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Research Article

POLYHERBAL FORMULATIONS FOR ANTI DIABETIC THERAPY

H.S. CHANDEL[1], A. PATHAK[2] AND M. TAILANG[2,*]

[1]Truba Institute of Pharmacy, Bhopal (M.P), India, [2]Department of Pharmacy, Barkatullah University, Bhopal (M.P), India, [3]Department of Drug Technology, Faculty of Medical Technology- Derna, Libya

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ABSTRACT

In the present work, hypoglycemic activity of the methanolic extracts of the marketed and prepared in-house formulations in alloxan induced diabetic rats was carried out. Methanolic extracts significantly reduced the blood glucose level in alloxan induced diabetic rats. The extracts were administered through oral routs in a dose of 150 mg twice a day/kg of body weight/twice a day with 0.2 % polyvinyl pyrrolidone solution. The hypoglycemic activity of methanolic extract of formulaion-1 showed 67.33% antidiabetic activity whereas in-house prepared formulation -2 showed 68.94% activity. Both the formulations have shown potential in their role to reduce the blood glucose level. Formulaiton 2 showed higher activity as compared to the Formulation 1. This may be because of the fact that some of the herbal counterparts in the Formulation 2 viz. bark of babul and gudvel, were not present in the Formulation 1 may possess a higher anti diabetic activity. A deeper insight into these herbs may lead to development of more potent anti diabetic formulations.

Keywords: Polyherbal formulation, Antidiabetic

INTRODUCTION

Herbal medicines are the oldest remedies known to mankind. Herbs had been used by all cultures throughout history but India has one of the oldest, richest and most diverse cultural living traditions associated with the use of medicinal plants[1]. In the present scenario, the demand for herbal products is growing exponentially throughout the world and major pharmaceutical companies are currently conducting extensive research on plant materials for their potential medicinal value. In many journals, national and international, we find an increasing number of research publications based on herbal drugs. Many analysis-based studies regarding pharmacological research in India[2,3,4] have been conducted in the past.

Diabetes is the world's largest endocrine disease involving metabolic disorder of carbohydrate, fat and protein. According to the WHO projections, the prevalence of diabetes is likely to increase by 35%[5]. Statistical projections about India suggest that the number of diabetics will rise from 15 million in 1995 to 57 million in the year of 2025 making it the country with the highest number of diabetics in the world[6]. In the present work we have developed anti diabetic polyherbal formulations and assessed their potential in the treatment of diabetes.

MATERIALS AND METHODS

Different herbs based on exhaustive literature survey were selected and these were authenticated by the Head Department of Pharmacy Barkatullah University Bhopal. Purified water was used in the entire study.

Method of Preparation

1. All the individual drugs were dried using hot air oven at 40ºC for 24 hours.
2. The individual drugs were then crushed using Willing grinder and passed through mesh no. 40.
3. The individual drugs were then weighed as per the quantity required on digital precision balance (Accuracy: 0.1g, Jyoti Scientific, India).
4. The drugs were mixed geometrically using double cone blender (Jyoti Scientific, India; TIP/PCS/DCB/01).

The mixed formulation was unloaded in a polythene bag, weighed, labeled and packed in glass bottles. The weight of the formulation was 100 grams. Two formulations with different herbs were prepared. Both he formulations were prepared with same method as reported. The constituents of both the formulations are as follows:

Table 1: Ingredients for formulation 1

Sr. No.	Ingredient	Quantity taken
1.	Gudmar	20 gm
2.	Jamun guthali	8 gm
3.	Karela beej	5 gm
4.	Haldi	5 gm
5.	Amla	5 gm
6.	Vijaysar	5 gm
7.	Tejpatra	5 gm
8.	Shilajeet	5 gm
9.	Kutki	4 gm
10.	Chitrak	4 gm
11.	Bilva patra	5 gm
12.	Trivanga bhasm	2 gm
13.	Methi	3 gm
14.	Neem patra	5 gm
15.	Pectin and guar gum qs to	100gm

Table 2: Ingredients for formulation 2

Sr. No.	Ingredient	Quantity taken
1.	Gudmar	30 gm
2.	Karela Beej	10 gm
3.	Haldi	10 gm
4.	Jamun Guthali	10 gm
5.	Gudvel	10 gm
6.	Babul Ki Chal	10 gm
7.	Bilva Patra	10 gm
8.	Neem Patra	5 gm
9.	Shilajeet	2.5 gm
10.	Trivanga bhasm	2.5 gm

Pharmacological evaluation

The methanolic extracts of the formulations were utilized for the pharmacological screening of the formulations. One gram of methanolic extracts of in-house prepared formulations were separately triturated with polyvinyl pyrrolidone (PVP 0.2 g) and added water for injection in success amount to make up the final volume to 100 ml (0.2%w/v). Adult albino rats of either sex (100-200 Gms) were selected for the study and were divided in to groups of six in each group. Rats were acclimatized for a period of two-three days in the new environment and subsequently used for further study. Toxicological studies revealed that albino rats tolerated considerably high dose of methanolic extract (700 µg/kg body weight, orally) without any toxic manifestation. Therefore doses of 150 µg twice a day/kg-body weight, twice a day, of methanolic extracts were administered orally to the alloxan induced diabetic albino rats[7]. Animals were divided in four groups of six animals each.

