ISSN No:-2456-2165

# Toxicity Test and Impact of Onion *(Allium cepa*) Leaf Methanolic Extract on Some Biochemical Parameters in Rats with Artificially Induced Diabetes

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**Abstract:- Diabetes mellitus (DM) is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both.Cultivated for its use as food, the onion ( Alluim cepa) bulb is a herbaceous plant grown twice-yearly belonging to the family of plants known as Amaryllis, specifically (Amaryllidaccae).it is indeed widely documented that onions has some properties that are beneficial to health, this discovery has existed since time immemorial ,as people of ancient time used it for treatment of diverse ailments such as headaches, mouth sores and heart diseases. It contains various bioactive components, Quercetin and polyphenols are the major constituent in onion which possess various health benefit such as antioxidant, anti-cancer and anti- diabetic properties. This review provides knowledge and guidance to the composition of onion, benefits of onion, producing of high-quality onion and to the food industry on developing functional foods to reduce some chronic diseases such as diabetes, cancer. The current study seeks to assess the phytochemical constituents as well as the toxicity and effects on some biochemical parameters in normal and alloxan-induced diabetic rats.**

**The leaf extract was prepared by mixing the powdered form with methanol, allowed for 48hrs then filtered; the filtrate was air-dried to obtain the extract. The stock was prepared by diluting 10g of the extract in 100ml of distilled water. phytochemical constituent was assessed using standard methods. A total of 16 male albino rats were randomly allocated to 4 groups of 4 rats each. Intraperitoneal injection was used to cause diabetes using alloxan across groups B, C and D and treatment commenced after 48hrs of induction upon confirmation of diabetes mellitus.**

**Alloxan-induced diabetic rats were treated with 1000mg/kg body weight. Metformin 500mg/kg body weight was used as standard control drug. Biochemical examinations (kidney and liver function test) were carried out on blood samples. Significant lowering of fasting blood glucose in extract treatment groups resulted in improved biochemical markers ($p<0.05$). which shows that methanolic extract was able to ameliorate this diabetic conditions (hyperproteinemia, albuminuria and hypo bilirubinemia) Serum enzyme markers ALP and ALT showed a significant drop ($p<0.05$) while Total cholesterol and Triglyceride level increased considerably when compared with diabetic control also when compared to the control. Toxicity assessment was carried out using different doses of extract 10, 100, 1000, 1600, 2900 and 5000mg/kg respectively. No mortality was recorded although there are some alterations in some biochemical parameters. Therefore, *Allium cepa* must be used with utmost caution due to potential toxicity even though results are indicative of its hypoglycemic, hypolipidemic, hepatoprotective and nephroprotective potentials on Alloxan-induced diabetic rats.**

***Keywords:-*** *Diabetes Mellitus, Allium cepa (Onion), Phytochemicals, Toxicity, Anti-diabetes*

## I. INTRODUCTION

Diabetes mellitus is a disease in which blood vessels of glucose(sugar) are high becausethe body does not produce or properly use insulin. They are two major forms of diabetes mellitus. Type 1 diabetes develops when the pancreas does not produce insulin. Type 2 diabetes occur when the body cell resist insulin effect (Microsoft Encarta, 2009). This condition leads to elevated levels of blood glucose. The normal range of blood glucose level is between 70- 110mg/dl. Insulin is a hormone that helps to maintain normal blood glucose level by making the body's cell absorbs glucose so that it can be a source of energy. In people with diabetes glucose levels build up in the blood and urine causing excessive urination, thirst, hunger and problems with fats and protein metabolisms because the body cannot convert glucose into energy, it begins to break down stored fat for fuel. This production increasing amounts of acidic compounds in theblood called ketone bodies which interfere with cellular respiration energy producing process in the cell. Alloxan induced diabetes mellitus in rat. Alloxan, a beta cytotoxin, induce diabetes in a wide variety of animal species through damaging insulin secreting cell. In these animals, with characteristic similar to type 1diabetes in human hypercholesterolemia and hypertriglyceridemia are common complication of diabetes mellitus (Rerun,1999.)

