

PATHOLOGICAL STUDIES ON THE EFFECT OF PHENOLIC COMPOUNDS EXTRACTED FROM *Myrtus communis* IN DIABETIC RATS

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ABSTRACT

Phenolic compounds, extracted from the leaves of M.communis were administered to streptozotocin induced diabetic rats @ 400 mg/kg b.wt and 800 mg/kg.b.wt. Rats received 800 mg of extract showed significant regenerative changes in islet cells of pancreas while

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Plants used in traditional medicine to treat diabetes mellitus represent a valuable alternative for the control of this disease. Of various plants, *Myrtus communis* has been widely reported for its antihyperglycemic properties (Elfellah *et al.*, 1984). Streptozotocin injection is a well established means of inducing diabetes in the animal model by the destruction of beta cells of the pancreas (Hardman *et al.*, 2001). The present work was undertaken to study the pathological changes in the pancreas, liver and kidney in diabetic rats treated with phenolic compounds extracted from the leaves of *M.communis*.

MATERIALS AND METHODS

The method described by Elfellah *et al.*(1984) was adopted for isolation and quantification of the extract containing phenolic compounds from the leaves of *M.communis*. Extract of phenolic compounds was dissolved in distilled water and administered orally twice daily through intragastric tube at the dose rates of 400 mg and 800 mg / kg body weight for 28 days.

Male albino Wistar rats weighing 200 to 250 grams were chosen for the present study. All the

animals were maintained as per the recommended standards (NRC, 1996). They were housed in polypropylene cages and fed on standard pellet diet with water given ad libitum.

Streptozotocin was purchased from Sigma Chemicals, USA. Biochemical kits and other reagents used were purchased from Span Diagnostics Ltd, India

The rats were injected intraperitoneally with streptozotocin, freshly dissolved in 0.01 mol/L citrate buffer (pH 4.5) at a dose rate of 65 mg/kg body weight as a single dose for induction of diabetes. Animals which had reached a steady state of hyperglycemia after 10 to 14 days were chosen for further studies.

A total number of 36 rats were used for the present study. They were divided into 6 groups each comprising of 6 numbers. The total period of our present study was of 4 weeks duration.

Group 1: Non diabetic rats received no treatment (Non diabetic control) .

Group 2: Diabetic rats received no treatment (Diabetic control)

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Group 3: Diabetic rats received phenolic compound @ 400mg/kg body weight

Group 4: Diabetic rats received extract of phenolic compound @ 800mg/kg body weight

Group 5: Diabetic rats received glibenclamide @ 5mg/kg body weight

Group 6: Non diabetic rats received phenolic compound @ 800mg/kg body weight

One rat from each group was sacrificed once in a week and the organs viz liver, kidney and pancreas were examined for any gross abnormalities and preserved in 10% formalin, processed by routine paraffin embedding method and stained by haematoxylin and eosin for histopathological examination.

RESULTS AND DISCUSSION

No appreciable gross lesions were observed in pancreas, liver and kidney in all the six groups of rats throughout the entire period of study. Diabetic control rats which received no treatment showed progressive necrosis of islet cells of the pancreas i.e at 0, 7, 14, 21 and 28 days. In addition, hydropic changes in hepatocytes and also in renal tubules were the consistent findings observed after 7 days till the end of the trial. Diabetic rats treated with phenolic compounds @ 400 mg/ kg body weight showed necrosis of islet cells of the pancreas till 21 days of treatment and regenerative changes could be observed at 28 days. Hydropic changes in the hepatocytes and also in the renal tubules were the consistent findings recorded after 7 days of treatment till the end of the trial as observed in diabetic control rats. Diabetic rats treated with phenolic compounds @ 800 mg/ kg body weight showed islet necrosis till 7 days and thereafter regenerative changes could be observed till the end of the trial. Liver and kidney revealed hydropic changes till the end of the trial as recorded in diabetic rats treated with 400 mg of phenolic

compounds. Similar observations of progressive regenerative changes in the islet cells of the pancreas and hydropic changes in the hepatocytes and renal tubules were also recorded in diabetic rats treated with glibenclamide. Non diabetic rats treated with phenolic compounds alone showed no histological changes indicating its non toxicity.

Progressive islet cells necrosis observed in diabetic rats was attributed to administration of streptozotocin. Degenerative changes noticed in kidney and liver could be attributed to the impaired protein and fat metabolism that is commonly encountered in diabetes mellitus. Administration of *M. communis* extract @ 800mg resulted in regeneration of islet cells of the pancreas. However it did not have significant effect on degenerative changes in other organs viz. liver and kidney. No pathological reports are available on efficacy of *M. comunis* in diabetic rats. Our findings also revealed that phenolic compounds exhibit marked antidiabetic effect when administered @ 800 mg/ kg body weight and moderate antidiabetic response @ 400 mg/kg in non diabetic rats as evidenced by regenerative changes in islet cells of the pancreas. Our study also revealed that the phenolic compounds alone do not exhibit any toxic effects as evidenced by absence of histological changes in the liver and kidney in non diabetic control rats.

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