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Research Article

The Effect of C. Papaya Leaf Powder on Biochemical and Haematological Parameters in Normal Rats.

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Abstract

Dengue fever is a mosquito-borne illness characterized by severe reduction in the platelet count. Since it is a viral disease, there is no single best treatment available currently. Some studies shown that Papaya extract may help Dengue patients by improving platelet counts. Recently, there is a increase in trend of consuming Papaya juice or tablets regularly.

Therefore, we would to like to see the long-term impact (beneficial or adverse) of Papaya powder diet on liver and kidney parameters in normal rats. Normal male wistar rats will be regularly fed with 0%, 10% and 20% Papaya diet for 90 days. After 90 days, blood was collected by retro-orbital puncture and analysed for haemoglobin, PCV, RBC count, WBC count, platelet count, Fasting glucose, AST, ALT, Urea, Creatinine, total cholesterol triglycerides. Our results shown significant increase in haemoglobin, PCV and platelet counts in Papaya diet groups compared to control group. But, there is no significant changes in any of the biochemical parameters. This proves the erythropoietic and thrombopoietic properties of the Papaya powder in normal rats. Also proves that Papaya powder has no adverse effect on liver and kidney in normal healthy rats when consumed for longer period.

Keywords: Carica Papaya; Dengue Fever; Platelets

Abbreviations

Hb: Hemoglobin; PCV: Packed Cell Volume; AST: Aspartate Transaminase; ALT: Alanine Transaminase; C. Papaya: Carica Papaya; CCl4: Carbon tetrachloride

Introduction

An infectious disease called Dengue fever has a high mortality and morbidity rate. As it's a viral illness, there isn't a particular medication that can be used to treat it. There have been some reports suggesting that Carica papaya leaf extract may help dengue patients; however, there is currently no comprehensive search or synthesized evidence to support this. There hasapparently been a sharp rise in demand for papaya leaf juice throughout India due to the recent dengue outbreak. Due to its apparent good effect on platelet count, the community quickly embraced the opinion pieces, news articles, and blogs published by print, social media, and national media regarding the use of papaya in the treatment of dengue [1]. The medicinal benefits of papaya (Carica papaya) leaf aqueous extract have been reported in the literature. These benefits are thought to be attributed to a number of active ingredients, including minerals, enzymes, alkaloids, and flavonoids, which may it also improved the lipid profile in diabetic rats. In addition, the leaf extract positively affected integrity and function of both liver and pancreas. Also have immunomodulatory and antioxidant properties [2-5]. C. papaya leaf extract is a viable option for raising platelet counts in dengue patients; however, before any decisions on the use of this extract are made, high-quality data in the form of extensive clinical trials are required. Papaya leaf powder is a finely ground and dried form ofPapaya leaves. It is full of minerals, including antioxidants, enzymes, and vitamins A, C, and E. Papaya leaf powder is frequently used to promote liver function, improve digestion, and increase immunity. Additionally, it might lessen the signs and symptoms of malaria, denguefever, and other infections. Study by O. J. Sule., *et al*. [6] showed the erythropoietic properties of Papaya extract in CCl4 induced rats. Papaya leaves and their extracts are sold as dietary supplements to improve the immune system and increase platelet counts. Juárez-Rojop et alstudied the hypoglycemic effect of Carica papaya leaves in streptozotocin-induced diabetic rats and showed the improvement of the lipid profile in diabetic rats [7].

Recently, there is a increase in trend of consuming Papaya juice regularly. Also many pharmaceutical companies introduced the papaya extract in tablet form to encash on its popularity. Therefore, we would to like to see the long-term impact (beneficial or adverse) ofPapaya powder diet on liver and kidney parameters in normal rats.

Materials and Methods

Preparation of animals: For the entire investigation, adult male wistar rats (10-12 months old) will be used. All of the rats will be kept in a climate-controlled room with a 12:12-hour light-dark cycle and free access to food and water. After receiving approval from the Institutional animal ethics committee (IAEC/KMC/08/2019), all research will be carried out with standardanimal care. Regular rat food pellets obtained from VRK nutritional solutions, Pune.

Preparation of Papaya diet supplementation: Papaya leaf powder is ordered from Amazon online store. Rats will be regularly fed with 0%, 10% and 20% Papaya diet for 90 days. For theexperimental rats, Papaya flour will be mixed at 0%, 10% ,20% with control rat chow. 0% indicates control rat chow without Papaya flour; 10% indicates 10% Papaya flour and 90% regular rat chow. 20% indicates 20% Papaya flour and 80% regular rat chow. Papaya powder mixed with hot water, food pellets prepared, sundried and then stored at room temperature. Two rats will be housed together and the food will be supplemented ad libitum daily for 90 days. 18 male wistar rats were divided into 3 groups (namely N0%, N10%, N20% diet groups), each group having 6 rats. N0% group serves as the control diet group.

