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Effect of *Mesua ferrea* Flower and *Carica papaya* Seed Extract on Haematological Studies in Female Albino Rats

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Abstract: ***Haematology is defined as the branch of biology, which deals with the morphology of blood and blood forming organs. Haematological profiles of blood can provide important information about the internal environment of the organism and it can be used as bio monitoring tool in ecotoxicity risks of toxicant. In the present investigation the effect of Mesu .ferrea flower and Carica papaya seeds compounds on the blood components is determined in Female albino rats. The present investigation was aimed to examine the haematological changes of albino rats with oral extract (100mg/kg, 200mg/kg & 300mg/kg) administration of M.ferrea flower and C.papaya seeds. Twenty (20) rats divided into four groups (I, II, III and IV) of five rats per group were used. Group I was placed on the basal diet alone, while group II, III and IV were placed on the diet and also dosed with 0.5ml (100mg/kg), 0.5ml (200mg/kg) and 0.5ml (300mg/kg) of reconstituted lyophilized culture of M.ferrea flower and C.papaya seeds respectively. In rats treated with different doses of M.ferrea and C.papaya there was a significant increase in the cell volume, white blood cells (WBC), haemoglobin and red blood cells (RBC) when compared with the control.***

Keywords: Haematology, *M.ferrea*, *C.papaya* and Female albino rat

1. Introduction

Medicinal plants possess therapeutic properties and despite the widespread use of modern medicine, herbal products are still in use in most developing countries of Africa and Asia for the management of ailments. A considerable percentage of medicinal plants identified the World over are from tropical Africa (Sofowora, 1993). *Parquetina nigrescens* happens to be one such medicinal plant. *Parquetina nigrescens*, also known as bullock is a shrub found in equatorial West Africa (Mabberly, 1987) has been in traditional medicine practice for centuries with its leaves, roots and latex (Gill, 1992). *Parquetina nigrescens* is also a constituent of a commercial herbal preparation in Nigeria used in the treatment of anaemia in humans.

Haematological studies are important in animals and humans because the blood is the major transport system of the body and both the input and output substances of almost all the body's metabolic processes and any deviations from normal are detectable in the blood profile. An evaluation of the haematological profile usually furnishes vital information on the response of the body to injury, deprivation and/or stress. Such an evaluation is indispensably important in arriving at a diagnosis, making a prognosis, assessment of the efficacy of therapy and toxicity of drugs and chemical substances. The erythrocytic and leucocytic profiles of greatest importance include erythrocyte counts, packed cell volume (haematocrit), haemoglobin concentration, erythrocyte sedimentation rate, mean corpuscular values, total leucocyte counts and differential leucocyte counts (Schalm et al., 1975).

Blood is composed of cells and plasma. Plasma is the liquid component of blood within which the cell and colloids are suspended and other transported materials are dissolved (Reece, 1997). Plasma is yellow to colourless, depending on the quantity, the species of animal and the animals' diet. Blood volume and plasma volume can be influenced by weight of the animal, nutrition, drugs and excessive exercise. The functions of blood are so numerous that to list each function individually would require a rather extensive enumeration. The functions of blood can, however be summarized as being within the following categories: respiratory, excretory, nutritive, thermal regulation of the body, protective, and regulatory. Blood affects these functions through its ability to transport heat, nutrients, and waste products of metabolism, products of internal secretion (hormones), and immune bodies from one portion of the body to another (Beames *et al.*, 1971).

Nowadays, many people's are relying on herbal medicines for health care (Griffin, 1988), because the other treatment options available are more expensive and are often associated with serious side effects. Therefore, there should be scientific documentation of information on the safety/toxic risk potentials of plants. This study was prompted in view of this and coupled with the fact that there is dearth of information on the effect of ayurvedic administration on the blood, an important fluid essential for the erection process in males. Therefore this study attempt to investigate the effect of ayurvedic administration of aqueous extract of *M.ferrea*, *C. Papaya* flowers and seeds (as used in ayurvedic medicine) on haematological parameters using female albino rats as model. Various workers had shown that haematological investigations among others could be used to evaluate the health status of an animal (Kakade, 1972& Gruchy, 1976), hence the choice of haematological parameters of Haemoglobin (Hb), Red Blood Cell Count (RBC), White Blood Cell Count (WBC) in this study.