ISSN No:-2456-2165

Diabetes mellitus is characterized by chronic hyperglycemia with disturbances of carbohydrates, fats, and protein metabolism resulting from insulin secretion, inaction or both. The effect off diabetes mellitus includes long-term damage, dysfunction and failure of various organs. It may present with characteristic symptoms such as thirst, polyuria, blurring of vision and weight loss (Ganie,2005). The long - term effects include progressive development of specific complications of retinopathy with potential blindness, nephropathy that may lead to renal failure and neuropathy with risk of foot ulcers, amputation, Charcot joints and features of autonomic dysfunction, including sexual dysfunction (McCance et al.,1997). Known to be a perennial monocot plant, grown twice a year, onion is a member of the family Liliaceae also of the Allium genus. Allium genus constitutes about 250 genera as well as 3700 species. Believed to have originated from central Asia, most likely Pakistan or Iran, this plant is widely distributed globally around the world. With several alternative local names, onions is small and purple whitish in colour. (Ehler, 2008). When the plant reaches a certain stage of growth, the leaf bases become thick and form a bulb. Onion is categorized based on their color into yellow, red and white and based on their taste as sweet and non-sweet.

Spring onion is also known as scallion are derivative of various species in the genus Allium. Spring onion are hollow, tubular green leaves growing from the bulb, in fact very young onions, harvested before the bulb has had a chance to swell. They have similar flavor to onion but are much milder. Scallion may be cooked or used raw as part of salad, diced in soups, noodles, sandwiches (Butt et al., 2009).

This plant is used in many forms, including raw bulbs, fresh juice, fried and roasted. Onion has been known that possesses various medicinal properties from ancient times. The plant is traditionally used to treat different diseases such as cough due to bronchitis, asthma, inflammatory disorders, dysentery, ulcer wounds, scars, keloids, pain and swelling after bee or wasp sting (Wu et al., 2005). Experimental researches have also shown numerous pharmacological effects for onion, including decreases blood levels of cholesterol, triglycerides and thromboxane (substances involved in the development of cardiovascular disease), inhibits platelet aggregation and platelet-mediated thrombosis (a process resulting in heart attacks and strokes), functions as a hypoglycemic, neuroprotective, anti-convulsant, antihypertensive, anti-depressant and diuretic agent, protective effect on the liver, prevents the processes of oxidation and inflammation as well as the release of histamine associated with asthma, stimulates the immune system and decreases osteoporosis (Gorinstein et al.2011). Moreover, onion is one of the strongest anti-carcinogenic components because it suppresses the growth of carcinogenic cells (Grffiths et al, 2002).

## II. MATERIALS AND METHODSPLANT MATERIALS

*Allium cepa* (onion) leaf was gotten from Farin-gada, Jos North Plateau State, Nigeria. The plantfruit was identified and verified in the forest herbarium at Federal College of Forestry Jos, with the voucher number: FHJ 538

- *Experimental Animals*

Sixteen (16) white males and twelve (12) white females making a total of twenty-eight (28) rats were purchased from the animal house of the University of Jos. The rats weigh between 120- 250grams before the commencement of the research. They were given access to standard feed and water all through the research process.

- *Preparation of Allium cepa Fruit Extract*

The plant fruit was collected and air dried at room temperature under shade. Pounded into powdery form using a local pestle and mortar. Then 260gram of the grinded powder was weighed and diluted with 1000ml of 70% methanol, allowed to settle for 48hours then sieved toget the supernatant which was later air dried for four days leaving the pure extract. Ten (10) gram of the extract was then diluted in 100ml of distilled water to prepare the stock.

- *Preparation of Standard Drug*

Metformin (metformin hydrochloride) tablets, an oral hypoglycemic drug was used. This was dissolved in freshly distilled water to form a suspension and was administered at a dose of 500mg/kg body weight orally.

- *Induction of Diabetes*

The rats were weighed after an overnight fast, diabetes was induced by intraperitoneal injection of Alloxan at 100mg/kg body weight in the three (3) groups namely: group B, C and D. The Alloxan was induced via injection targeting the beta cells of the pancreas of the rats and where allowed access to feed and water, after forty either (48) hours the blood glucose level of each rat was measured using an on-call glucometer. Animals with blood glucose concentration above 140mg/dL were taken as diabetic and used for the experiment. The different animal groups received their respective doses orally, once daily for the period of fourteen (14) days.

- *Administration of Plant Extract*

The *Allium cepa* methanolic leaf extract was administered orally at a dose of 1000mg/kg bodyweight daily for fourteen (14) days.

- *Toxicity Test*

The toxicity test was conducted using twelve (12) female rats separated in to six (6) groups of two (2) rats each. Each group was administered a different dosage of the Onion *(Allium cepa*) leaf extract. The groups were numbered 1-6 and were administered 10mg/kg, 100mg/kg b.w, 1000mg/kg b.w, 1600mg/kg b.w, 2900mg/kg b.w and 5000mg/kg b.w

respectively for fourteen (14) days. After which a representative of each group was sacrificed and the blood samples wereanalyzed for kidney and liver functions.