Hematological and biochemical measurements

Rats were fasted overnight after the experimental period of 90 days, and blood samples weretaken from the retro-orbital plexus from all animals in each group into a clean and labelled tube. After allowing blood samples to clot at room temperature, serum was separated using cooling centrifugation at 3000 rpm for 10 minutes at -4°C. The serum samples were kept at -20°C until the biochemical tests were completed. Serum biochemical assessments such as AST, ALT, creatinine, blood urea, serum total cholesterol, triglycerides, fasting glucose weremeasured by routine analysis. For hematological parameters, blood was collected using EDTA vacutainers and then assays done by automated analyzer in Central Animal ResearchFacility. Hematological tests include: Hemoglobin, PCV, RBC count, WBC count, platelet count.

Statistical analysis

Statistical analyses will be performed using GraphPad Prism software. One-way analyses of variance (one-way ANOVA) with Newman-Keuls multiple comparison post hoc tests will be employed for comparison of 0, 10%, 20% dietary influence. Numerical data will be presentedas mean ± SD. and $p < 0.05$ will be considered statistically significant.

Results

Groups	Hb (g/dl)	PCV (%)	RBC Count (millions/mm3)	WBC Count (permm3)	Platelet count (lakhs/ mm3)
N0	15.4+/-0.4	39.2+/1.5	8.5+/-0.15	12900+/-1000	7+/-0.1
N10	17.2+/-0.2	44+/-1.6	8.6+/-0.15	10000+/-450	7.2+/-0.1
N20	17.8+/-0.4	44.2+/-1.6	8.7+/-0.2	9800+/-350	7.8+/-0.2

Table 1: Mean+/- SD values of Hematological parameters.

Groups	Fasting glucose (mg/dl)	AST (U/L)	ALT (U/L)	Urea (mg/dl)	Creatinine (mg/dl)	Total cholesterol (mg/dl)	Triglycerides (mg/dl)
N0	78+/-10	117+/-12	59.70+/-8.9	18.3+/-2.3	0.75+/-0.06	125.73+/-6.7	170+/-33.10
N10	80+/-6	128+/-13	48.8+/-5.4	22.2+/-2.5	0.82+/-0.1	128.07+/-7.7	161+/-38.66
N20	82+/-12	113+/-5	61.41+/-4.7	20.3+/-0.6	0.83+/-0.04	137+/-16.3	172+/-66.34

Table 2: mean +/- SD values of Biochemical parameters.

