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Evaluation Of Haematinic Activity of Bauhinia Purpurea Leaves Under In-Vivo Models

Akkiraju Sudheer[1*], N. Keerthana[2], B. Dhanush[3], Bukke Geethanjali[4], Papireddypalli Sushma[5], T R Harini Ganga[6], Joshua Anthony Vomo[7], Kanala Somasekhar Reddy[8]

[1,2,3,4,5,6,7,8]Department of Pharmacology, Raghavendra Institute of Pharmaceutical Education and Research, Chiyyedu, Ananthapuram, Andhra Pradesh, India.

***Corresponding Author:**

Akkiraju Sudheer

Department of Pharmacology, Raghavendra institute of pharmaceutical education and research, Chiyyedu, Ananthapuram, Andhra Pradesh, India,

Email ID:sudheerlegend@gmail.com

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ABSTRACT

The haematinic activity of an orally administered ethanolic extract of Bauhinia purpurea leaves was studied on haemolytic anaemic rats. Anaemia was induced by oral administration of phenyl hydrazine for a period of 14 days. red blood cell count, haemoglobin concentration, and packed cell volume were analysed as indices of anaemia. The mean cell haemoglobin, mean cell volume and mean cell haemoglobin concentration were calculated accordingly. Phenyl hydrazine induced a significant decrease ($p<0.05$) in the blood indicating anaemia and also resulted to significant increase($p<0.05$) in the mean cell haemoglobin, mean cell volume values, which are indicator of macrocytosis. leaf extract of Bauhinia purpurea induced a significant ($p<0.05$) increase in the red blood cell count, haemoglobin concentration, and packed cell volume which has been originally decreased by phenyl hydrazine administration 14 days of treatment. The presence of macrocytosis turn towards normal as the animal recovered from anaemic condition. The results obtained suggested that bauhinia purpurea leaves have hematinic activity

Keywords: *Haematinic activity, Bauhinia pupurea, Haemolytic anaemia, Phenyl hydrazine*

1. INTRODUCTION

Recently, the synthesis of heterocyclic organic compounds with a seven-membered ring is an important class and has diverse Anaemia is a widespread public health issue that is defined as a decrease in the mass of erythrocytes or the concentration of haemoglobin in blood, which results in a loss in the blood's ability to carry oxygen.

Anaemia affects about two billion people globally. In developing nations, anaemia is a more prevalent health issue. The management of anaemia is typically best achieved through dietary modifications and iron supplementation; oral ion therapy has significant drawbacks, including poor absorption and noncompliance. In addition, consuming large amounts of these iron supplements can result in major health complications, including cancer and neurogenic disorders.

All these facts demonstrate the need to have safe and effective alternative management of anaemia. Ayurvedic medicinal plants known as Rasayana are said to be beneficial for boosting a person's immune syst em and hematopoietic system

2. MATERIALS AND METHODS

Plant material

Fresh leaves of Bauhinia purpurea plant (fam: Caesalpiniaceae), were collected from forest region of Tirupati, India. The herbarium was prepared and authenticated by Dr. Madhava chetty, Sri Venkateshwar University, Tirupati. The authentication voucher specimen number is 0611.

The leaves were initially separated from the main parts of body and rinsed with distilled water and shade dried and then homogenized into fine powder and stored in air tight bottles.A total of 150g of leaf air dried powder was weighed and was placed in 500ml of organic solvents[ethanol]in a borosil screw cap bottle/container.The container is then closed and kept for

at least 3 days.The content is stirred periodically and if placed inside a bottle it should be shaken time to time to ensure complete extraction and then it was filtered with the help of muslin cloth and then kept in a rotary evaporator.Subsequently, the micelle is separated from the menstrum by the evaporation in an oven on top of water bath, extract was filtered and dried in China dish.

Phytochemical screening

The dried powdered leaves were screened for their phytochemical constituents and detailed in our previous wrok. The presence of carbohydrates, alkaloids, glycosides, flavonoids, terpenoids, tannins, steroids and phenolic compounds.

Animals

Healthy adult female albino rats (120-200gram body weight) were randomly assigned to 5 groups, each containing 6 animals in polypropylene cages layered with husk and maintained in a controlled room at a temperature (22±3°C) and light (12 hours light/dark cycle). Animals were allowed free access to water and standard pellet diet. Animals were cared in accordance with the "Guide for the care and use of laboratory animals" and study was conducted in accordance with CPCSEA. All animal experiments were conducted during the present study got prior permission from Institutional Animal Ethics Committee (IAEC approved) and following the guidelines of Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA) constituted by the Animal Welfare Division, Government of India (No: IAEC/I/06/RIPER/2022).

