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Research Article

EFFECTS OF AQUEOUS AND ALCOHOLIC LEAVES EXTRACT OF *OCIMUMBASILICUM.LINN*ON BLOOD GLUCOSE LEVELS OF ALLOXAN-INDUCEDDIABETIC ALBINO-WISTAR RATS

R. Naga Kishore[1,2]*, G. Abhinayani[2], V.Somashankar[2] and N.Sravya[2]

[1]Department of Pharmacy, JJTU, Jhunjhunu, Jaipur, Rajasthan, India.
[2]Department of Pharmacology, Geethanjali College of pharmacy, Hyderabad, Andhra Pradesh, India.

ABSTRACT

The aim of the study was to evaluate the anti diabetic activity of aqueous and alcoholic extract of leaves of plant Ocimumbasilicum in alloxan induced diabetes in rats. The study was conducted on five groups of five rats each to evaluate the hypoglycaemic effect of aqueous and alcoholic extract of Ocimumbasilicum. Glibenclamide was used as a standard drug and the results were compared in reference to it. The fasting blood sugar levels were recorded on 0, 15, 30, 60, 90 and 120 min on 1,7,14,21 days respectively by glucometer. The results indicate that the test compound aqueous and alcoholic extract of Ocimumbasilicum has significant and sustained oral hypoglycaemic activity, comparable with the hypoglycaemic effect of glibenclamide, asulfonylurea derivative. The hypoglycaemic potential of the test compound is found to be comparable with that of the standard drug glibenclamide.

Keywords: Diabetes mellitus, Alloxan induced diabetes, Hypoglycemic drugs, Glibenclamide.

INTRODUCTION

Diabetes Mellitus (DM) is a major metabolic disorder characterized by chronic hyperglycemia as a result of a relative or absolute lack of insulin or the actions of insulin.The condition affects the metabolism of carbohydrates, protein, fat, water and electrolytes leading to structural changes in a range of cells especially those of the vascular system, subsequently leading to long-term complications of diabetes. Diabetes is the most common of the endocrine disorders[1-3]. It is estimated that there are currently 285 million people worldwide and this number is set to increase to 438 million by the year 2030. India has the highest number of patients with known diabetes worldwide, with a prevalence of 11.6%. Most of these cases will be type 2 diabetes, which is strongly associated with a sedentary lifestyle and high calorie-nutrition and obesity. On the basis of the etiology, type 1 may be due to immunological destruction of pancreatic β cells resulting in insulin deficiency. Its pathogenesis involves environmental triggers that may activate autoimmune mechanisms in genetically susceptible individuals, leading to progressive loss of pancreatic islet β cells. Many of the acute affectsof this disease can be controlled by insulin replacement therapy, but there are long-term adverse effects on blood vessels, nerves and other organ systems. Type 2 DM is associated with both impaired insulin secretion and insulin resistance. Type 2 DM is more prevalent form of the disease and common in individuals over 40 years of age. It is often associated with obesity and hereditary disposition.

Despite enormous research efforts, the nature of the defect has been difficult to determine. In

some patients, the insulin receptor is abnormal, in others some aspects of insulin signaling is defective, and in others no defect has been identified[4-8]. Significantly, the disease is usually controlled through dietary therapy, exercise and hypoglycaemic agents.
More than 1200 plants species are world wild usein diabetes phytotherapy and experimental studiessupport the hypoglycaemic activity of a large number ofthese plants. In addition to correction of bloodglucose levels, several hypoglycaemic plants arepotential in ameliorating lipid metabolismabnormalities of diabetes mellitus. Thus, the study ofplant hypoglycaemic activities of aqueous and alcoholic extract maygive new pharmacological approach in the treatment ofdiabetes mellitus.*Ocimumbasilicum*is a plant belonging toLamiacea family locally known as "Lahbakalbaldi". The present study was undertaken to evaluate the hypoglycaemic activities of a single and repeated intraparetoneal administration of aqueousand alcoholic extract of Ocimum *basilicum*[9-12].

