



Original Article

EFFECT OF PAPAYA SEEDS ON QUANTITATIVE HEMOGLOBIN ANALYSIS IN ANIMAL MODEL

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Received on 17-09-2015
Accepted on 27-12-2015

ABSTRACT

Objective: Present study designed to evaluate the pharmacological value of medicinal papaya seeds on quantitative hemoglobin estimation in conjunction with renal biochemistry tested on healthy rabbits. **Materials and Methods:** This experimental and interventional study conducted on animal subdivide group, papaya seeds powder were given at dose 250mg & 500mg once a day subsequently laboratory evaluation was performed at 0, 15, 30, 45 days. **Result:** Statistically proven incremental (7.8%, 11.4%) response in hemoglobin all tested groups noted. Increase in cumulative hemoglobin (g/dl) 11.2 ± 0.65 , 10.9 ± 0.50 was noted as compared to baseline ($p < 0.05$). Moreover Packed Cell Volume and Mean Corpuscular Hemoglobin Concentration were also showed increased value in test group B. Additionally group C also showed increase in Packed Cell Volume, Mean Corpuscular Volume and Mean Corpuscular Hemoglobin ($p < 0.05$). Desirably Urea and Creatinine remained unchanged. **Conclusion:** Desirable clinical improvement of Hemoglobin, Packed Cell Volume, Mean Corpuscular Volume, Mean Corpuscular Hemoglobin and Mean Corpuscular Hemoglobin Concentration was noted after 250/500mg of papaya powder seeds.

Key Words: Papaya seeds, Hemoglobin, Renal profile, Rabbit, PCV & MCV.
MC Karachi 2016; 22(1): 33-37

INTRODUCTION

It has been observed that human ailments are increasing throughout world. Therefore it is mandatory to look in the new avenues of treatment. In the recent years there have been a shift noted towards the natural medicine known as alternative medicine (WHO, 2000) [1].

Papaya is belongs to the family Caricaceae, commonly available in many part of the world. Many part of papaya plant reported to have nutritional and medicinal values [2-5]. It has been reported that edible

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fruit, leaves, latex and stem contain many biologically active ingredient such as vitamin A, vitamin C, Calcium, Iron, Folate, Riboflavin, Chymopapain and Papain etc [6-7]. Papaya markedly increases iron absorption from rice meal which was measured in parous women. Various parts of papaya plant are also used as chronic indigestion, asthma, fever, diarrhea, boils, hypertension, anti-microbial, anti-oxidant, anti-malarial, ulcer, HIV, anti-inflammatory, anti-cancer, infertility, anti-fungal and diabetes management [8-11].

Interestingly the papaya seeds particularly reported to have a rich source of proteins (27.8% to 44.4%), lipids (28.3%) and crude fiber (22.6% to 31.8%) and are used as anti-helminthics, anti-bacterial, anti-hyperglycemic and for infertility [12-18]. Therefore this novel study was designed to evaluate new pharmacological aspects of papaya seeds on hematological and renal parameter.

MATERIALS AND METHODS:

Group label	Type	Dose	Frequency
Group-A (Control)		Hay and Water as Standard diet/ (no) test sample	
Group-B (Test)	Seeds fed & Standard diet	Primary-dose-250mg	Once a day
Group-C (Test)	Seeds fed & Standard diet	Escalated-dose-500mg	Once a day

and oral cavity was examined for deglutition process [21].

Animal Model: Healthy adult rabbits of (either sex, age 16-24 months, weight approximate 2.5-3.0 kg) were used. The animals were kept and maintained under standard condition of well aerated room (temperature 22°C, light/dark cycle of 12hrs and were given fresh hay and water) [22]. Eighteen animals were randomly divided into three groups, each consisting of six animals, as follows:

Schedule for Sample Extraction: The blood samples were extracted in a uniform interval; first reading at zero time, subsequently samples were drawn at 15, 30 and 45 days.

Blood Extraction: Blood samples were drawn through clear venipuncture (rabbit ear, using the large visible veins). The extracted blood was immediately transferred into desirable containers (for Complete Blood Count was administered in anticoagulant (EDTA) containing test tube). For renal function estimation the extracted

This experimental and interventional study was conducted on healthy animal model using rabbits.

Study Setting and Duration: This 45 days study was conducted in the animal house situated in Baqai Medical college/University, Karachi.

