

**ANTIDIABETIC AND HYPOLIPIDEMIC EFFECT OF ASPARAGUS RACEMOSUS IN ALLOXAN INDUCED DIABETES IN RATS.****Wesam E.M<sup>1</sup>; Yakout A.El-Senosi<sup>2</sup>; Samy A. Aziza<sup>3</sup>; and Souad A. Ahmad.<sup>4</sup>**<sup>1</sup>Department of Biochemistry, Faculty of Veterinary Medicine, Benha University, Egypt.<sup>2</sup>Department of Biochemistry, Faculty of Veterinary Medicine, Benha University, Egypt.<sup>3</sup>Head Department of Biochemistry, Faculty of Veterinary Medicine, Benha University, Egypt,<sup>4</sup>Head Department of Hygen, Behavior, and Mangement of Animals Faculty of Veterinary Medicine, Benha University, Egypt.Article Received on  
30 Jan. 2018,Revised on 19 Feb. 2018,  
Accepted on 12 Mar. 2018,

DOI: 10.20959/wjpps20184-11227

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Biochemistry, Faculty of  
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University, Egypt.**ABSTRACT**

The *Asparagus racemosus* was evaluated for its antidiabetic activities and hypolipidemic activity against alloxan induced hyperglycemia in rats. Thirty rats were used divided into 2 groups, normal control: Composed from 10 rats and diabetic group composed from 20 rats I.P. injection. of alloxan by dose 120mg/kg b. w, This group subdivided into 2 subgroup: Alloxan group: 10 rats as control negative. *Asparagus* treated group: 10 rats administrated *Asparagus racemosus* powder by dose 500 mg/kg b. Wt. daily P.O. for 30days. (Kumar et al., 2011 and Sara et al., 2013) Diabetes is recognized as a group of heterogeneous disorders with the common of hyperglycaemia and

glucose intolerance, due to insulin deficiency, impaired of insulin action, or both (Harris and Zimmet, 1997). Diabetes mellitus type 1 is caused by insufficient or non-existent production of insulin, while type 2 is primarily due to a decreased response to insulin in the tissues of the body which called insulin resistance. Both types of diabetes, if untreated, result in too much glucose remaining in the blood which defined as hyperglycemia and many of the same complications. Also, too much insulin and/or exercise without enough corresponding food intake in diabetics can result in low blood sugar which named as hypoglycemia (Hsu et al., 2007). Daily administration of *Asparagus racemosus* to diabetic rats by dose (500 mg/kg b. wt.) for 30 days decreased serum glucose. These findings indicate that anti hyperglycemic activity of *Asparagus racemosus* mediated by inhibition of carbohydrate digestion and

absorption, together with enhancement of insulin secretion and action in the peripheral tissue (Hannan, et al., 2011).

**KEYWORDS:** Alloxan, *Asparagus racemosus*, hypolipidemic. Antidiabetes.

## 1-INTRODUCTION

DM caused by destruction of  $\beta$ -cells with little or no endogenous insulin secretion is called type 1, also caused by insulin deficiency due to disorder of insulin secretion or insulin resistance this known as type 2 and genetic causes due to infection of exocrine pancreas and gestional diabetes (Salim, 2005).

Changes in human behavior and lifestyle over the last century have resulted increase in the incidence of diabetes (Laakso, 2001 and Zimmet et al., 2001).

*Asparagus racemosus* (Liliaceae) is a popular vegetable consumed in many parts of the world and grows naturally throughout India, Asia, Australia and Africa. It is commonly used for the treatment of diarrhea, dysentery, rheumatism, nervous breakdown, and is thought to be an aphrodisiac (Nadkarni, 1976).

This study was carried out to study the effect of *Asparagus racemosus* on the Alloxan induced diabetes in rats.

The steps of study include

### **Determination the serum activities of**

*Fasting blood sugar (FBS).*

**Lipid profile:-** Cholesterol, Triglyceride, HDLP, and LDLP.

After (30) days of *Asparagus* administration.

## 2-MATERIALS AND METHODS

### 2.1. Experimental animals

A total number of 30 male albino rats, weighting 170-200 g were used in the experimental investigation of this study. Rats were obtained from the laboratory animal's research center, faculty of veterinary medicine, Benha University. Animals were housed in separate cages, fresh and clean water was supplied adlibitum. Rats were kept at a constant environmental and nutritional condition throughout the period of the experiment. Animals were left for 10 days for

adaptation period before the beginning of the experiment.