3. METHODOLOGY

The *Bauhnia purpurea* was freshly prepared at a dose of 2gm/kg by dissolving in 2ml of carboxy methyl cellulose.

Treatment Protocol

Group	Treatment
Group I (Normal group)	Received saline only for 14 days.
Group II (Anemic control group)	Received phenylhydrazine (40 mg/kg) at day 0 and day 1 then distilled water daily during 13 days.
Group III (Test group I)	Received phenylhydrazine (40 mg/kg) at day 0 (D0) and day 1 (D1) then treated with extract of Bauhinia purpurea at dose of 250mg/kg, p. o) daily during 13 days.
Group IV (Test group II)	Received phenylhydrazine (40 mg/kg) at day 0 (D0) and day 1 (D1) then treated with extract of Bauhinia purpurea at dose of 250mg/kg, p. o) daily during 13 days.
GroupV(Standard group)	Receivedphenylhydrazine (40 mg/kg) at days 0 (D0) and day 1 (D1) and dexorange single dose 200 mg/kg p. o per day for 13 days.

At the end of study blood was collected from retro-orbital plexus of all rats and estimated the haematological parameters.

Statistical Analysis

The results were expressed as mean ± SEM and statistically analyzed by using one way ANOVA followed by dunnet test multiple comparison test. $P<0.05$ is considered to be significant.

4. RESULTS

Table 1: Phytochemical result of ethanolic extract of *Bahunia purpurea.*

S. No.	Phytochemical constituent	Result
1	Carbohydrates	+
2	Alkaloids	++
3	Glycosides	+
4	Flavonoids	+
5	Terpenoids	+

6	Tannins	+
7	Steroids	+
8	Phenolic compounds	+

+ Indicates presence

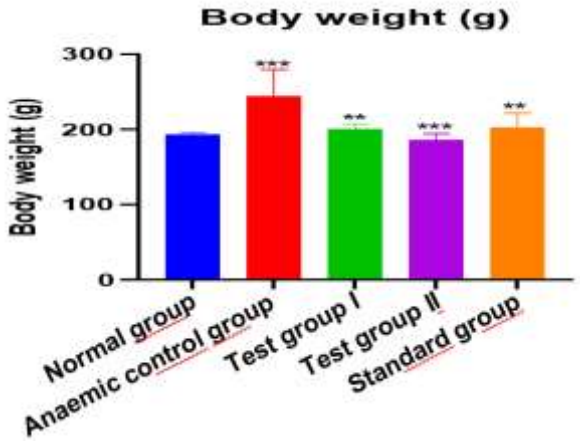
Table 2: Effect of ethanolic extract of *Bahunia Purpurea* on body weight, Haemoglobin and RBC in rats.

Group	Body weight (g)	Haemoglobin (g/dl)	RBC (Million/mm3)
Normal group	193 ± 1.42	11.1 ± 0.39	3.88 ± 0.13
Anaemic control group	144 ± 14.5***	6.58 ± 0.50**	2.73± 0.12ns
Test group I	201 ± 3.05##	12.2 ± 1.01###	4.28 ± 0.35##
Test group II	186 ± 3.38##	11.3± 0.69##	3.96± 0.24 #
Standard group	203 ± 7.79##	13.6 ± 1.17###	4.75± 0.40###

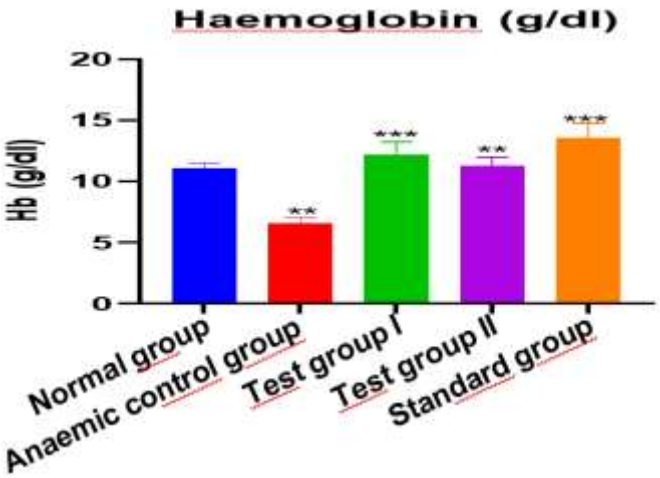
All values are expressed mean± SEM.