Sample Preparation: Seeds: Ripen papaya was collected from the local vegetable and fruit market of Karachi. Fruits were cut into pieces and seeds were be separated and subsequently thoroughly washed. They were dried at room temperature for 2 week. Then dried seeds were crushed into fine powder using a domestic grinder. The fine powder was measured using Electric Balance (snowrex Ej-120), were pack in small plastic envelopes and kept in room temperature. For the purpose of this study, measured quantity of papaya powder was fed 250 to 500 mg. The viability of powder was considered 7days [19-20].

Sample administration: This measured seeds powder was mixed initially 10/cc plain tap water and subsequently were syringed directly into oral cavity

blood has centrifuged (2000 revolutions per minute) to get plasma and subsequently Urea & Creatinine were estimated as biochemical parameters for renal assessment.

Statistical Analysis:

Statistical analysis was performed on SPSS (Version 19).

RESULTS

This study clearly indicates that administration of therapeutic dose of papaya seeds powdered at pharmacological dose of 250/500mg OD showed a significantly incremental 7.8%, 11.4% (Table I, figure) response in quantitative hemoglobin concentration in all tested animals noted.

Statistical analysis showed in test group B and C showed, increase cumulative mean hemoglobin concentration (g/dl) i.e. mean value of TM_1 - TM_3 test 15-45 days (Table II-III) showed 11.2 ± 0.65 , 10.9 ± 0.50

EFFECT OF PAPAYA SEEDS ON QUANTITATIVE HEMOGLOBIN ANALYSIS IN ANIMAL MODEL

Table I:
% Change of Hematological of Group B & C from Baseline to end of treatment

	Group B (seed-fed) 250 mg (n=6) %	Group C (seed-fed) 500 mg (n=6) %
Hematology		
Hb.%	7.8	11.4
PCV	13.4	13.5
MCV	1.9	7.5
MCH	-0.8	7.8
MCHC	-2.8	-1.7
RBC	5.6	0.5

Table II:
Comparison of Hemoglobin, PCV, MCV, MCH, MCHC & RBCs estimation test of Group B/C (seeds-fed 250mg/500mg once a day) from Baseline (Day 0)

		Baseline Mean ± S.D	Test Cumulative Mean ± S.D			P-value
Hematology 250mg		500mg	250mg	500mg	250mg	500mg
Hb.%	10.4 ± 0.46	9.8 ± 0.18	11.2 ± 0.65	10.9 ± 0.50	0.010	0.001
PCV	33.5 ± 2.88	32.8 ± 1.47	38.8 ± 1.61	37.3 ± 0.96	0.001	0.001
MCV	70.5 ± 1.87	67.2 ± 1.17	71.8 ± 3.81	72.2 ± 2.16	0.423	0.001
MCH	21.5 ± 1.05	19.2 ± 1.17	21.3 ± 2.11	20.7 ± 1.03	0.856	0.001
MCHC	30.2 ± 0.41	29.2 ± 1.47	29.3 ± 0.84	28.7 ± 1.33	0.030	0.445
RBCs	5.1 ± 0.36	5.1 ± 0.19	5.4 ± 0.56	5.2 ± 0.19	0.251	0.770

Significant difference (p<0.05)

Table III:
Hemoglobin, PCV, MCV, MCH, MCHC & RBCs estimation test of Group B/C (seeds-fed 250mg/500mg once a day).

	Day-0 Mean ± S.D	Day-15 – TM₁ Mean ± S.D	Day-30 – TM₂ Mean ± S.D	Day-45 – TM₃ Mean ± S.D				
	250mg	500mg	250mg	500mg	250mg	500mg	250mg	500mg
Hb.%	10.4±0.46	9.8±0.18	10.7±0.26	10.7±0.27*	12.0±0.2*°	11.6±0.21*°	10.8±0.16	10.6±0.22*?
PCV	33.5±2.88	32.8±1.47	37.0±0.8*	37.3±1.03*	39.7±1.3*°	37.3±0.82*	37.3±1.03*?	37.2±1.17*
MCV	70.5±1.87	67.2±1.17	75.0±3.0*	70.5±0.55*	68.3±2.4°	72.0±1.41*°	72.2±2.71	74.2±2.32* °
MCH	21.5±1.05	19.2±1.17	23.0±2.28	20.7±1.03*	19.7±1.2*°	21.2±0.75*	21.3±1.37	20.2±1.17
MCHC	30.2±0.41	29.2±1.47	29.5±1.05	27.5±0.55*	29.7±0.52	30.0±0.89 °	28.8±0.75*?	28.5±1.05?
RBCs	5.1±0.36	5.1±0.19	5.0±0.27	5.1±0.17	6.0±0.50*°	5.9±0.12	5.2±0.32	5.1±0.23

