ABSTRACT
The present study was carried out to determine the effects of curcumin on blood glucose level and histology of pancreas in alloxan induced diabetic mice. 15 male albino mice weighing 26-30 gm were used. They were divided into 3 groups, control group received subcutaneous injection of 0.15 M acetate buffer for 15 days, alloxan induced group received subcutaneous injection of alloxan 150 mg/kg body weight to induce diabetes and recovery group received intraperitoneal injection of curcumin 100 mg/kg body weight per day for 15 days. At the end of experiment body weight, pancreatic gland weight, blood glucose level was determined and histology of pancreas was studied by HE and PAS technique. In diabetic mice there was decrease in body weight, pancreatic gland weight and increase in blood glucose level but after treatment with curcumin significant increase in body weight and pancreatic gland weight and decrease in blood glucose level was observed. In histology there was decrease number and size of islets which was again increased after curcumin administration. In conclusion curcumin can be useful as curative agent in diabetes.

Keyword: curcumin, diabetes, islets of Langerhans, histology.

INTRODUCTION
Diabetes mellitus (DM) is considered as one of the major health concerns all around the world today.1-2. It is a metabolic disorder featured by hyperglycemia and alteration in carbohydrate, fat and protein metabolism associated with absolute or relative deficiency of insulin secretion and / or insulin action. DM is classified into two types, insulin dependent diabetes mellitus (IDDM Type 1) and non insulin dependent diabetes mellitus (NIDDM, Type 2). Type I diabetes is an autoimmune disease characterized by a local inflammatory reaction in and around islets that followed by selective destruction of insulin secreting β cells4,5. Type II diabetes is characterized by peripheral insulin resistance and impaired insulin secretion. There is growing consensus that diabetes is usually accompanied by an increased production of free radicals or by impaired antioxidant defenses which is accompanied by development and progression of diabetic complications6-9. Alloxan is a chemical compound used to induce experimental diabetes by leading the β cells islets of the Langerhans to swell and finally degenerate. Alloxan diabetic mice have been reported to have increased vascular permeability; with no recorded fiber loss10. Various drugs presently available to reduce diabetes associated hyperglycemia are associated with several side effects. Hence, in the recent years, there is growing interest in herbal medicine all over the world, as they have little or no side effects11,12. Here we have selected one such important popular ayurvedic herb, Curcuma longa (Zingiberaceae) commonly known as turmeric. Curcumin is the major pigment from dried rhizome of the plant Curcuma longa Linn, that has been used as spice and traditional medicine in Asia for centuries to treat gastrointestinal upset, arthritic pain, parasites, inflammation and other diseases. Studies have shown the potent antioxidative activity of curcumin may be one of the mechanisms of antiaging. Curcumin extends life span in Drosophila by reducing oxidative stress and increasing locomotive activity11-12. The present study was conducted to investigate the curative effect of curcumin in diabetes mellitus.

MATERIAL AND METHODS
Materials
Animals
Male albino mice (Mus musculus Linn,) of age 3 months and weighing between 28-30 gm were used for present investigation. All the animals were maintained under controlled condition with 12 hr light and 12 hr dark cycles at temperature of 26°C ± 2°C in departmental animal house (1825/PO/ERBi/S/15/CPCSEA). Mice were divided into groups such as control and experimental and were caged separately. The animals were housed in plastic cages having dimensions of 29x22x14 cm and allowed to live in groups of 4 to 5 per cage with rice husk bed and under proper condition of light, temperature and humidity. The animals were supplied with standard ‘Amrut Mice Feed’ (Pranav Agro Industries, Pvt. Ltd. Sangli, Maharashtra, India) and water was given ad libitum.

Experimental design
Mice were divided into 3 groups
Control Group
Three months’ male mice were given subcutaneous injection of 0.15M acetate buffer pH 5.4 for 15 days.

Diabetic Group
Three months’ male mice were given single subcutaneous injection of alloxan 150 mg/kg body weight¹³.

Recovery group

Captions: AC- Acinar cells, N-Nucleus, I- Islets of Langerhans

Plate 1: Islets of Langerhans of pancreas stained by HE.

Figure 1 and 2: Control mice pancreas showing normal structure of Islets of Langerhans at 400X, 1000 X respectively.

Figure 3 and 4: Diabetic mice pancreas showing degenerative and necrotic changes, reduced dimension of Islets of Langerhans at 400X, 1000 X respectively.

Figure 5 and 6: Diabetic mice treated with curcumin showing marked improvement of Islets of Langerhans at 400X, 1000 X respectively.
Three months’ male mice were given intraperitoneal injection of curcumin at a dose of 100 mg/kg body weight to diabetic mice daily for 15 days.

**Body weight of mice**

Animals were weighed before starting experiment, during respective treatment and also after completion of each treatment. The record of these observations was maintained.

**Weight of Pancreas**

The animals from respective groups were killed by cervical dislocation after completion of treatment. Pancreas dissected out, washed in ice cold saline (0.09 %...
The present study the diabetic mice showed weight loss; this is likely due to increased insulin consumption. The number of cells in each islet was also reduced drastically in the diabetic group in comparison to control. After treatment with curcumin there was significant decrease in blood glucose level (P<0.01). This clearly indicated the hypoglycemic activity of curcumin. This result is in agreement with research work by some scientists. Curcumin showed an anti-hyperglycemic effect. Moreover, curcumin antagonizes the deficit of glucose energy metabolism or oxidative stress related to cognitive impairment associated with diabetes. Alloxan induces damage to β-cell DNA, mitochondria, lysosomes, and plasma membrane. It was noted that the destruction of 90% insulin secreting β cells of islets of Langerhans was caused by alloxan and hence high blood glucose level was detected. Curcumin might aid in the recovery of β cells to secrete insulin; therefore, the blood glucose level was decreased after treatment. The present study showed increase in PAS staining intensity after curcumin treatment which indicates increase in neutral type of glycoproteins indicating increase in insulin secretion i.e. may be due to increase in β cell or recovery of β cells. The histological studies of pancreas of the diabetic mice showed shrinkage of islets of Langerhans, reduction in size and number of islets while recovery group showed restoration of number and size of islets of Langerhans. Islets cells of recovery group treated with curcumin have regenerated considerably suggesting the presence of stable cells in the islets with the ability of regenerating. In conclusion, this study investigated the effect of alloxan on a β cells and threw light on the potential of curcumin in the prevention or treatment of diabetes. This also suggests that the curcumin at 100 mg/kg dose has the ability of inducing the quiescent cells to proliferate to replace the lost cells of islets of Langerhans.

**REFERENCES**

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