➢ *Sample Collection*

At the end of the fourteenth (14) day of the treatment, the animal glucose level was tested using on-call glucometer to check for a drop in blood glucose level. Those with lowered glucose level were sacrificed by decalcification using chloroform. Then the blood samples were collected in toplane containers for test of kidney and liver function.

➢ *Experimental Design*

**Table 1 Experimental Design**

| Group | Description | Treatment | Dosage |
|---|---|---|---|
| A | Normal control rats | None | None |
| B | Diabetic control rats | None | None |
| C | Diabetic treated | Extract | 1000mg/kg b. w |
| D | Diabetic treated | Std drug | 500mg/kg b. w |

➢ *Phytochemical Screening of Allium cepa Leaf Extract*

Qualitative phytochemical analysis of methanolic extract of *Allium cepa* leaf was carried out using standard procedure to identify the constituents as described by (Harbone, 1984; Trease andEvan et al., 1990; and Khandelwal,2006).

➢ *Data analysis*

Results are presented as mean and standard deviation values. Analysis of variance (ANOVA) was utilized for comparison. Differences were considered significant when values of $p<0.05$. Theanalysis was performed using graph-pad prism.

## III. RESULTS

➢ *Yield Allium cepa methanolic leaf extract*

215.53g of powdered *Allium cepa* leaf was dissolved in 1.5L of methanol and allowed for 48hours. The filtrate was air-dried yielding methanolic leaf extract.

➢ *Toxicity Test Result of methanolic leaf extract of Allium cepa*

Table 2 shows that there was no mortality in all phases, after the acute toxicity studies. This isindicative of the fact that the plant is edible.

➢ *Phytochemical Result of the methanolic leaf extract*

Alkaloids, flavonoids, saponins, tannins, phenols, carbohydrates, balsam, resins, glycosides,terpenes and steroids were all found in the methanolic leaf extract of *Allium cepa* (table 4).

**Table 2. Yield of methanolic leaf extract of *Allium cepa***

| Plant powder (g) | Quantity of solvent (L) | Yield (g) | % Yield |
|---|---|---|---|
| 215.53 | 1.5 | 46.3 | 4.64 |

**Table 3. Toxicity Test Result of methanolic leaf extract of *Allium cepa***

| Group mg/kg b. w | No of rats | Mortality | LD50 |
|---|---|---|---|
| 10 | 2 | 0 | ≥10 |
| 100 | 2 | 0 | ≥100 |
| 1000 | 2 | 0 | ≥1000 |
| 1600 | 2 | 0 | ≥1600 |
| 2900 | 2 | 0 | ≥2900 |
| 5000 | 2 | 0 | ≥5000 |

**Table 4. Result of phytochemical screening of methanolic leaf extract of *Allium cepa***

| PHYTOCHEMICAL | INFERENCE |
|---|---|
| Alkaloids | + |
| Flavonoids | + |
| Saponins | - |
| Tannins | + |
| Phenols | + |
| Carbohydrates | + |
| Cardiac Glycosides | + |
| Terpenes and Steroids | + |
| Ninhydrin test | + |
| Biuret test | + |

Key: + = Present, - = Absent

➢ *Effect of methanolic leaf extract of Allium cepa on Serum glucose, Total protein, Albumin, Total bilirubin and conjugated bilirubin.*

In this study, there is significant increase in the level of blood glucose of rats in the diabetic group in the Table 5, it was observed that oral administration of the methanolic crude extract of *Allium cepa* leaf was effective as a hypoglycemic agent as compared to the standard drug. There was a decrease in serum glucose concentration which was statistically significant after prolong administration of the methanolic extract of allium cepa leaf., as opposed to the diabetic control, where the reduction was so enormous that it went below the normal rats level of glucose, when compared to the normal group as shown in Table 5.

Previous report has indicated that plant extracts possess hypoglycemia properties. Oral administration of the extract per body weight caused a remarkably increase in the serum total protein and albumin levels of diabetic rats. According to Luka,2013 decrease of increase in the concentration of serum protein is associated with one or more clinical conditions, total protein is increases in condition causing dehydration or inflammation. Table 5 shows that there was a significant increase in the concertation of Total bilirubin of the treated alloxan induced rats when compared with the normal control,

diabetic control and the standardcontrol.

