EVALUATION OF HYPOGLYCEMIC, ANTI HYPERGLYCEMIC AND ANTI HYPERLIPIDEMIC ACTIVITY OF HYDROALCHOLIC EXTRACT OF CARICA PAPAYA L. IN ALLOXAN INDUCED DIABETIC RATS

Jayadev Sureddi¹* and Pankaj Sharma²

¹Faculty of Pharmacy, Pacific Academy of Higher Education and Research, Udaipur-313003, India.
²Department of Pharmacology, Jaipur National University, Jaipur-302017, India.

ABSTRACT

This present investigation is study the effect of hydroalcoholic extract of Carica papaya fruit on blood glucose levels in normal and alloxan (150 mg/kg b.w. i.p) induced diabetic and rats. An attempt also made to check the hyperlipidemic activity (induced by high fat diet cocktail) of hydroalcoholic extract of C. papaya in rats. The Phytochemical screening was performed by using standard chemical methods. The treatment was given at doses of 200, 300 and 400 mg/kg, b.w. for single doses to the animal and estimating the hypoglycemic, antihyperglycemic and antihyperlipidemic activities. Blood glucose levels were measured using GOD-POD. After the treatment a significant reduction was observed in fasting blood glucose levels in treated diabetic rats and normal rats. Carica papaya showed significant decrease (p < 0.005) in blood glucose levels. Simultaneously, the alteration in lipid metabolism was partially attenuated as evidenced by decreased Serum Total Cholesterol (TC), Triglyceride (TG) And Low-Density Lipoprotein Cholesterol (LDL) levels and by increased High-Density Lipoprotein Cholesterol (HDL) concentration in diabetic rats (p < 0.001). These results suggest that Carica papaya L possesses anti diabetic effects in alloxan induced diabetic rats.

KEYWORDS: Hypoglycemic, Antihyperglycemic, Antihyperlipidemic, Carica papaya, Lipid Profile, Hydroalcoholic Extract.
INTRODUCTION
Diabetes mellitus is a metabolic chronic disorder affecting carbohydrate, fat and protein metabolism and is caused by an absolute or relative lack of insulin. It is characterized by hyperglycemia in the postprandial and/or fasting state, and in its severe form is accompanied by ketosis and protein wasting.\textsuperscript{[1]} Besides drugs classically used for the treatment of diabetes (insulin, sulphonylureas, biguanides and thiazolidine-diones), several species of plants have been described in the scientific and popular literature as having a hypoglycemic activity.\textsuperscript{[2,3]} Because of their perceived effectiveness with minimal side effects in clinical experience and relatively low costs, herbal drugs are prescribed widely even when their biologically active compounds are unknown.\textsuperscript{[4]}

Hyperlipidemia contributes significantly in the manifestation and development of atherosclerosis and coronary heart diseases (CHD). Atherosclerosis is the most common cause of mortality and morbidity worldwide. Although several factors, such as diet high in saturated fats and cholesterol, age, family history, hypertension and life style play a significant role in causing heart failure, the high levels of cholesterol particularly TC, TG and LDL cholesterol is mainly responsible for the onset of CHDs (Choudhary et al., 2005). A 20% reduction of blood cholesterol level can decrease about 31% of CHD incidence and 33% of its mortality rate.\textsuperscript{[5]}

The papaya (Caricae) is a large, tree like plant with a single stem growing from 5 to 10 m (16 to 33 ft) tall, with spirally arranged leaves confined to the top of the trunk. The lower trunk is conspicuously scarred where leaves and fruit were borne. The leaves are large, 50–70 cm (20–28 in) in diameter, deeply palmately lobed, with seven lobes. Unusually for such large plants, the trees are dioecious. The tree is usually unbranched, unless lopped. The flowers are similar in shape to the flowers of the plumeria, but are much smaller and wax like. They appear on the axils of the leaves, maturing into large fruit 15–45 cm (5.9–18 in) long and 10–30 cm (3.9–12 in) in diameter. The fruit is ripe when it feels soft (as soft as a ripe avocado or a bit softer) and its skin has attained amber to orange hue.

MATERIALS AND METHODS
Collection and authentication of plant material: Carica papaya was collected in the month of May 2012 from sLB Nagar market and was taxonomically identified by Dr. (Mrs.) B. Prathibha Devi, Professor and Head of Department of Botany, Osmania University, Hyderabad and a specimen was deposited as voucher 0144.
Preparation of powder: The fruit of *C. papaya* cut into pieces, shade dried and then powdered with a mechanical grinder to form a coarse powder. The powder was passed through sieve no 40 and was stored in an air tight container until further use.