The study was thus carried out to provide data on the effect of aqueous flowers extract of *M.rerrea* and *C.papaya* on haematological parameter as well as its antioxidant properties and to verify claims by local medical practitioners of its use to influence growth and multiplication of blood cells.

2. Materials and Methods

Twenty albino rats used in this study were housed in the Experimental Animal Unit (EAU) of the Department of Zoology, Sri Krishnadevaraya University, Anantapuramu.

There were four groups of five rats each kept in four cages measuring about 18 by 12 inches under the same environmental conditions. The rats were allowed for a period of one week to stabilize with their new environment which is different from where they were bought (Bangalore).

The rats were fed ad libitum with commercially prepared feed and given fresh water. They were kept in cages and their faeces were cleaned out every day. The feeds and water were provided in earthen troughs.

3. Experimental Design

The animals were divided into 4 groups, consisting of 5 animals in each group. Group-I was maintained as Control and the remaining groups II, III and IV were administered orally 100 mg/kg, 200 mg/kg and 300 mg/kg body weight of M.ferrea and C.papaya extract by using intragastric tube for 7, 21 and 30 days daily.

Experimentation I:-

Group- I: - Control (Received D.w).
Group- II: - Treated with 100 mg D.w Extract /kg b.w.
Group-III: -Treated with 200 mg D.w. extract /kg b.w.
Group-IV: - Treated with 300 mg D.W. extract/kg b.w.

Experimentation II:-

The animals were divided into 4 groups, consisting of 5 animals in each group.
Group- I: - Control (Received D.w).
Group- II: - Treated with 100 mg Ethanol Extract /kg b.w.
Group-III: -Treated with 200 mg Ethanol extract /kg b.w.
Group-IV: - Treated with 300 mg Ethanol extract/kg b.w.
All the above treatments were given orally by using intragastric catheter for 7, 21 and 30 days to studies the haematological parameters.

Blood collection.

Blood was collected from each of the rats from the orbital sinus called the infra orbital lateral Canthus method. This was done using heparinised capillary tubes, a glass chamber, anaesthetic ether, cotton wool, and 2ml heparinised sample bottles and a recovery cage.

Analysis of the Haematological Parameters:

The Red Blood cells (RBC), White Blood Cells (WBC) and the differential count were estimated using the Improved Neubauer counting chamber as described by Baker et al., 1990. The Haemoglobin (Hb) concentration was determined by the Cyanmeth-haemoglobin method also as described by Baker et al 1990. (Fig: 1)

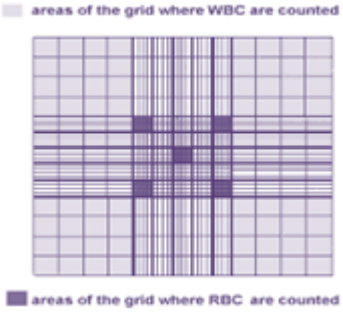

Figure 1

4. Results

Table 1: Effect of 100mg/kg, 200mg/kg and 300mg/kg D.W Extract of Mesua ferrea Flowers on RBC, WBC and Hb percentage in Female Albino Rats

Treatment groups	Dose mg/kg body weight	No. of days	RBC	WBC	Hb %
Group-I	(Control)	------	8.62±1.95	8.90±0.39	12.54±0.88
Group-II	100	7	8.96±2.35	7.85±0.87	13.24±1.48
Group-III	200	14	9.02±2.25	9.08±0.46	13.99±1.98
Group-IV	300	30	11.22±2.75	8.76±0.49	14.54±2.78

*Values are means and standard errors for 4 rats per treatment. Means along the row with different superscripts are significantly different ($P < 0.05$).