***P<0.001 compared to normal group, **P<0.01 compared to normal group, ns – non significant to normal group.

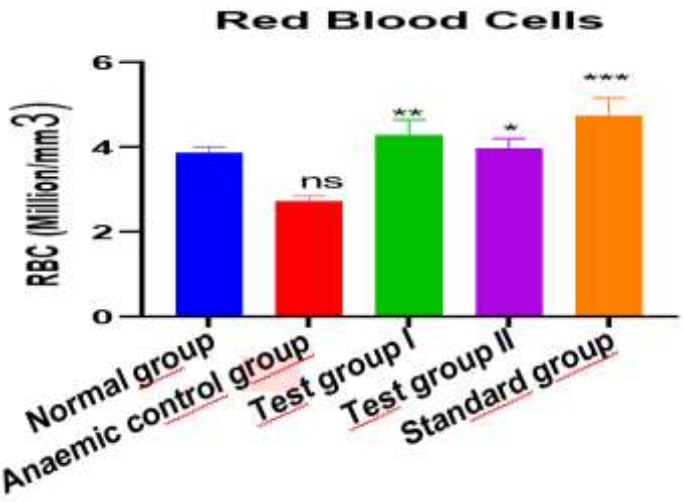
###P<0.001 compared to anaemic control group, ##P<0.01 compared to anaemic control group, #P<0.05 compared to anaemic control group.



All values are expressed as mean± SEM.***P<0.001 vs normal group***P<0.001, **P<0.01 vs anaemic control group.



All values are expressed as mean± SEM.**P<0.01 vs normal group***P<0.001, **P<0.01 vs anaemic control group.



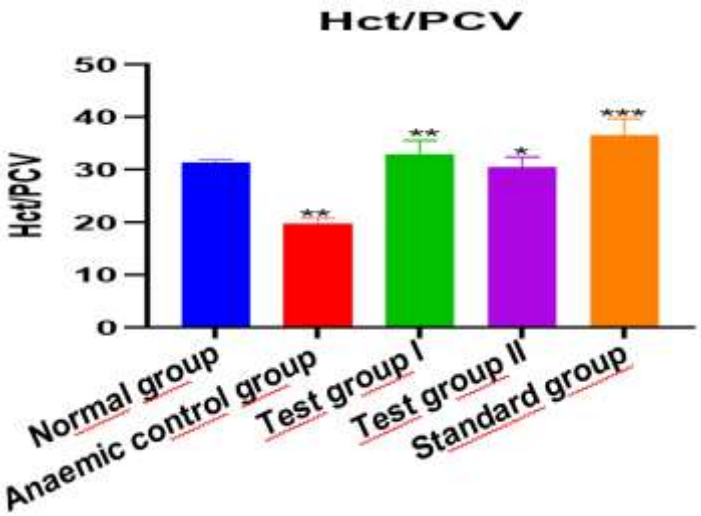
All values are expressed as mean± SEM. ns-non significant vs normal group**P<0.01, *P<0.05, ***P<0.001 **P<0.01 vs anaemic control group.

Table 2: Effect of ethanolic extract of *Bahunia Purpurea* on Hct/PCV, MCV,MCH, MCHC in rats.

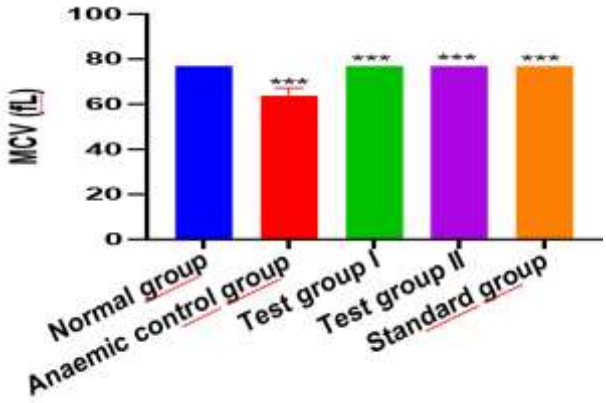
Group	Hct/PCV	MCV (fL)	MCH (pg)	MCHC (g/dl)
Normal group	31.3 ± 0.52	76.9 ± 0.002	28.3± 0.31	37.1±0.002
Anaemic control group	19.8± 1.02**	63.7 ± 3.43***	22.2 ±2.00*	40.9±1.48^{ns}
Test group I	32.9 ± 2.70$^{\#\#}$	76.8±0.10$^{\#\#\#}$	27.2± 0.84^{ns}	37.1±0.002^{ns}
Test group II	30.5± 1.87$^{\#}$	76.9 ± 0.004$^{\#\#\#}$	23.0±1.77^{ns}	34.1±1.91$^{\#\#}$
Standard group	36.5± 3.14$^{\#\#\#}$	76.9±0.003$^{\#\#\#}$	27.2±0.84^{ns}	36.1±0.515^{ns}

All values are expressed mean ± SEM.