Preparation of hydro alcoholic extract: The powder was stored in airtight container which was used for extraction. About 70 g of air dried powdered material was soaked in mixture of water and alcohol (ethanol) 60:40%v/v and placed it separately for 72 h. Separated filtrate extract is filtered by using muslin cloth and the liquid was evaporated. At the end of the extraction process the marc was taken out and it was dried. After drying, the powdered marc was weighed and again packed.

**CHEMICALS:** Alloxone monohydrate was purchased from sigma chemicals (St. Louis, U.S.A). Glucometer purchased from Microgene (Accasure). Simvastatin was obtained as gift sample from Dr. Reddys labs Ltd., Hyderabad. Diagnostic kits for estimation of Cholesterol (Span Diagnostics), triglyceride (Biolab diagnostics), HDL-C (Coral Clinical) were used. All other chemicals used for this study were analytical grade.

**PHYTOCHEMICAL SCREENING**
The hydro alcoholic extract was exposed to several qualitative tests to confirm the constituents present in the extract were given below.

**Tests for Alkaloids:** Five milliliters of the crude extract were added to 2 mL of hydrochloric acid and filtered, the filtrate was used for Mayer’s, Dragendorff's, Wagner’s and Hager’s tests.

**Mayer’s test:** To 1ml of filtrate, two drops of Mayer’s reagent was added along the sides of the test tube. White or creamy precipitate produced due to presence of alkaloids.

**Dragendorff's test:** To 1ml of the filtrate, few drops of Dragendorff's reagent added. A prominent reddish brown precipitate was formed due to alkaloids(Kokate, 2001).

**Wagner’s test:** Few drops of Wagner’s reagent were added to 1ml of filtrate along the sides of the test tube. Formation of reddish brown precipitate confirmed the alkaloids.

**Hager’s test:** 1 or 2ml of Hager’s reagent was added to 1ml of filtrate, a prominent yellow precipitate was formed due to alkaloids.
Tests for glycosides

**Legal’s test:** The extract was dissolved in pyridine. Sodium nitroprusside solution was added and made alkaline by using 10% sodium hydroxide solution. Presence of glycoside is indicated by a characteristic pink color.

**Baljet test:** To the extract, sodium picrate solution was added. Formation of yellow to orange color indicates presence of glycosides.

**Keller killiani test [test for Deoxy sugars]:** The crude product was extracted with chloroform and evaporated to dryness. Added 0.4ml of glacial acetic acid containing a trace amount of ferric chloride and transferred into a small test tube. Carefully 0.5ml of concentrated sulphuric acid was added on the sides of the test tube, blue color appeared in the acetic acid layer indicates the presence of deoxy sugars.

**Amino acids**

One milliliter of the crude stock extract was added a few drops of Ninhydrin reagent. The purple colour appearance shows the presence of amino acids (Harborn, 1998).

**Flavonoids and tannins**

**Shinoda Test:** Few fragments of magnesium ribbon added to few ml of conc. HCl and add by drop wise to the alcoholic solution. Development of pink or crimson red color pointed out the flavonoids.

**Fecl₃ test:** Few drops of 5% Fecl₃ solution added to a few ml of alcohol. A blue, green or violet color formation indicates the presence of phenolic compounds.

**Lead acetate test:** A small quantity of extract dissolved in distilled water added to 3ml of 10% lead acetate solution. A white precipitate was observed indicates the presence of flavonoids.

**Zinc-hydrochloric acid reduction test:** A pinch of zinc dust was added to few drops of conc. alcoholic solution. Generation of magenta color indicates presence of flavonoids.

**Tests for Sugars**

**Molish’s test:** To two ml of filtrate, 2 drops of alcoholic solution of alfa-napthol was added. The mixture was shaken and 1ml of conc. H₂SO₄ was added slowly down the sides of the test
tube, the test tube was cooled in ice water and allowed to stand. A violet colour ring at the junction of two liquids indicated the presence of carbohydrates.

**Fehling’s Test:** 1ml of the filtrate was boiled on water bath with 1ml each of Fehling’s solution A and B. Formation of red precipitate indicates the presence of sugars (Kokate, 2001).