Table 2: Effect of 100mg/kg, 200mg/kg and 300mg/kg Ethanol Extract of C.papaya Seeds on RBC, WBC and Hb percentage in Female Albino Rats:

Treatment groups	Dose mg/kg body weight	No. of days	RBC	WBC	Hb %
Group-I	(Control)	------	8.62±1.95	8.90±0.39	12.54±0.88
Group-II	100	7	8.86±2.09	9.21±0.98	13.24±1.08
Group-III	200	14	9.16±2.79	9.99±1.58	13.84±1.78
Group-IV	300	30	9.96±2.92	10.10±1.95	13.94±1.98

*Values are means and standard errors for 5 rats per treatment. Means along the row with different superscript are significantly different ($P < 0.05$).

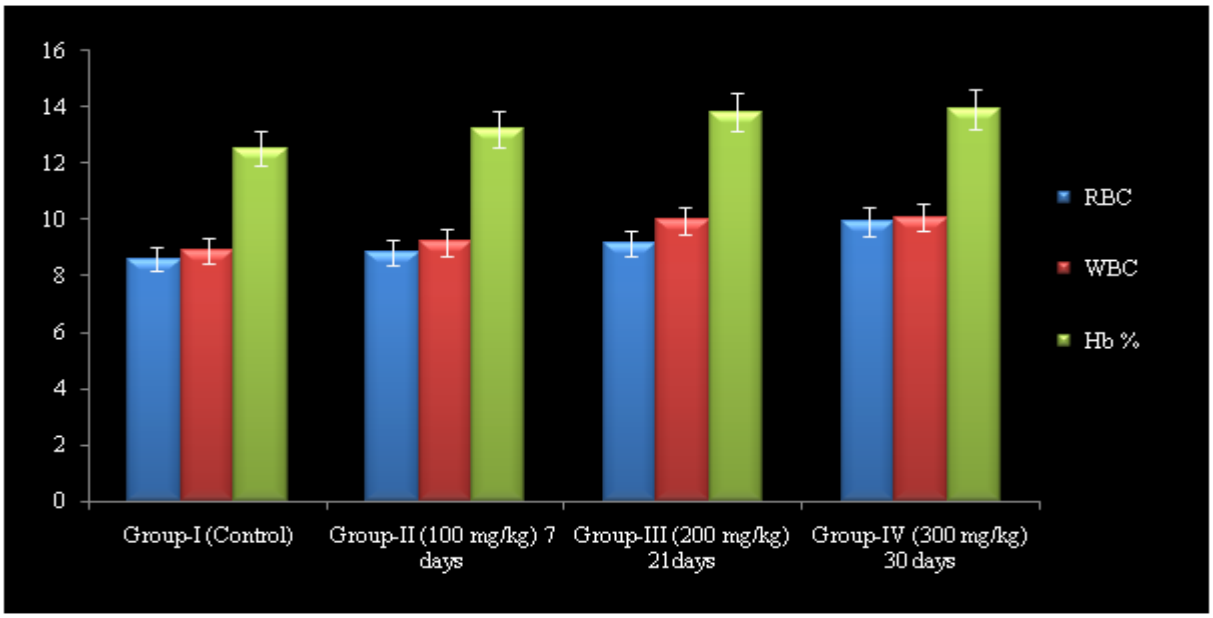

Figure 2: Effect of Mesua ferrea Flowers extract on RBC, WBC and Hb in Female Albino Rats