- *The Effect of methanolic leaf extract of Allium cepa on Serum Lipid profile level ofAlloxan-induced diabetic rats.*

Alloxan induced diabetic untreated rats showed significant increase in serum HDL while TG, LDL and TC showed significant result in Table 6 suggested that methanolic extract of *Allium cepa* leaf possess hypolipidemic agents in combating atherosclerosis, which is one of the major complications of diabetes by lowering level of high-density lipoprotein (HDL) which is termed as good cholesterol. It was observed from Table 6 there was a drastically decreased of LDL level of Diabetic+ Extract when compared with normal control, Diabetic control, and Diabetic + Std drug.

- *Effect of methanolic pulp extract of Allium cepa on Serum enzyme level of Alloxan-induceddiabetic rats.*

The increase in the activities of serum ALT and AST as shown in Table 7, diabetic rats could be a proof that hepatic dysfunction can result from diabetes. As the result, while attending to the activities of ALT and AST within the serum there could be enzyme leakage from the liver cytosol straight to the blood. This could be a sign of the hepatotoxic consequence of Alloxan. Whereas the use of methanolic Allium cepa leaf in treating diabetic rats resulted in a decrease in activity of ALT and ASTin the serum as against the mean values of diabetic group except ALS which caused an elevation compared to the controls and standard drug in Table 7.

**Table 5. Results of the effect of methanolic leaf extract of *Allium cepa* on serum glucose,Total protein, Albumin, total bilirubin and conjugated bilirubin of Alloxan-induced diabetic rats**

| Treatment | Glucose (Mmol/l) | TP (g/L) | ALB (g/L) | TB (µmol/L) | CB (µmol/L) |
|---|---|---|---|---|---|
| **NC** | 3.93±1.105 | 59.00±2.082 | 30.00±1.732 | 16.80±2.957 | 10.33±2.176 |
| **DC** | 17.72±2.462[a] | 57.00±1.472 | 28.50±0.866 | 26.85±11.461 | 17.85±4.193 |
| **D + Extract** | 3.40±0.611[b] | 59.66±2.603 | 30.00±1.155 | 20.33±5.166 | 16.90±3.158 |
| **D + Std Drug** | 3.86±0.066[b] | 65.00±0.577 | 33.66±0.881 | 16.20±0.981 | 11.63±0.375 |
| **p-values** | 0.0003 | 0.0581 | 0.0595 | 0.7359 | 0.3080 |

Values are expressed as mean ± SEM, n=3.
[a]Values are statistically significant when compared to normal control ($p<0.05$)
[b]Values are statistically significant when compared to diabetic control ($p<0.05$).

**Table 6. Result of the effect of methanolic leaf extract of *Allium cepa* on serum Lipid profilelevel of Alloxan-induced diabetic rats**

| Treatment | TC (mmol/l) | HDL (mmol/l) | TG (mmol/l) | LDL (mmol/l) |
|---|---|---|---|---|
| **NC** | 2.10±0.095 | 1.03±0.023 | 1.07±0.075 | 1.06±0.036 |
| **DC** | 2.95±0.068[a] | 1.45±0.027[a] | 1.49±0.061[a] | 1.25±0.072 |
| **D + Extract** | 2.07±0.065[b] | 1.04±0.020[b] | 1.31±0.198[b] | 1.03±0.040 |
| **D + Std Drug** | 2.69±0.034[b] | 1.26±0.023[b] | 1.04±0.031[b] | 1.10±0.054 |
| **P-Values** | <0.0001 | <0.0001 | 0.0373 | 0.0746 |

Values are expressed as mean ± SEM, n=3.
[a]Values are statistically significant when compare to normal control ($p<0.05$)
[b]Values are statistically significant when compare to diabetic control ($p<0.05$)

**Table 7. The result of the effect of methanolic pulp extract of *Allium cepa* on serum enzymelevel of Alloxan-induced diabetic rats**

| Treatment | ALP(U/L) | ALT(U/L) | AST(U/L) |
|---|---|---|---|
| **NC** | 185.33±39.704 | 85.66±14.530 | 205.00±22.368 |
| **DC** | 180.25±54.481 | 106.75±14.361 | 226.50±27.375 |
| **D + Extract** | 85.66±14.263 | 98.00±37.018 | 288.00±10.242 |
| **D + Std Drug** | 90.33±0.333 | 96.66±2.028 | 298.00±2.309 |
| **p-values** | 0.2048 | 0.8996 | 0.5348 |

Values are expressed as mean ± SEM, n=3.
[a]Values are statistically significant when compare to normal control ($p<0.05$)
[b]Values are statistically significant when compare to diabetic control ($p<0.05$)

ISSN No:-2456-2165

- *Effect of methanolic leaf extract of Allium cepa on Serum Urea, Uric Acid and Creatinine on Alloxan-induced diabetic rats.*

From Table 8 the result indicates significantly increase in uric acid in Diabetic + Extract when compared with normal control. The treatment of alloxan induced diabetic rats with methanolicextract of *Allium cepa* leaf, serum Creatinine, Urea and Uric acid compared to the mean value($p<0.05$) of diabetic group as shown in Table 8 shows a significant decrease.