**Benedict’s test:** 0.5ml of the filtrate added to 0.5ml of Benedict’s solution and was heated on a boiling water bath for 2 minutes. A characteristic brick red precipitate was observed due to sugars (Kokate, 2001).

**ANIMALS**

Wister Albino Rats (150–200g) were obtained from the Animal House, Hyderabad. Rats were maintained on standard pellet diet and tap water *ad libitum*. They were kept in clean cages under a 12 h light/dark cycle and room temperature 22–24°C and were acclimatized to the environment for 2 weeks prior to experimental use. This study was conducted according to the guidelines approved by the Institutional Animal Ethics Committee.

**Acute toxicity studies**

Acute oral toxicity study was performed as per acute toxic class method i.e., OECD-423; 2001 guidelines (Diener *et al*., 1995). Mice (n=3) of female sex selected by random sampling technique were used in the study. The animals were kept fasting for overnight providing only water, after which the extracts were administered orally at the dose level of 5000 mg/kg body weight by intra-gastric tube and observed for 14 days. Mortality was not observed for 5000 mg/kg body weight (Ecobichon *et al*., 1997).

**INDUCTION OF DIABETES**

Diabetes was induced by injection of a single intra-peritoneal dose of Alloxan monohydrate (freshly prepared in 0.1% normal saline). Overnight fasted rats were injected with alloxan (120 mg/kg body wt., *i.p*) to induce diabetes. Diabetes was confirmed by glucose estimation and animals with plasma glucose level >200 mg/dl were selected for the study. Diabetic induced Animals were grouped for further study. After 3 days of alloxan induction, treatment was started.
The serum glucose level was estimated in overnight fasted controls, diseased controls (DC) and drug treated diabetic animals at a dosage of 200, 300 and 400 mg/kg b.w. Blood samples were withdrawn from tail vein and glucose concentration was estimated by using glucometer for 12 h.

COMPOSITION OF HIGH FAT DIET\textsuperscript{10,11,12}
High fat diet cocktail was prepared by mixing cholesterol (100g), cholic acid (50g) in 1 liter of coconut oil supplemented with egg. The animals were fed with high-cholesterol diet for 10 days. To confirm the induction of hyperlipidemia, blood samples were collected by retroorbital vein. The TC concentration of the blood samples was then determined using a standard diagnostic kit. The rats were then divided into 5 groups of 6 animals based on their cholesterol levels, after which the treatments were administered orally once daily for 10 days.

EXPERIMENTAL DESIGN
HYPOGLYCEMIC ACTIVITY\textsuperscript{8,9}
On the previous day of experimentation, the food was withdrawn 12h advance. However water was allowed \textit{ad libitum}, the fasting was continued till the completion of the experiment. On nextday, the blood samples were withdrawn from tail vein for determine of basal glucose concentration. Then the animals were administered with plain 0.5% w/v CMC suspension. Thereafter the blood sample each were collected at 0,1,2,3,4,5,6 h and analyzed for the determining the glucose concentration using glucometer.

Wister albino rats (150-200 g) and healthily 36 rats were selected. The rats were divided in to six groups each having six animals. Group 1–normal rats, Group 2–treated rats that served as control rats, Group 3–Glibenclamide (50mg/kg) treated rats, Group 4, 5 and 6 treated with hydroalcholic extract of \textit{Carica papaya} Lat doses of 200,300 and 400 mg/kg respectively according to the body weight. All the doses were administered orally.

ANTIHYPERTENSION
Group 1–normal rats, Group 2–treated rats that served as control rats, Group 3–simuvastatin (10mg/kg) treated rats, Group 4, 5 and 6–treated with hydroalcholic extract of \textit{C. papaya} at oral doses of 200,300 and 400 mg/kg respectively according to the body weight.
BIOCHEMICAL ASSAY
At the end of the experimental period blood was withdrawn from retro-orbital plexus of rat under ether anesthesia and centrifuged at 2000 rpm for 30 min so as to get serum. Serum total cholesterol, triglyceride HDL-C was estimated by using diagnostickits. Atherogenic index was calculated from TC and HDL-C. Cholesterol was measured by a direct colorimetric method.¹³

\[
\text{Atherogenic index (AI)} = \frac{LDL - \text{Cholesterol}}{HDL - \text{Cholesterol}}
\]

HISTOPATHOLOGICAL EXAMINATION
After 21 days experimental tenure animals were sacrificed, the whole pancreas was removed and fixed in 10% formalin for histopathological examination. Sections were cut and stained by hematoxylin and eosin for histological examination.

