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Investigation of Anti-diabetic Activity of aerial part of *Rivea hypocrateriformis* in Dexamethasone induced Diabetes in Expermental animal

Parag Kaushal[1*], Sachin Jain[2] and Neetesh Kumar Jain[3]

1, Department of Pharmacology, Faculty of Pharmacy, Oriental University, Indore, (M.P.) – India

2, Department of Pharmacognosy, Faculty of Pharmacy, Oriental University, Indore, (M.P.) – India

3, Department of Pharmacology, Modern Institute of Pharmaceutical Sciences, Indore (M.P.)-India

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Abstract

The different extracts were prepared and evaluated for *invivo* antidiabetic activity by using Dexamethsone induced diabetes model. The decreased in weight of liver, kidney and pancreas after the treatment with EERH may be due to prevention of inflammation, necrosis and infiltration of MNC due to the oxidative stress induced by dexamethasone. The protection against the histopathological injury of pancreas, as evident from the decrease inflammation, necrosis and infiltration of MNC in pancreatic tissue, also revealed the antioxidant potential of EERH. Furthermore, decreased bilirubin, SGOT and SGPT levels suggested that EERH were effectively protected the liver injury due to the oxidative stress induced by dexamethasone.

Key Words: Diabetes, Dexamathasone, Plant extract

Introduction

Diabetes mellitus (DM) is a group of metabolic disorders characterised by hyperglycemia. It is associated with abnormalities in carbohydrate, fat, and protein metabolism and results in chronic complications including microvascular, macrovascular, and neuropathic disorders [40]. Several distinct types of DM exist and are caused by a complex interaction of genetics, environmental factors, and life-style choices. Depending on the etiology of the DM, factors contributing to hyperglycemia may include reduced insulin secretion, decreased glucose utilization, and increased glucose production. The metabolic dysregulation associated with DM causes secondary pathophysiologic changes in multiple organ systems that impose a tremendous burden on the individual with diabetes and on the health care system. *Rivea hypocrateriformis* contains flavonoids, tannin, alkaloids etc.. The flavonoids have been reported for antioxidants activity, and antioxidants are known to possess antidiabetic activity [1-4].

Rivea hypocrateriformis are traditionally used in the treatment of diabetes mellitus . The root contains the chemical constitutes: β-Sitosterol, phenolic acids, flavonoids, coumarin and quercetin, isoquercetin and rutin, neo-chlorogenic acid, 3, 4 dimethoxy-6, 8-dihydroxy coumarin; 6, 7- dihydroxy-8 methoxy coumarin [2].

***Corresponding Author:**
E.mail: paragkaushal11@gmail.com

Materials and Methods

Collection and Authentication of Plant Material

Rivea hypocrateriformis aerial parts were collected from Malwa region. The plant was identified, authenticated and certified by Dr. S.N. Dwivedi, Botanist.

Acute toxicity study

In the present investigation, the doses of the *R. hypocrateriformis* extracts were selected on the basis of literature reports.

Pharmacological studies

In-Vivo Studies

In vivo antidiabetic activity was performed by dexamethasone induced model. [5-8]

Experimental animals

Wistar rats of either sex, weighing 230–250 g were utilized for the research. Animals were housed in colony cages and kept up under the standard laboratory environmental conditions; temperature 25 ± 2°C, 12 h light: 12 h dark cycle and 50 ± 5% relative humidity with free access to food and water *ad libitum*. Animals were acclimatized to laboratory conditions before the test. Each gathering comprised of six (n = 6) animals. Every one of the trials was done amid the light time frame (08:00– 16:00 h). Investigations were done as per the rules are given by Committee for the Purpose of Committee for Control and Supervision of Experiments on Animals (CCSEA), New Delhi, India. All animal experiments were approved by the Institutional Animal Ethics Committee (IAEC).

Experimental design-II (*Rivea hypocrateriformis*)

Group 1: Vehicle treated (Distilled water, 5 ml/kg, and p.o.)

Group 2: Dexamethasone sodium phosphates, (10mg/kg/day, s.c.)

Group 3: HFD + Dexamethasone sodium phosphates,(10 mg/kg/day, s.c.)

Group 4: HFD + Dexamethasone sodium phosphates, (10mg/kg/day, s.c.)+ RHEE (200 mg/kg p.o.)

Group 5: HFD + Dexamethasone sodium phosphates, (10mg/kg/day, s.c.) + RHEE (400 mg/kg p.o.)

Group 6: HFD + Dexamethasone sodium phosphates,(10 mg/kg/day, s.c.) + Glibenclamide (500 mcg/kg/day, p.o.)

Group 7: HFD+Dexamethasone sodium phosphates, (10 mg/kg/day, s.c.) + Atorvastatin 10 mg/kg

Blood samples of each animal from respective treatment groups were collected by retro orbital on 0, 10 and 20 day of the treatment for estimation of biochemical parameters. At the end of the experimental period, i.e. on day 20, The animals were anasthesized with anesthetic diethyl ether and blood samples were collected by retro-orbital method and serum were separated for estimation of various biochemical parameters and sacrificed by cervical dislocation and viscera was exposed to remove the various tissues for estimation of physical and biochemical parameters and Histopathological study.

Results and Discussion

Administration of dexamethasone (10 mg/kg, s.c.) showed significant ($P<0.01$) increase in serum glucose level on 10, 20 day of observational period respectively as compared to the normal group. Administration of glibenclamide (500 mcg/kg, p.o.) showed significant ($P<0.01$) decrease in serum glucose level as compared with diabetic control. Administration of EERH (200 and 400, p.o.) showed significant ($p<0.05$ and $p<0.01$) decrease respectively in serum glucose level as compared with diabetic control. Administration of Atorvastatin 10 mg/kg showed significant ($p<0.01$) decrease in serum glucose level as compared with diabetic control.

Conclusion

The different extracts were prepared and evaluated for *invivo* antidiabetic activity by using Dexamethsone induced diabetes model. The results indicate that the extract posses significant anti-diabetic activity.

Table 1: Effect of EERH on Serum Glucose level in dexamethasone induced diabetes mellitus

Group	Groups	Serum glucose level		
		0 Day	10 Days	20 Days
I	Normal Control (Normal Saline)	89.104±4.336	86.383±3.646	87.561±3.626
II	Diabetic control	90.2±21.44##	171.61±28.9##	196.88±28.06##
III	HFD + Dexamethasone 10 mg/kg	88.71±45.750	194.77±9.532	158.28±5.576*
IV	EERH 200 mg/kg	95.98±19.952	178.21±18.461	123.61±40**
V	EERH 400 mg/kg	98.28±6.686	164.16±4.844*	108.543±3.37**
VI	Glibenclamide 0.5 mg/kg	97.47±17.420	149.27±9.237*	97.817±4.104**
VII	Atorvastatin 10 mg/kg	92.54±35.585	154.86±26.71*	102.029±5.58**

The values are expressed as mean±SEM (n=6). ##p<0.01, compared to normal group (Students't' test) *p<0.05, **p<0.01, compared to diabetic control group (One way ANOVA followed by Dunnett's test).

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