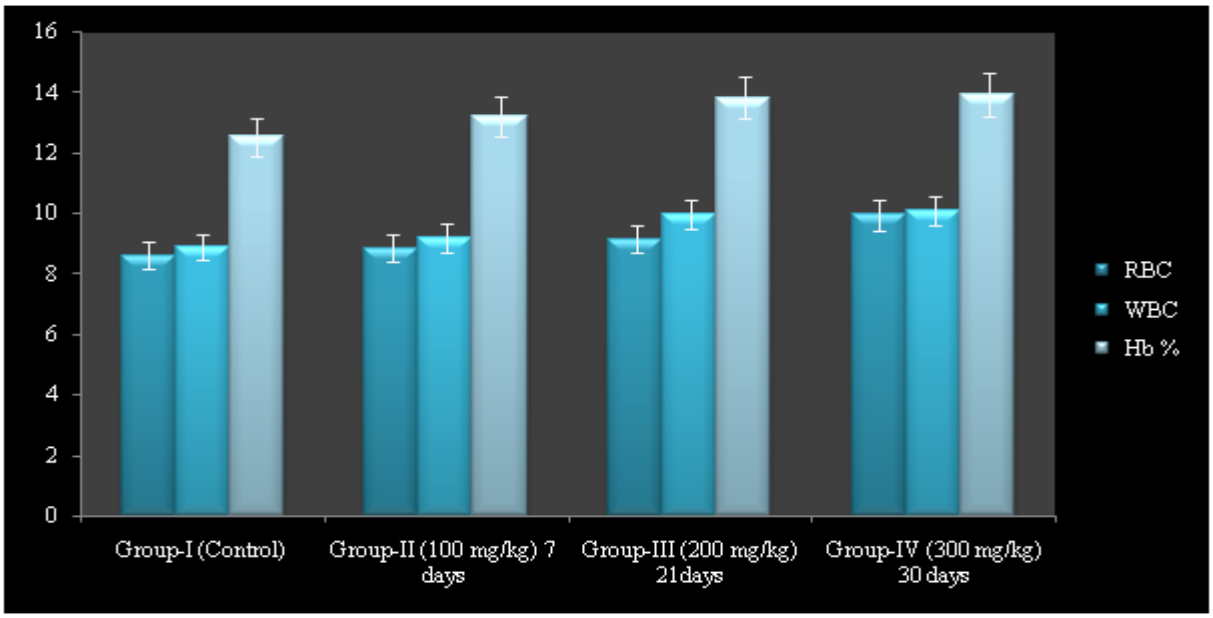

Figure 3: Effect of C.papaya seed extract on RBC, WBC and Hb in Female Albino Rats

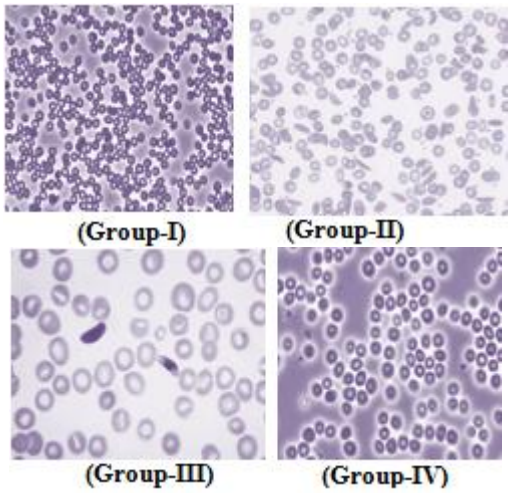

Figure 4: Effect of 100mg/kg, 200mg/kg and 300mg/kg D.W Extract of Mesua ferrea Flowers on RBC. (Table: 1)

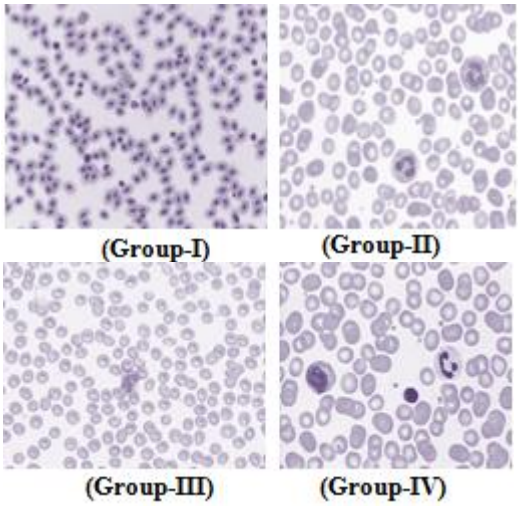

Figure 5: Effect of 100mg/kg, 200mg/kg and 300mg/kg D.W Extract of Mesua ferrea Flowers on WBC. (Table: 1)