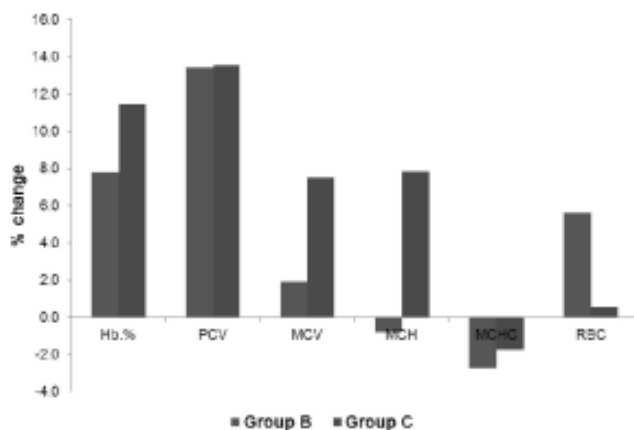
* Significant as compared to baseline (Day 0) p<0.05

° Significant as compared to baseline Day 15

? Significant as compared to baseline Day 30

TM (Test mean)

Figure: % Change in Hematological test value from baseline to end of treatment in Group B and C



Group B = Seed-fed (250 mg), Group C = Seed-fed (500 mg),

respectively (Table II). Interestingly the pronounced mean incremental response is noted on TM_2 30 days study on test showed hemoglobin (g/dl) 12.0 ± 0.21 , 11.6 ± 0.21 (Table III).

Additionally compared to baseline test group B; PCV was showed increased on test cumulative mean 38.0 ± 1.61 (Table II). In group C PCV, MCV and MCH were also increased as noted on test cumulative mean 37.3 ± 0.96 , 72.2 ± 2.16 , 20.7 ± 1.03 (Table II). Moreover RBCs, Urea and Creatinine were showed no significant effects are observed.

DISCUSSION

Various pathological diseases or nutritional deficiency of diverse etiological factors are increasing the human suffering by affecting the hemoglobin as well as other blood indices. As it is well known that anemia is common hematological problem in Pakistani population particular females that adversely affect the patient health that also significantly translate into social problem too. Adversely low hemoglobin can cause different functional changes in the biological structure such as brain in the form of loss of concentration & mood change. Therefore it is imperative to locate the natural remedy to increase hemoglobin concentration.

Papaya is well recognized for its admirable nutritional and medicinal properties all over world. At the present time, papaya is considered as a Nutraceutical Fruit due to its assorted medicinal properties^[23]. Therefore

this current study was planned to observe the potential therapeutic effects of papaya powder seeds in healthy adult animal model by quantitative hemoglobin estimation with empirical dose regime for 45 days. This result might reflect that effects of papaya seeds powder at dose of 250/500mg OD could be pronounced at 30 days ingestion. However a slight decremented response is noted TM_3 with the values of 10.8 ± 0.16 , 10.6 ± 0.22 . This might be showed some unfavorable effect. However exact mechanism of action of this incremental response remains to be discovered, but may be incremental response of hemoglobin due nutritional value of papaya contain iron and folate. Therefore it observed that 30 days ingestion of papaya seed could be beneficial for quantitative hemoglobin estimation. Interestingly another fact that is recorded during the examination of result Group A control that fed for 45 days showed increase cumulative mean hemoglobin concentration g/dl (i.e. 11.2 ± 0.58) that incremental response in hemoglobin may be because of good nutrition care.

Further investigation showed the effects of empirical dose of papaya seeds powder on the renal biochemistry no significantly effects observed.

Desirable upon therapeutic dose administration of papaya seeds powder showed that translate as unchanged biochemically analysis urea/creatinine tested. However large scales studies are required to explore the various therapeutic and toxic effects of papaya seeds.

CONCLUSION

Ingestion of papaya powder seeds could be improve the hemoglobin concentration in tested animal model.

AUTHORS INPUT

DA: Write the Research paper and do all research work, **AA:** Supervise the whole research work, **DM:**, Assist the Research work in lab and Help in statistics, **FJ:** Take part in animal handling and draw samples

Conflict of interest: Author declare that there is no conflact of interest

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EFFECT OF PAPAYA SEEDS ON QUANTITATIVE HEMOGLOBIN ANALYSIS IN ANIMAL MODEL

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