STATISTICAL ANALYSIS
One way analysis of variance (ANOVA) followed by turkey's test was carried out and P<0.005 was considered significant.

RESULTS
Yield: The yield of the extract of the mixture of water and alcohol (ethanol) 60:40%v/v was 12.85g/100g of powder.

PHYTOCHEMICAL SCREENING
The plant extract was analyzed by qualitative chemical tests to check the phyto-constituents i.e. flavonoids, alkaloids, glycosides, steroids, saponins, terpenoids and tannins etc., according to the standard methods (Kokate, 1991; Wagner, 1984; Harborne et al., 1973; Hawk et al., 1954). Phytochemical screening studies indicated the presence of various chemical constituents like flavonoids, alkaloids, glycosides, terpenoids and carbohydrates in the hydroalcoholic extract of *C. papaya*. The Phytochemical screening studies results were given in table 1.

Table 1. Qualitative Phytochemical screening of hydroalcoholic extract of *C. papaya*.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Chemical constituents</th>
<th>Hydroalcoholic extract</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Alkaloids</td>
<td>+</td>
</tr>
<tr>
<td>2.</td>
<td>Sterols</td>
<td>-</td>
</tr>
<tr>
<td>3.</td>
<td>Proteins</td>
<td>+</td>
</tr>
<tr>
<td>4.</td>
<td>Tannins</td>
<td>-</td>
</tr>
</tbody>
</table>
HYPOGLYCEMIC ACTIVITY

The effect of various doses of *Carica papaya* fruit hydroalcoholic extract was tested in normal and alloxane induced rats were summarized in table 2 and 3 respectively. In normal rats the effect of carica papaya fruit hydroalcoholic extract resulted as significantly decreased in serum glucose levels from 97.1 to 89.83 mg/dL in comparison to the control group (93.5±4.46 mg/dL)(p< 0.001). After the administration of the different doses of the aqueous extract of C. papaya (200, 300 and 400 mg/100 mL) to normal rats during 6 h a significant decrease in blood glucose levels (64.66±8.6; 63.5±7.58 and 53.8±9.76 vs 79±7.18 mg/dL, respectively) (p< 0.05) was observed (Table 2).

Table 2. Effect of *C. papaya* fruit hydro alcoholic extract on blood glucose levels on normal rats

<table>
<thead>
<tr>
<th>Groups</th>
<th>0 hr</th>
<th>1st hr</th>
<th>2nd hr</th>
<th>3rd hr</th>
<th>4th hr</th>
<th>5th hr</th>
<th>6th hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>97.1±4.38</td>
<td>96.6±5.8</td>
<td>94±8.3</td>
<td>90.66±7.63</td>
<td>85.6±10.8</td>
<td>83.3±3.43</td>
<td>81.66±7.63</td>
</tr>
<tr>
<td>Control(CMC)</td>
<td>97.83±10.9</td>
<td>97.5±5.68</td>
<td>93.66±7.5</td>
<td>89.1±7.29</td>
<td>82.16±7.4</td>
<td>80±7.77</td>
<td>79±7.18</td>
</tr>
<tr>
<td>Std 10mg</td>
<td>93.5±4.46</td>
<td>88±4.85</td>
<td>78.5±7.39</td>
<td>65.33±5.16</td>
<td>52.16±4.9</td>
<td>47.83±6.2</td>
<td>43.83±6.9</td>
</tr>
<tr>
<td>Low200</td>
<td>94.6±4.63</td>
<td>91.83±6.01</td>
<td>86.66±5.3</td>
<td>81.33±5.8</td>
<td>75.8±3.8</td>
<td>72±8.7</td>
<td>64.66±8.6</td>
</tr>
<tr>
<td>Inter300</td>
<td>89.83±3.3</td>
<td>86.5±2.01</td>
<td>78±3.08</td>
<td>75.83±4.4</td>
<td>73.5±3.2</td>
<td>67.16±4.7</td>
<td>63.5±7.58</td>
</tr>
<tr>
<td>high 400</td>
<td>92.1±7.16</td>
<td>87.66±5.4</td>
<td>82.16±8.5</td>
<td>72.16±6.49</td>
<td>68.66±6.6</td>
<td>65±5.72</td>
<td>53.8±9.76</td>
</tr>
</tbody>
</table>

Value expressed as mean ±sem where n=6* P< 0.05.

