RESEARCH PAPER | Home Science | Volume : 5 | Issue : 3 | March 2015 | ISSN - 2249-555X

Effect of Fresh Papaya Leaf (*Carica Papaya*) Aqueous Preparation on Serum Lipid Profile of Hyperlipidemic Female Subjects

KEYWORDS: lipoproteins, hyperlipidemia,

Pretty Well Kar
Department of Home Science, Women's Christian College, Chennai

Nora Vigasini
Department of Home Science, Women's Christian College, Chennai

ABSTRACT *Caricapapaya (papaya) is a promising medicinal plant which could be utilized in several pharmaceutical and medical applications because of its effectiveness, availability and safety. The presence of phytochemicals in papaya leaves that possess lipid lowering properties, throws light on the possibility of using papaya leaves as a natural plant based remedy for either preventing or treating hyperlipidemia in a very cost effective way. The effect of fresh papaya leaf (Carica papaya) aqueous preparation on serum lipid profile of hyperlipidemic female subjects was studied using the pre testpost test experimental research design with control group.Papaya leaf aqueous preparation was administered to 15 subjects in the experimental group for a period of 60 days. A statistically significant reduction in the total cholesterol (TC), low-density lipoproteins (LDL), very low-density lipoproteins (VLDL) and Triglyceride (TG) levels was observed in the experimental group. However, the high-density lipoproteins (HDL) level did not show any statistically significant change. In the control group, no statistically significant difference was observed in all parameters at the end of the study period.*

INTRODUCTION

Hyperlipidemia is a heterogeneous group of disorders characterized by an excess of lipids in the bloodstream. These lipids include cholesterol, cholesterol esters, phospholipids and triglycerides (Rakel and Rakel, 2011). Lipids are transported in the blood as large 'lipoproteins'. Lipoproteins are divided into five major classes, based on density: chylomicrons, VLDL, IDL, LDL and HDL. Most triglyceride is transported in chylomicrons or VLDL, and most cholesterol is carried in LDL and HDL (Brunzell et al., (2008). The consequences of hyperlipidemia include atherosclerosis, higher coronary heart disease risk, angina, heart attack andstroke.

Health benefits of papaya leaves

Micronutrient analysis of*Carica* papaya leaves indicate that they are a good source of vitamin A, folic acid, magnesium and vitamin B_{12} (Imaga, 2010).The presence of phytocomponents such as alkaloids, tannins, saponins, flavonoids, anthraquinones and anthocyanosides might be responsible for the antihyperglycemic and hypolipidemic activity of papaya leaves (Maniyar, 2012).

The active components in **papaya leaf** extract namely papain, ascorbic acid, flavonoids, chymopapain, cyanogenicglucosides, cystatin, and glucosinolates are found to increase the total antioxidant power in the blood and reduce the oxidative damage. The leaf also contains beta-carotene, calcium, carpaine, fats, flavonols, niacin, papain, tannins and vitamin C (Seigler, 2002).

OBJECTIVES OF THE STUDY

- To formulate and supplement fresh papaya leaf aqueous preparation to hyperlipidemic female subjects aged between 35 to 45 years (premenopausal women) for a period of 60 days.
- To study the effect of supplementation on body weight, body mass index, waist circumference and waist hip ratio.
- To study the effect of supplementation on the total cholesterol, LDL-cholesterol, VLDL-cholesterol, HDL-cholesterol and Triglyceride levels.

METHODOLOGY

The design adopted was the pre-test, post-test experimental research design with control group. Thirty subjects were randomly divided into15 in the control and 15 in the experimental group. The supplementation was conducted for a period of 60 days. The study was approved by the Independent Institutional Ethics Committee of Women's Christian College, Chennai before the supplementation was carried out.

The anthropometric and biochemical assessments were carried out a day before the commencement of the supplementation period and a day after the completion of the supplementation period. Comparisons were made between the two to study the effect of supplementation. The control group did not receive the supplement.