***P<0.001 compared to normal group, **P<0.01, *P<0.05 compared to normal group, ns – non significant to normal group.$^{\#\#\#}$P<0.001 compared to anaemic control group, $^{\#\#}$P<0.01 compared to anaemic control group, $^{\#}$P<0.05, ns – non significant compared to anaemic control group.



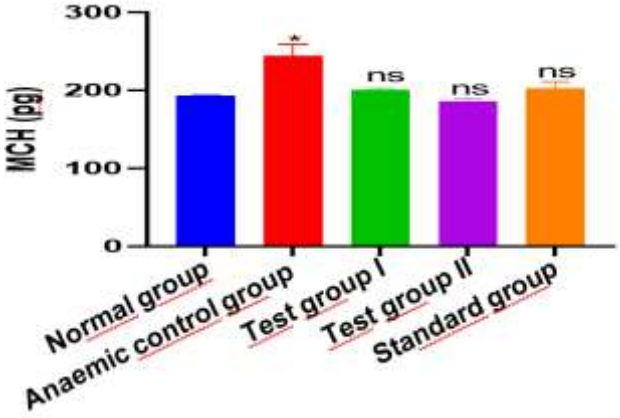
All values are expressed as mean± SEM.**P<0.01 vs normal group**P<0.01, *P<0.05, ***P<0.001 vs anaemic control group.



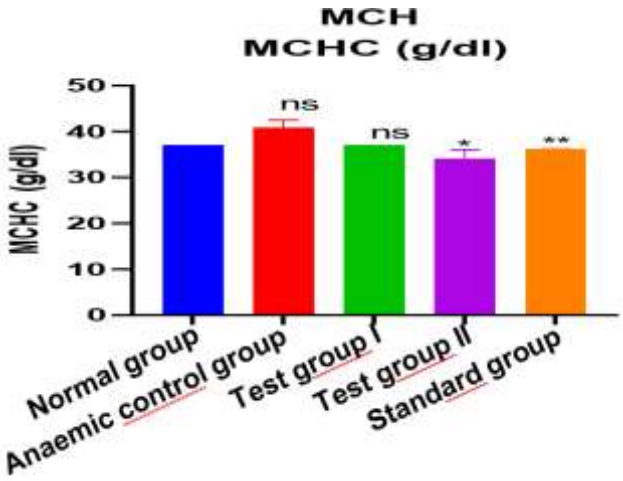
All values are expressed as mean± SEM.

***P<0.001vs normal group

***P<0.001 vs anaemic control group.



All values are expressed as mean± SEM.*P<0.05 vs normal group.Ns – non significant vs anaemic control group.



All values are expressed as mean± SEM.Ns -non significant vs normal group.**P<0.01 vs anaemic control group.*P<0.05 vs anaemic control group.

5. DISCUSSION

Phytochemical result of ethanolic extract of Bahunia purpurea

Ethanolic extract of leaves of Bahunia purpurea showed presence of carbohydrates, alkaloids, flavonoids, phenolic compounds, steroids, terpenoids.

Effect of ethanolic extract of Bahunia purpurea on Body weight, Haemoglobin and RBC in rats

Phenyl hydrazine induced rats exhibited significant decrease in body weight, haemoglobin, RBC compared to normal animals. Ethanolic extract of leaves of *Bahunia purpurea*at doses of 250 mg/kg, 500mg/kg respectively exhibited the significant increase in body weight, haemoglobin, RBC compared to anaemic control group.

Effect of ethanolic extract of Bahunia purpurea on Hct/PCV, MCV, MCH, MCHC in rats.

Phenyl hydrazine induced rats exhibited significant decrease in Hct/PCV, MCV, MCH whereas significant increase MCHC in compared to normal animals. Ethanolic extract of leaves of *Bahunia purpurea* at dose of 250mg/kg exhibited the significant increase in body weight, haemoglobin, RBC compared to anaemic control group.

6. CONCLUSION

In conclusion, ethanolic extract of leaves of *Bahunia purpurea* at dose of 250mg/kg have been shown haematinic activity against phenyl hydrazine induced anaemic effect in rats. It is due to presence of haematinic active constituents like flavonoids, phenolic compounds, alkaloids.Further study is warranted to identify the phytochemical constituent of *Bahunia purpurea*, responsible for haematinic activity.

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