5. Discussion

The results of the haematological parameters (Table: 1) showed that the mean RBC and Hb concentrations increased significantly ($p<0.05$) at 100mg/kg, 200mg/kg and 300mg/kg body weight of administration. The mean WBC count decreased significantly at 100mg/kg and 300mg/kg of administration. There was no significant difference in WBC, as well as the RBC and Hb concentrations at 100mg/kg, 200mg/kg and 300 mg/kg of administration. Literature has shown that oral ingestion of medicinal compounds or drugs can alter the normal range of haematological parameters (Ajagbonna *et al.,* 1999; Ofuya &Ebong, 1996). These alterations can either be positive or negative. In this study, significant increases in RBC and Hb at 100 mg/kg, 200 mg/kg 300mg/kg ($p<0.05$) were observed. This may be due to the presence of erythropoietin-like principles in the extract which probably stimulated erythropoietin synthesis or release at minimal doses (100mg/kg, 200 mg/kg & 300mg/kg). The active Biological principles such as alkaloids, cardiac glycosides, saponins, tannins, terpenoids, phenols and steroids contained in the extract, may be responsible for its hematopoietic effects.

This result agrees with the findings of (Agbor &Odetola, 2001) on the aqueous leaf extract of the *M.ferrea* on erythrocyte indices. Red blood cell count, haemoglobin concentration, hematocrit, reticulocyte population, and erythrocyte osmofragility were used as erythrocyte indices. It was observed that the aqueous flowers extract of *M.ferrea* significantly ($p <0.05$) increased the erythrocyte indices which were attributed to erythropoietin potential of *M.ferrea*. At higher doses, i.e. (100mg/kg, 200mg/kg and 300mg/kg), there were significant changes in RBC and Hb when compared with the control ($p<0.05$) (Fig:2,4). This implies that the erythropoietic potential of aqueous extract of *M.ferrea* flower is limited to a low dose of the extract. The findings also show that the aqueous flower extract of *M.ferrea* may possess the ability to suppress immunity because its oral administration at 100mg/kg and 300mg/kg significantly changes in the WBC count when compared with the control ($p<0.05$)(Fig:3,5). In consumption of the aqueous flower extract of *M.ferrea*, care should be taken because of its effect on immunity. The erythropoietic potentials and immunity depression of the aqueous flower extract of *M.ferrea* was only for the duration of the treatment.

Haematological findings of C.papaya:-

Result on the Haematological data is presented in the various figures above. Haematological values measured showed a significant ($p<0.05$) elevation of RBC, WBC and Haemoglobin level in the treatment group. This increase in the various haematological parameters was dose dependent.

An increase in the amount of RBC is suggestive of positive erythropoesis (Iranloye BO, 2002 & Mansi K, 2008) and therefore haemoglobin level increase as shown in this study in treated rats may result from increase in red blood cell production (Nancy E,2004). Reports of plant extract inducing increase in WBC and lymphocytes have pointed out their ability in boosting immune system (Adedapo AA, 2007), such is the case in Carica papaya from this study.

Findings from this study show that Carica papaya caused a dose dependent increase in the various haematological parameters. The RBC, WBC and haemoglobin level increased significantly ($p<0.05$) when compared with control rats.

6. Conclusion

It was concluded that the study of aqueous extract of *M. Ferrea* flower & *C. Papaya* seed administered orally to Female albino rats increased the haematological parameters, suggesting that these two plant extracts might boost up the general health of the animal.

7. Acknowledgement

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