PREPARATION OF SUPPLEMENT AND SUPPLEMENTATION

Water was used as the medium to prepare the aqueous extract. Fifty grams of fresh papaya leaves was simmered in 3 cups of water for half an hour during which time it reduced to less than 1/3rd its volume which measured to approximately 150 ml. This was supplemented to the subjects in the experimental group for a period of 60 days.

RESULTS AND DISCUSSION

Effect of supplementation on anthropometry

The effect of supplementation of papaya leaf aqueous preparation on body weight, BMI, waist circumference and waist hip ratio are presented in Table 1

Volume : 5 | Issue : 3 | March 2015 | ISSN - 2249-555X

Table 1
Comparison of anthropometric assessments of subjects (Before supplementation Vs After supplementation)

Parameter	Experimental group Mean± SD	Weight (kg)	Height (cm)	BMI	Waist circumference (cm)	Waist/hip ratio
Initial assessment (Before supplementation – 0th day)		72.8 ± 8.56	155± 4.46	30.5 ± 2.61	93.2 ± 7.03	0.85 ± 0.05
Final assessment (After Supplementation – 61st day)		66.8± 9.43	155 ± 4.46	27.8 ± 3.02	91.9 ± 6.95	0.83 ± 0.04
t value		9.72	-	10.58	3.45	1.87
Level of sig		1%	-	1%	NS	NS
Initial assessment (Before supplementation – 0th day)	Control group Mean± SD	68.8 ± 10.1	156.6 ±3.73	28.2 ± 3.8	94.6 ± 7.00	0.86 ± 0.04
Final assessment (After Supplementation - 61st day)		69.2 ± 10.5	156.6 ± 3.73	28.2 ± 3.35	95.7 ± 7.60	0.85 ± 0.05
t value		0.47	-	0.04	1.49	1.47
Level of sig		NS	-	NS	NS	NS

NS – Not significant

The supplement had a weight reducing effect that was significant at 1% level in the experimental group. A significant reduction in the BMI observed in the experimental group proved that it reduces the risk of acquiring CVD. No statistically significant change was observed on the waist circumference and waist/hip ratio in both groups.Mantok (2005) reported that the tea, prepared with the green papaya leaf, promotes digestion and aids in the treatment of ailments such as chronic indigestion, overweight and obesity, arteriosclerosis and high blood pressure. Papaya leaf extract offers many health benefits for the digestive system and is an excellent addition to natural weight loss regimen. Papaya leaves contain a high concentration of the enzyme papain which helps digest proteins, fat and carbohydrates and helps speed up the metabolism thus resulting in weight loss.

Effect of supplementation on the serum lipid profile

The effect of papaya leaf aqueous preparation on the total cholesterol (TC), High density lipoprotein (HDL), low density lipoprotein (LDL), very low density lipoprotein (VLDL) and triglyceride (TG) levels is presented in table 2

Table 2
Lipid profile of control and experimental groups before and after supplementation of aqueous extract of Carica papaya

Blood lipid Parameters desirable values (WHO, 2002)		Serum lipid profile								
		Experimental group				Control group				
(mean±SD)	0th day	(mean±SD)	61st day	t val	p val 0th day Vs 61st day	Level of sig	0th day	61st day	t val	p val 0th day Vs 61st day	Lev of sig
TC (mg /dl) <200	261.46 ± 21.47	227.6 ± 22.7	13.9	0.00	1%	250.1 ± 22.6	250.9 ± 23.1	0.54	0.59	NS
HDL >60	52.3 ± 4.3	51.3 ± 3.6	2.71	1.6	NS	49.5 ± 4.5	49.9 ± 4.5	0.8	0.41	NS
LDL < 100	156.7 ± 21.7	130.4 ± 24.0	10.9	0.00	1%	148.8 ± 23.4	150.2 ± 22.8	0.74	0.46	NS
VLDL	52.4 ± 6.5	46.5 ± 6.6	13.2	0.00	1%	51.2 ± 7.3	50.7 ± 7.08	0.76	0.45	NS
TG < 150 mg/dl	261.9 ± 32.6	232.7 ± 33.1	13.2	0.00	1%	256.2 ± 36.6	257.02 ± 35.31	0.8	0.38	NS

NS- not significant

In the experimental group, a statistically significant reduction at 1 per cent level was observed in the total cholesterol, LDL, VLDL and TG levels. The HDL level did not show any statistically significant change. In the control group that did not receive any supplement, no statistically significant difference was observed in all parameters at the end of the study period.