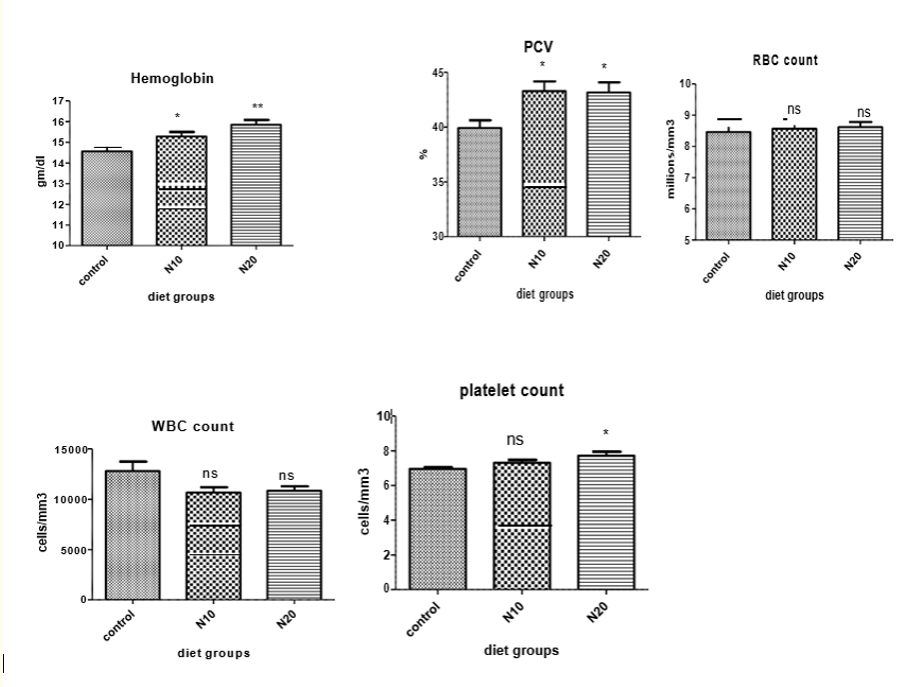

Figure 1

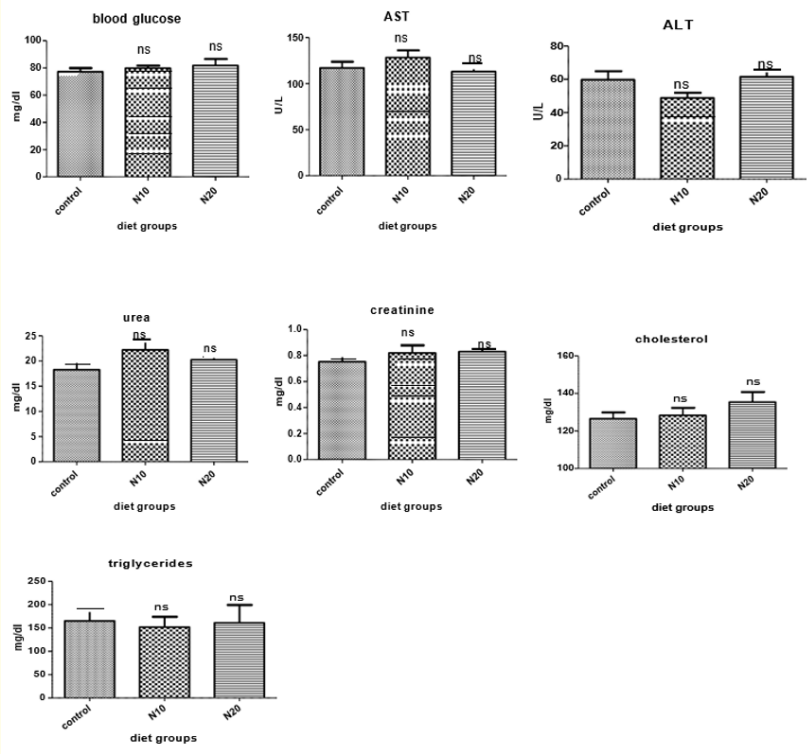

Figure 2

Discussion

Hematological parameters: Our study shows significant increase in hemoglobin levels in N10% ($p < 0.05$) and N20% ($p < 0.001$) diet groups compared to control group. N10% and N20% diet groups also show significant increase in Packed cell volume ($p < 0.05$). But RBC count does not show any significant difference, though there is some increase in the count.

These findings are in agreement with the previous study by O.J. Sule [6] that hemoglobin andhematocrit levels increased significantly in CCl4 induced rats. There is no significant changein the WBC count is observed. But the platelet count shows significant increase only in the N20% Papaya diet group. This finding is in agreement with the earlier studies [2-5].

Biochemical parameters: Biochemical parameters like Fasting glucose, AST, ALT, Urea, creatinine, lipid profile such as total cholesterol and triglycerides not showing significantdifference in their blood levels.

Conclusion

In conclusion, Papaya leaf powder possess erythropoietic properties which isevident by increase in hemoglobin, PCV levels. Our study also shows improvement in platelet count in papaya diet groups. But Papaya powder is not altering any biochemical parameters in normal healthy rats. Therefore we can say that consumption of Papaya leaf powder has no detrimental effect on liver and kidney parameters in normal rats when consumed for longer time.

Bibliography

1. Jha DN. "Doctors Unsure but Papaya a Hit for Dengue Treatment". *The Times of India* (2015).

2. Sarala N and Paknikar S. "Papaya extract to treat dengue: A novel therapeutic option?" *Annals of Medical and Health Science Research* 4 (2014): 320-324.

3. Subenthiran S., *et al*. "*Carica papaya* leaves juice significantly accelerates the rate of increase in platelet count among patients with dengue fever and dengue haemorrhagic fever". *Evidence-Based Complementary and Alternative Medicine* 2013 (2013): 616737.

4. Senthilvel P., *et al*. "Flavonoid from *Carica papaya* inhibits NS2B-NS3 protease and prevents dengue 2 viral assembly". *Bioinformation* 9 (2013): 889-895.

5. Dharmarathna SL., *et al*. "Does *Carica papaya* leaf-extract increase the platelet count? An experimental study ina murine model". *Asian Pacific Journal of Tropical Biomedicine* 3 (2013): 720-724.

6. OJ Sule., *et al*. "Effect of *Carica papaya* (L) Leaves on Haematological Parameters in Ccl4-induced Wistar Albino Rats". *BJMMR* 16.3 (2016): 1-6.

7. Juárez-Rojop., *et al*. "Hypoglycemic effect of Carica papaya leaves in streptozotocin-induced diabetic rats". *BMC Complementary and Alternative Medicine* 12 (2012): 236.