- *The Effect of methanolic leaf extract of Allium cepa on Serum Electrolyte level of Alloxan-induced diabetic rats.*

There was a significant ($p < 0.05$) decrease in the serum $HCO_3^-$ of the diabetic control group in Table 9 when compared to the normal control. Treatment with methanolic extract of *Allium cepa* increases the $HCO_3^-$ to almost the values of the normal control. Also, there was a slight decrease in the concentration of $K^+$ in the *Allium cepa* diabetic treatment groups in Table 9 to almost thelevels of the normal control when compared to the diabetic group.

**Table 8. Result of the effect of methanolic leaf extract of *Allium cepa* on serum creatinine,urea and uric acid**

| Treatment | CREATININE | UREA | URIC ACID |
|---|---|---|---|
| | (µmol/L) | (mmol/l) | (µmol/L) |
| NC | 62.66±6.692 | 6.66±0.560 | 183.67±22.981 |
| DC | 123.75±20.130 | 7.60±0.793 | 314.25±19.207[a] |
| D + Extract | 92.66±13.569 | 7.80±0.400 | 252.00±4.726[b] |
| D + Std Drug | 74.66±0.881 | 5.50±0.208 | 200.00±0.577[b] |
| p-values | 0.0586 | 0.0923 | 0.0009 |

Values are expressed as mean ± SEM, n=3.
[a]Values are statistically significant when compare to normal control ($p<0.05$)
[b]Values are statistically significant when compare to diabetic control ($p<0.05$)

**Table 9. Result of the effect of methanolic leaf extract of *Allium cepa* on serum electrolyteof Alloxan-induced diabetic rats.**

| Treatment | $Na^+$ (mmol/l) | $K^+$ (mmol/l) | $HCO_3$ (mmol/l) | CL (mmol/l) |
|---|---|---|---|---|
| Normal Control | 139.67±0.881 | 5.13±0.233 | 26.00±0.001 | 101.67±0.881 |
| Diabetic Control | 145.00±1.732 | 5.65±0.150 | 23.75±1.887 | 105.50±0.957[a] |
| Diabetic + Extract | 143.67±0.333 | 5.40±0.200 | 26.00±0.001 | 103.67±0.667[b] |
| Diabetic + Std Drug | 142.00±0.577 | 5.10±0.115 | 23.66±0.333 | 101.33±0.881[b] |
| p-values | 0.0565 | 0.1486 | 0.3749 | 0.0244 |

Values are expressed as mean ± SEM, n=3.
[a]Values are statistically significant when compare to normal control ($p<0.05$)
[b]Values are statistically significant when compare to diabetic control ($p<0.05$)

## IV. DISCUSSION

The study evaluates the antidiabetic properties of methanolic extract of *Allium Cepa* on Alloxan induced diabetic rats as well as it's toxicity. Diabetes mellitus is a chronic metabolic disorder leading to perturbed metabolism of carbohydrates, proteins and lipids characterized by hyperlipidemia due to metabolic abnormalities. Liver and other body tissues are involved in body metabolism (evaluates, 2014). Plants contain specific components that help to treat various diseases. Onions also exhibit immune modulatory, cardio-protective, nephro-protective, anti- cancer effect and anti-diabetic effects (Grffiths et al, 2002).The plant extract had phytochemical and biologically active components that can be of importance therapeutically. These phytochemical components have been seen to be useful in the combating and prevention of some disease conditions (Harbone, 1984; Trease and Evan et al.,1990; and Khandelwal,2006). In this research work, the phytochemical screening of methanolic extract of spring onion (*Allium Cepa*) showed the presence of Terpens/steroid and carbohydrate. Plant extract can partially reverse hyperglycemic condition in Alloxan induced diabetic rats. It ishelpful in improving the level of glucose by partial regeneration of beta cells and stimulation of insulin secretion. The activity of this fraction could be attributed to some extent to the presence of glycosidic components as well as other vital bioactive components as indicated by the phytochemical screening result in Table 4.