Cardiovascular risk factor ratios

The Cardio Vascular risk (CVD) factor ratios TC : HDL ratio (coronary risk ratio), LDL : HDL ratio (Atherogenic index), TG : HDL ratio (specific index for women)) were calculated for the experimental and control groups before commencement of the supplementation and after the supplementation period. This is presented in Table 3.

Volume : 5 | Issue : 3 | March 2015 | ISSN - 2249-555X

Table 3
Effect of supplementation on CVD risk factor ratios

CVD risk factor ratios (AHA &WHO approved)	Desirable value	Experimental group			Control group		
		Before supplementation (0th day) Mean ± SD	After supplementation (61st day) Mean ± SD	Lev of sig	Before supplementation (0th day) Mean ± SD	After supplementation (61st day) Mean ± SD	Levof sig
TC : HDL ratio	< 4.5	4.99 ± 0.02	4.38 ± 0.24	1%	4.99 ± 0.02	4.98 ± 0.11	NS
LDL : HDL ratio	< 3.71	2.94 ± 0.18	2.47 ± 0.31	1%	2.92 ± 0.21	2.94 ± 0.21	NS
TG : HDL ratio	< 4.0	5.01 ± 0.93	4.52 ± 0.91	1%	5.14 ± 1.06	5.17 ± 1.02	NS

NS-not significant

A comparison was made between the initial and final values. In the experimental group, TC:HDL, LDL:HDL as well as TG:HDL indexes showed a highly significant reduction (1% level) after supplementation of fresh papaya leaf aqueous preparation for a period of 60 days. The control group did not show any significant change in the risk factor ratio at the end of the study period.

This is a very significant finding of the present study which proves that fresh papaya leaf aqueous preparation has the potential to reduce the blood lipid parameters that are linked with increased risk for heart disease. This preparation can be afforded by individuals belonging to all income levels as this tree can be grown in the back yard or in terraces of apartments. It is therefore a simple, cost effective and a more natural way to lower elevated blood lipids without any side effects.

CONCLUSION

From the findings of this study it can be concluded that fresh papaya leaves aqueous preparation can be used as a safe, cost effective, natural supplement for lowering elevated blood lipids. This preparation has the potential to bring about weight reduction thus lowering the risk for heart disease.

REFERENCE Brunzell et al., (2008) Lipoprotein Management in Patients WithCardiometabolic Risk. Diabetes care , 31(4) . | Imaga,N.A., et.al., (2010) Phytochemical and antioxidant nutrient constituents of Carica papaya and Parquetinanigrescens extracts; Scientific Research and Essays Vol. 5(16), 2201-2205. | Maniyar , Y., and Bhixavatimath, P., (2012) Antihyperglycemic and hypolipidemic activities of aqueous extract of CaricapapayaLinn.leaves in alloxan-induced diabetic rats Ayurveda intergrated journal 3(2) 70-74 | Mantok, C., (2005) Multiple usage of green papaya in healing at Tao Garden.Tao | Rakel and Rakel., (2011) Textbook of Family Medicine 8thedCopyright © 2011 by Saunders, an imprint of Elsevier Inc. 73-99. | Seigler., D.,S., Pauli, G.,F., Nahrstedt., A., Leen., R., (2002) Cyanogenicallosides and glucosides from Passifloraedulis and Carica papaya Phytochemistry 60 873–882. |