## 2.2. Natural products

Asparagus racemosus powder was obtained from Shaanxi Pioneer Biotech Co. Ltd from China.

## 2.3. Drugs and dosage

**2.3.1.** Alloxan powder of European Egyptian Pharm Alexandria Egypt.

**2.3.2.** Kits for FBS obtained from Spinreact, Ch, TG, LDLP, and HDLP obtained from Spinreact.

**2.3.3** Experimental design

**At the beginning of the experiment, rats were divided into 3 groups:**

Group 1: - normal control: Composed from 10 rats were fed normal diet.

Group 2:- diabetic group(alloxan group): Rats in this group were injected once with alloxan monohydrate in sterile normal.

### Induction of diabetes

The animals were fasted for 12 h. prior, and alloxan freshly prepared in saline was administrated intraperitoneally (i.p.) as a single dose of 120 mg/kg.

Alloxan is capable to producing fetal hypoglycemia by massive pancreatic insulin release, so rats were treated with 20% of glucose solution (15-20 ml) intraperitoneally after 6 h.

The rats were kept for 24 h on 5% glucose solution bottles in cages to prevent hypoglycemia (Stanely et al., 1998).

### Group 3 (alloxan and A.R. group):

Rats were injected as group 2 by alloxan and treated with A.R. after alloxan injection by 48 hours .Asparagus group: 10 rats taken Asparagus racemosus powder by dose 500 mg/kg daily P.O. for (30) days. (Kumar et al., 2011 and Sara et al., 2013)

### 2.3.4. Sampling

Blood samples were collected from all animals at 30 day from onset of treatment with Asparagus racemosus. The samples were allowed to coagulate and then centrifuged at 3000 rpm for 5 min; the serum separated was used for determination of FBS, Ch, TG, HDLP, and LDLP.

### 2.3.5. Biochemical Analysis

Serum FBS, Ch, TG, HDLP, and LDLP were determined according to the method of (Young, 2001).

### 2.3.6. Statical Analysis

Results data were analyzed using SPSS (Statistical package for social science; ver. 10.0) and the significance among the samples was compared at  $P < 0.05$ . Results were represented as mean  $\pm$  SD.

## 3-RESULTS

### 3.1. -Effect of alloxan and Asparagus racemosus on serum fasting blood suger of rats (U/L):-

The data represented in table (1) showed that administration of alloxan nonsignificantly increase the serum sugar level.

Administration of Asparagus racemosus by dose of 500 mg/ kg P.O. decrease the serum sugar levels. When compared to alloxan group.

### 3.2. Effect of alloxan and Asparagus racemosus on lipid profiles in rats

Table (1) revealed that administration of 120 mg/kg of alloxan significantly increased in cholesterol, triglyceride and LDLP but not significantly decrease in HDLP when compared to control group.

Administration of Asparagus racemosus significantly decreased serum cholesterol and triglyceride when compared with alloxan group while not significantly decreased on serum (LDLP) activity as compared to alloxan group as well as nonsignificantly increase in serum HDLP level when compared with alloxan group.

The levels of lipid profile of Asparagus group is better as the normal group.

**Table 1: The effect of Asparagus racemosus on serum FBS, and lipid profile, in Alloxan induced diabetes in rats after (30) days.**

	<i>FBS</i> (mg/dl)	<i>Cholesterol</i> (mmol/L)	<i>Triglyceride</i> (mmol/L)	<i>HDLP</i> (mgm/dl)	<i>LDLP</i> (mmol/L)
Contro	68.8 $\pm 4.979^b$	88.6667 $\pm 8.21246^a$	76.1400 $\pm 13.3267^a$	51.0 $\pm$ 4.62 <sup>a</sup>	24.367 $\pm 11.120^b$
Alloxan	222.88 $\pm 24.4039^a$	119.65 $\pm 23.66198^a$	129.28 $\pm 33.58201^a$	38.25 $\pm$ 3.09 3 <sup>b</sup>	69.175 $\pm 19.078^b$
<i>Asparagus racemosus</i>	73.1429 $\pm 5.2169^b$	78.500 $\pm 2.25462^a$	60.043 $\pm 3.7546^a$	51.33 $\pm$ 0.53 <sup>a</sup>	14.375 $\pm 1.4043^a$

Data was expressed as mean $\pm$ SE. SE = standard error.