Figure 1. Effect Of *C. papaya* Fruit hydroalcoholic extract On blood glucose levels On normal rats
Alloxane induced diabetes resulted in a significant increase in serum glucose levels (292±10.10 mg/dL) in comparison to the control group (90.16±6.64 mg/dL) (p< 0.05). After administration of the different doses of the hydro alcoholic extract of C. papaya (200, 300 and 400 mg/100 mL) to diabetic rats during 12 h a significant decrease in blood glucose levels (266.33±3.32; 254.33±3.38 and 236± 3.94 mg/dL, respectively) (p< 0.05) was observed (Table 3).

Table 3. Effect of Carica papaya fruit hydro alcoholic extract on blood glucose levels on alloxan induced diabetic rats.

<table>
<thead>
<tr>
<th>Groups</th>
<th>0 h</th>
<th>1st h</th>
<th>2nd h</th>
<th>3rd h</th>
<th>4th h</th>
<th>6th h</th>
<th>8th h</th>
<th>10th h</th>
<th>12th h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>90±6.6</td>
<td>89±4.3</td>
<td>86±5.84</td>
<td>84±3.8</td>
<td>83.33±1.9</td>
<td>82±1.41</td>
<td>80±1.50</td>
<td>78±1.32</td>
<td>79±1.94</td>
</tr>
<tr>
<td>Alloxan 120 mg</td>
<td>292±10.1</td>
<td>289±10.0</td>
<td>285±10.53</td>
<td>281±9.06</td>
<td>280±6.22</td>
<td>277±5.77</td>
<td>274±4.62</td>
<td>272±4.33</td>
<td>269±4.17</td>
</tr>
<tr>
<td>Std 10mg</td>
<td>290±8.61</td>
<td>283±8.37</td>
<td>277±8.82</td>
<td>271±8.03</td>
<td>263±7.84</td>
<td>256±8.45</td>
<td>249±8.00</td>
<td>237±6.50</td>
<td>225±6.43</td>
</tr>
<tr>
<td>Low 200</td>
<td>290±4.79</td>
<td>287±5.64</td>
<td>283±5.61</td>
<td>279±5.35</td>
<td>277±4.63</td>
<td>274±3.40</td>
<td>271±3.66</td>
<td>269±3.65</td>
<td>266±3.32</td>
</tr>
<tr>
<td>Inter 300</td>
<td>288±6.22</td>
<td>284±5.78</td>
<td>279±5.68</td>
<td>274±4.21</td>
<td>271±2.60</td>
<td>267±2.85</td>
<td>262±2.16</td>
<td>258±3.06</td>
<td>254±3.38</td>
</tr>
<tr>
<td>High 400</td>
<td>281±8.50</td>
<td>277±8.63</td>
<td>272±9.0</td>
<td>265±5.85</td>
<td>259±5.42</td>
<td>252±5.03</td>
<td>247±4.07</td>
<td>241±4.26</td>
<td>236±3.94</td>
</tr>
</tbody>
</table>

Value expressed as mean ±sem where n=6 * P< 0.05.

Figure 2. Effect of C. papaya flower extract on blood glucose levels on alloxan induced diabetic rats.

ANTI HYPER LIPIDEMIC ACTIVITY

Table 4 depicts the levels of total cholesterol (TC), triglycerides, HDL-C, VLDL-C and LDL-C in control, high fat diet and alloxan-induced diabetic rats. The level of cholesterol and...
triglycerides increased in diabetic animals when compared to control animals. After treatment with HAC (hydro alcoholic caraca papaya fruit extract) cholesterol and triglycerides decreased to near control. The level of HDL-C in serum of diabetic rats were decreased. These lowering of HDL-C, VLDL-C denotes the restoration of levels significantly in diabetic induced rats.

