research Article

Anti-anemic activity of hydro-alcoholic extract of leaves of *Lycium Barbarum* in phenylhydrazine induced anemic rats

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ABSTRACT

The aim of the current research was to bring out the anti-anemic activity in hydro-alcoholic extract of leaves of *Lycium barbarum* in phenylhydrazine induced anemic rats. The anemia was induced by the administration of phenylhydrazine (40mg/kg) intraperitoneally in rats for two days. The animal were divided into 5 groups containing 6 animal 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 leaves of *Lycium barbarum* and 5th group was served as test control-II administered with 200mg/kg of hydro-alcoholic extract of leaves of *Lycium barbarum*. 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 On 29th day blood was withdrawn, through tail puncture and subjected to the estimation of RBC, Hb and percentage Haematocrit.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 leaves extract of *Lycium barbarum* and Vit. B₁₂ significantly increase the Haemoglobin, Red Blood Cells & percentage Haematocrit level which conclude that *Lycium barbarum* leaves exhibits the anti-anemic activity.

Key words: Anemia; anti-anemic activity; hydro-alcoholic extract; *Lycium barbarum*;

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. 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 *Lycium barbarum* against phenyl hydrazine induced anemic rats. In many developing countries, herbal medicines are assumed as greater importance in health care^{1,2,3}.

METHODOLOGY

Plant profile

Table 1: Plant profile



Figure 1: Leaves of *Lycium barbarum*

Plant taken	Wolfberry
Part used	Leaves
Kingdom	Plantae
Order	Solanales
Genus	<i>Lycium</i>
Species	<i>L. barbarum</i>
Family	Solanaceae
Origin	China



Preparation of extract

The leaves 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. The % yield value was found to be 19.45% w/w⁴.

Animals

Wistar strain male albino rats, weighing 100–150 g were selected for the study. The animals were taken from the animal house of Modern Institute of Pharmaceutical Sciences, Indore. The animals were housed individually in polypropylene cages under hygienic and standard environmental conditions (22 ± 3°C, humidity 30–70%, 12 h light/dark cycle). The animals were allowed to have standard feed and water *adlibitum*. 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. The CPCSEA registration number of the institute is 1509/PO/RE/S/11/CPCSEA⁵.

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 leaf extract of *Lycium barbarum* (100 mg/kg) per day for 28 days.

Group V-Phenyl hydrazine treated rats with a single dose of leaf extract of *Lycium barbarum* (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 Haematocrit. The dose of extract was selected on the basis of acute toxicity study, the OECD guideline 420 (up & down) procedure was followed for the acute toxicity study^{6,7,8}.

Statistical Analysis

Data's were expressed as mean ± 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.

RESULT AND DISCUSSION

The hydro-alcoholic extract of leaves of *Lycium barbarum* showed the presence of alkaloids, flavonoid, iron, saponins, carbohydrates, amino acids, glycoside, proteins and fixed oil & fats. Anti-anemic activity of *Lycium barbarum* leaves extract on Phenylhydrazine induced hemolytic anemia in rats was studied and the results were shown on table 2. The anti-anemic activity of *Lycium barbarum* leaves 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 *Lycium barbarum* leaves extract against phenylhydrazine provocation. Also there was significant (P<0.01) increase in % HCT with both Vitamin B₁₂ and *Lycium barbarum* leaves extract. This shows that *Lycium barbarum* leaves have anti-anemic activity against phenylhydrazine induced hemolytic anemia in rats and it has comparable effect as that of the standard drug Vitamin B₁₂.

Table 2: Effect of leaves of *Lycium barbarum* on haemoglobin, RBC and percentage haematocrit.

S.No	Drug Treatment	RBC($10^6 \mu\text{L}^{-1}$)	Hb(g dL^{-1})	HCT %
1.	Normal Control (0.1% CMC)	8.81±0.65	13.72±0.65	48.78
2.	Anemic Control Phenylhydrazine(40mg/kg)	4.71±0.14	6.42±0.22	27.44
3.	Reference control Vit. B ₁₂	8.43±0.42***	13.18±0.73***	46.29**
4.	Test Control - I <i>Lycium barbarum</i> (100 mg/kg)	8.38±0.51***	13.29±0.70***	45.67**
5.	Test Control - II <i>Lycium barbarum</i> (200 mg/kg)	8.52±0.34***	13.43±0.62***	48.52**

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

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CONCLUSION

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

IRON 4.5 mg (25 %) per 100 g

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