The mean values with different super script letter within the same column were significantly differing at  $P < 0.05$ .

#### 4-DISCUSSION

The obtained data demonstrated in table (1) revealed that the administration of *Asparagus Racemosus* to diabetic rats decrease the serum FBS, Ch, TG, HDLP, and LDLP. activities when compared with alloxan treated group

##### 4.1. Effect of *Asparagus racemosus* and alloxan on serum Fasting blood suger (FBS)

The obtained data demonstrated in table(1) revealed that the administration of *Asparagus racemosus* to Diabetic rats decrease the serum fasting blood suger when compared with alloxan group.

The present study showed that oral administration of alloxan at a dose of 120mg/kg b.wt IP non significantly increase the serum sugar level.

Our results reported that supplementation of *Asparagus racemosus* roots powder at 500mg \kg P.O. enhances blood sugar level which decrease the serum sugar level when compared to alloxan group this result matched with Godwin and Alvin 2014 they said in diabetic rats treaded with *Asparagus racemosus*, the fasting blood sager level was significantly decreased when compared to diabetic alloxan group.

In the diabetic rats treated with *Asparagus racemosus*, the fasting blood glucose level was significantly decreased when compared to diabetic control rats.

Liver is mainly responsible for maintaining normal concentrations of blood glucose by its ability to store glucose as glycogen and to produce glucose from glycogen breakdown or from gluconeogenic precursors. Selective destruction of pancreatic  $\beta$ —cells by alloxan using experimental diabetes results in the decreased plasma insulin levels. This in turn leads to the defective glucose oxidation and causes hyperglycemia in diabetes involves overproduction (excessive hepatic glycogenolysis and gluconeogenesis) and decreased utilization of glucose by the tissues that said by Pari and Srinivassan, 2010.

As well as Raghavan *et al.*, 2004 said 4 weeks treatment with *Asparagus racemosus* in diabetic rats significantly decreased in plasma glucose level which might be attributed to its anti-diabetic and insulin secretory activity.

#### 4.2. Effect of *Asparagus racemosus* and Alloxan on lipid profile levels

Administration of *Asparagus racemosus* significantly decreased serum cholesterol and triglyceride when compared with diabetic group while not significantly decreased on serum (LDLP) activity as compared to diabetic group as well as nonsignificantly increase in serum HDLP level when compared with diabetic group.

Our results matched with Yakout *et al.*, 2014 they said dietary supplement of *Asparagus racemosus* powder to normal rats groups revealed a significant decreased in serum TG, Ch, LDLP and VLDL concentration with highly significant increased in HDLP. And hypercholesterolemic rats supplemented with *Asparagus racemosus* showed a highly significant decrease in serum TG, Ch, LDLP and VLDL with high significant increased in HDLP as compared to hypercholesterolemic rats.

High levels of cholesterol and LDLP in blood are major coronary risk factors. The abnormally high concentration of lipid profiles in diabetics are mainly due to increase in mobilization of free fatty acids from peripheral fat depots, since insulin inhibits the hormone sensitive lipase. Insulin deficiency or insulin resistance may be responsible for dyslipidemia, due to insulin has an inhibitory action on HMG-CoA reductase a key rate-limiting enzyme responsible for the metabolism of cholesterol rich LDLP particles, acute insulin deficiency initially causes an increase in free fatty acids mobilization from adipose tissue. This results in increased Ch, LDLP. the administration of *Asparagus racemosus* increased the HDLP serum level and decreased cholesterol, triglycerides and LDLP levels that was said by Miurali *et al.*, 2002.

Dheeba *et al.*, 2012 showed administration of *Asparagus racemosus*, the serum triglycerides, total cholesterol, and LDLP were significantly increased in untreated diabetic rats compared to normal rats, while HDLP was significantly decreased in untreated diabetic rats compared to normal rats. treatment of diabetic rats with *Asparagus racemosus* by dose 400 mg/kg has significantly decreased in serum cholesterol, triglycerides and LDLP. Also significantly increased HDLP levels when compared to untreated diabetic group.

Our results matched with Ramachandran *et al.*, 2011 they said the effects of *Asparagus racemosus* 200 and 400 mg/kg on plasma total cholesterol and triglyceride levels. A significant increase in the cholesterol and triglyceride levels were observed in the diabetic group. Treatment with *Asparagus racemosus* significantly reduced cholesterol and triglyceride levels in diabetic rats.

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