MATERIALS AND METHODS

Plant material

The leaves of *Ocimumbasilicum*were collected around the local area. The leaves were dried under shade, dehydrated leaves were powered to a fine texture and 100g of the dried powdered leaves were repeatedly extracted with alcohol and water separate. The extracts were concentrated under vacuum and the residue was used in the experiments[13]. The dried leaves extracts were freshly re-dissolved in normal saline and given to adult albino Swiss rats.

Animals

Albino Swiss rats of either sex weighing 150-200g were used for Alloxan-induced anti-diabetic activity. All animals were fasted for 72 hoursbefore the experiments. Each experimental group consisted of five animals housed in separate cages.

Experimental design

In the experiment, a total of 25 rats were used, the rats were divided into 5 groups of 5 rats each. Group 1 receives saline; Groups 2 acts as diabetic control (Alloxan treated rat): Groups 3 diabetic rat with glibenclamide; Group 4 diabetic with aqueous extract of *Ocimumbasilicum*; Group 5 diabetic with alcoholic extract of *Ocimumbasilicum.*Extracts were given at a dose of 200 mg kg of body weight in normal and alloxan-induced diabetic rats[14-16].

Induction of diabetes

Diabetes mellitus was induced by single intraperitoneal dose of 10mg/kg of alloxan dissolved in 2ml of distilled water were administered into 12 h-fasted rats[17-21]. On the second day of alloxan- injection, the rats were fasted for 72 h and blood was taken from tail artery of the rats. Rats with moderate diabetes having hyperglycemia were taken for the experiment. The diabetic rats were then divided randomlyin the different groups.

Determination of blood glucose levels

All blood samples were collected from the tail artery of the rats atinterval[22-25]. Determination of the blood levels was done by the glucose oxidase principle using the One Touch Basic (Lifescan, Mulpital CA instrument) and the result were expressed as mg/dl.

Statistical analysis

Blood glucose levels for each group were expressed in mg/dl asmean ± SEM. The data were statistically analyzed using ANOVA with multiply comparisons versus control group. The values of$p<0.01$ were considered as significant.

RESULTS

The blood glucose levels of normal rats were measured in regular intervals i.e., 0, 15, 30, 60, 90, 120 min increased when compared to the control and plant extracts as shown in table 1[26-28]. Blood glucose levels of aqueous and alcoholic extracts of the plants showed significant values when compared with that of standard.
From the initial day onwards blood glucose levels were measured up to the 21st day of the study and the observed standard group values were showed significant when compared to the control as shown in table 2. Plant extracts showed the significant when compared to the standard and control groups.

Table 1: Total blood glucose level in fasting conditions

Treatment Group	Total Blood Glucose Levels					
	0min	15min	30min	60min	90min	120min
Normal	86±2	86±1	88±1	87±2	88±1	86±1
control	86±1	132±1	138±2	159±3	152±4	160±3
standard	88±1	127±2	125±2	131±1	119±2	105±1
Aqueous extract	86±2	132±3	131±1	142±2	141±3	146±2
Alcoholic extract	87±3	130±2	129±1	144±1	124±1	139±2

All values are mean ±SEM (n=6); *p< 0.01 when compared to control.

Table 2: Total blood glucose level in fasting conditions

Treatment Group	Total Blood Glucose Levels			
	1st day	7th day	14th day	21st day
Normal	86±1	87±3	86±1	86±2
control	87±1	149±2	281±2	357±2
standard	86±2	120±4	125±2	88±1
Aqueous extract	90±1	138±2	153±3	144±2
Alcoholic extract	86±2	129±2	145±2	139±3

All values are mean ±SEM (n=6); *p< 0.01 when compared to control.

CONCLUSION

The results indicate that the test compound aqueous and alcoholic extract of Ocimum basilicum has significant and sustained oral hypoglycemic activity, comparable with the hypoglycemic effect of glibenclamide, a sulfonylurea derivative. The anti diabetic effect may be due to increased insulin secretion. By utilizing the vast reserves of phytotherapy we can reduce the economic burden, especially in poor &developing countries.

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