Table 4. Effect of Carica papaya fruit hydroalcoholic extract on blood lipid levels on High fat diet rats

<table>
<thead>
<tr>
<th>Groups</th>
<th>TC</th>
<th>TG</th>
<th>HDL</th>
<th>VLDL</th>
<th>LDL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>77.77±4.05</td>
<td>70.15±6.16</td>
<td>34.81±1.58</td>
<td>14.03±1.23</td>
<td>27.08±2.91</td>
</tr>
<tr>
<td>HCD</td>
<td>183.33±6.67</td>
<td>148.92±6.53</td>
<td>18.51±1.36</td>
<td>29.77±1.30</td>
<td>135.04±5.47</td>
</tr>
<tr>
<td>Standard 200 mg/kg</td>
<td>103.33±7.13</td>
<td>97.22±5.28</td>
<td>31.47±2.54</td>
<td>19.60±1.03</td>
<td>51.80±3.97</td>
</tr>
<tr>
<td>Standard 300 mg/kg</td>
<td>150±10.33</td>
<td>121.54±3.29</td>
<td>25.92±2.58</td>
<td>24.41±0.75</td>
<td>99.77±9.85</td>
</tr>
<tr>
<td>Standard 400 mg/kg</td>
<td>141.31±4.15</td>
<td>116.54±3.10</td>
<td>26.74±2.7</td>
<td>22.94±1.4</td>
<td>84.34±1.9</td>
</tr>
</tbody>
</table>

Value expressed as mean ±sem where n=6* P< 0.05.

Figure 3. Effect of Caricapapaya fruit extract on blood lipid levels on High fat diet rats

Histopathological studies

Alloxaninduced diabetic rats showed degeneration of liver tissue, hepatic cords and necrosis leading to inflammation. Most of pathologies seen in group II indicated hepatic lesions appeared. According to microscopic examination alloxane induced lesions were reduced by the administration of HAC extract at low to high considerable difference could observed in Group IV to VI. These results revealed (fig. 4) that liver tissue of alloxan induced diabetic rats can be protected and repaired by HAC extract. But it seems to be glibenclamide do not have much protective effect on the liver tissues (Huang et al., 2012).
DISCUSSION

Hydro Alcoholic Extract of *C. papaya* obtained as 12.85g/100g of powder. The extract shows the presence of alkaloids, tannins, glycosides, mucilage, flavonoids, reducing sugars.

From 6h of study on hypoglycemic activity by *C. papaya* fruit hydroalcoholic extract shows a significantly reduced in blood glucose levels with increasing in dose, the percentage inhibition of blood glucose level on normal rats was to be found as std 44.51, test (200, 300 and 400 mg/kg) was 18.15, 19.62 and 31.89% respectively. From the study on diabetic induced by alloxan carried for 12h on antihyperglycemic activity *C. papaya* shows a significantly reduced in blood glucose levels with increasing in dose. The diabetic rats when treated with HAC extract in the dose of 400 mg/kg b.w. showed 4.5, 7.38, 8.67 and 12.38% decline in the blood glucose level at 2, 4, 6, and 12 h respectively. The beta cells of pancreas destroyed due to necrosis by alloxan (Jorns et al., 1997) and induced the diabetes. Further necrosis mediated the reactive oxygen species and massive increase in calcium concentration led to quick damage of beta cells (Szkudelski, 2001). The lower dose of alloxan causing partial destruction of cells leads to diabetic which was used in this study. Thus these rats were surviving beta cells and regeneration is possible (Ayber et al., 2001). Glibenclamide used as standard drug and mediated by stimulating insulin release from beta cells of pancrease, suppressing of glucagon ultimately suppress glusoneogenesis. The hydro alcoholic extract...
extract of (HAC) of *C. papaya* significantly reduced the plasma glucose level in alloxan induced diabetic rats. This may be enhanced by two reasons i.e. the secretion of insulin from beta cells of pancreas and increased uptake of glucose by tissue.

From the table 4 the hyperlipidemic was induced by High fat diet cocktail was prepared by mixing cholesterol (100g), cholic acid(50g) in 1 liter of coconut oil supplemented with egg for 10 days, the plant extract shows an significant decrease the levels of total cholestrol, triglyceride, VLDL, LDL but increase in HDL. Elevated plasma cholesterol and triglycerides were utmost risk factor for cardiovascular disease. Hydro alcoholic extract of *C. papaya* at the dose of 400 mg/kg b.w. showed reduced levels of plasma cholesterol and triglycerides along with reduced levels of plasma glucose. This evidences showing that *C. papaya* has capability to reduce the level of glucose, plasma cholesterol and triglycerides. The similar results were shown in experimentally alloxan induced diabetic rats (Gaamoussi et al., 2010). These biological activity might be shown due to the presence of phytoconstituents i.e. flavonoids, alkaloinds and tannins (Satyanarayana et al., 2001). There is a strong link between diabetes mellitus, dyslipidemia, obesity and hypertension. Further scientific evaluation is required to develop its molecular level of action.

**REFERENCES**