Therefore, based on this research work, the result from the table was observed that the methanolic extracts of onion (*Allium cepa*) has an antidiabetic effect on alloxan induced rat when compared the Diabetic control and Diabetic+ standard drug.

The determination of serum glucose concentration among others is a useful quantitative parameter for diabetes screening. In this study, there is significant increase in the level of blood glucose of rats in the diabetic group in the Table 5, it was observed that oral administration of the methanolic crude extract of *Allium cepa* leaf was effective as a hypoglycemic agent as compared to the standard drug. The methanolic extract of *Allium cepa* leaf caused a lowering of serum glucose concentration after some weeks of administration as opposed to the diabetic control. This decrease was below the normal glucose level of the rats used as seen in Table 5, and this also agrees with previous works which indicate the plant has hypoglycemic properties, a decline in the total protein level in diabetic rats has been attributed to inhibition of oxidation phosphorylation, which leads to decrease in protein synthesis increase in catabolic processes and reduction in protein absorption. Oral administration of the extract per body weight caused a remarkably increase in the serum total protein and albumin levels of diabetic rats. According to Luka,2013 decrease of increase in the concentration of serum protein is associated with one or more clinical conditions, total protein is increases in condition causing dehydration or inflammation. Table 5 shows that there was a significant increase in the concertation of Total bilirubin of the treated alloxan induced rats when compared with the normal control, diabetic control and the standard control.

Diabetes affects both glucose and lipid metabolism (Sperling and Saunder,2000). Alloxan induced diabetic untreated rats showed significant increase in serum HDL while TG, LDL and TC showed significant result in Table 6 suggested that methanolic extract of *Allium cepa* leaf possess hypolipidemic agents in combating atherosclerosis, which is one of the major complications of diabetes by lowering level of high-density lipoprotein (HDL) which is termed as good cholesterol. It was observed from Table 6 there was a drastically decreased of LDL level of Diabetic+ Extract when compared with normal control, Diabetic control, and Diabetic +Std drug.

The liver enzymes, Aspartate aminotransferase (AST), Alanine aminotransferase (ALT) and alkaline phosphatase (ASP) are routinely used in evaluation of liver function. The increase in the activities of serum ALT and AST as shown in Table 7, is an indication that diabetes could result in hepatic dysfunction showing that Alloxan treatment could be hepatotoxic in nature. Whereas treatment of the rats that where diabetically induced with extracts of Allium cepa leaf only reduced enzyme activities of ALT and AST in the serum when compared to the mean value of the diabetic group except ALS which caused an elevation compared to the controls and standard drug inTable 7.

From Table 8 the result indicates significantly increase in uric acid in Diabetic + Extract when compared with normal control. The treatment of alloxan induced diabetic rats with methanolicextract of *Allium cepa* leaf, serum Creatinine, Urea and Uric acid compared to the mean value($p<0.05$) of diabetic group as shown in Table 8 shows a significant decrease.

Routinely measured electrolytes are Na+, K+, Cl- and HCO3-. These four ions in plasma exert the greatest influence on water balance and acid-base relationship. There was a significant ($p < 0.05$) decrease in the serum HCO3- of the diabetic control group in Table 9 when compared to the normal control. Treatment with methanolic extract of *Allium cepa* increases the HCO3- to almost the values of the normal control. Also, there was a slight decrease in the concentration ofK+ in the *Allium cepa* diabetic treatment groups in Table 9 to almost the levels of the normal control when compared to the diabetic group.

- *Toxicity Assessment*

Results of toxicity test with different concentrations of *Allum cepa* leaf extract shows a significant difference in statistical values suggesting potentially toxicity of the plant which could account for the irregularities in some kidney and liver function parameters. However, no morality was recorded throughout the process. The LD50 therefore, is ≥5000mg/kg b.w.

## V. CONCLUSION

The phytochemical screening of methanolic extract of *Allium cepa* leaf showed the presence of Terpens/steroid and carbohydrates. It also has an effect on hyperglycemia on alloxan induced diabetic rat and a significant effect on low density lipoprotein (LDL) i.e., bad cholesterol than the TG, TC, and HDL. The oral administration of methanolic extract of *Allium cepa* leaf to the induced diabetic rats resulted in significant decrease in fasting blood glucose level and serum transaminases (AST and ALT) and therefore might be beneficial in the management of diabetes mellitus.

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