The diabetes was experimentally induced by i.v. administration of alloxan monohydrate 150 µg twice a day/kg of body weight. Alloxan is given by rapid intravenous injection, as its half-life in the body is only a few seconds. The diabetes is induced within 24 hours if the rats were fasted before the alloxan injection. Diabetes is checked by measuring blood glucose level using Glucometer[8]. Haemo gluco test 200-800R(HGT) method was utilized for the measurement of blood glucose level. Blood Sample collected by retro orbital puncture under light ether anesthesia. The blood glucose level was determined after fixed intervals of four days and the study was continued for a period of twenty-eight days.

Group-I: Control

Adult albino rats were fed with 0.1 ml poly vinyl pyrolidone (PVP) solution (0.2%w/v).

Group-II: Glibenclamide treated

Adult albino rats were orally administered with 50 µg twice a day/Kg of body weight of Glibenclamide.

Group-III: Formulation-1 extract treated

Adult albino rats were orally administered with 150 µg twice a day/kg of body weight of methanolic extract of Formulation-1.

Group-IV: Formulation-2 extract treated

Adult albino rats were orally administered with 150 µg twice a day/kg of body weight of methanolic extract of Formulation-2.

The observations with respect to the measurement of blood glucose level have been recorded in Table 3 and the efficiency of the formulations with respect to their potential in the anti diabetic therapy in terms of percent reduction of glucose level has been tabulated in Table 4.

Table 3: Estimation of Blood glucose level in alloxan induced diabetic albino rats

Group	AIBGL Mg/dL	First Day (mg/dl)	Forth Day (mg/dl)	Eighth Day (mg/dl)	Twelfth Day (mg/dl)	Sixteenth Day (mg/dl)	Twentieth Day (mg/dl)	Twenty-Forth Day (mg/dl)	Twenty-Eighth Day (mg/dl)
GP-I 2% PVP w/v 0.1 ml	368.67 ± 5.13	365.05 ± 6.15	365.33 ±10.36	362.66 ±9.15	358.01 ± 5.19	356.67 ±15.3	353.33 ± 6.33	352.33 ± 11.55	249.67 ± 6.89
GP-II Glibenclamide 50 µg twice a day/Kg	304.17 ± 9.60	266.49 ± 6.11	210.33 ± 8.11	188.32 ±12.11	165.33 ±11.52	154.33 ±5.56	134.5 ±5.89	121.14 ±13.23	101.33 ±5.33
GP-III Formulation-1 150 µg twice a day/Kg	412.5 ±5.69	387.5 ±9.55	353.88 ±12.78	328.17 ±9.36	296.5 ±10.52	263.43 ±7.2	228.62 ±8.66	186.76 ±7.5	134.76 ±5.18
GP-IV Formulation-2 150 µg twice a day/Kg	426.36 ±8.23	415.34 ±8.48	387.46 ±11.63	342.48 ±8.54	302.79 ±10.82	272.68 ±8.64	236.72 ±11.96	186.67 ±12.72	132.43 ±8.94

Values reported are Mean ± S.D. and n=6.

AIBGL: Alloxan induced blood glucose level

Table 4: Percentage reduction of Blood glucose level in alloxan induced diabetic albino rats

Group	First Day (mg/dl)	Forth Day (mg/dl)	Eighth Day (mg/dl)	Twelfth Day (mg/dl)	Sixteenth Day (mg/dl)	Twentieth Day (mg/dl)	Twenty-Forth Day (mg/dl)	Twenty-Eighth Day (mg/dl)
GP-I 2% PVP w/v 0.1 ml	0.98	0.97	1.63	2.71	3.25	4.16	4.43	5.15
GP-II Glibenclamide 50 µg twice a day/Kg	12.38	30.85	38.08	45.64	49.26	55.78	60.17	66.68
GP-III Formulation-1 150 µg twice a day/Kg	6.06	14.21	20.44	28.12	14	44.57	54.72	67.33
GP-IV Formulation-2 150 µg twice a day/Kg	2.58	9.12	19.67	28.98	36.04	44.48	56.22	68.94

RESULTS AND DISCUSSION

In the present work, we evaluated the hypoglycemic activity of the methanolic extracts of the marketed and prepared in-house formulations in alloxan induced diabetic rats. As shown in the table the methanolic extracts significantly reduced the blood glucose level in alloxan induced diabetic rats. The extracts were administered through oral routs in a dose of 150 mg twice a day/kg of body weight/twice a day with 0.2 % polyvinyl pyrrolidone solution. The hypoglycemic activity of methanolic extract of formulaion-1 showed 67.33% antidiabetic activity whereas in-house prepared formulation -2 showed 68.94% activity. Both the formulations have shown potential in their role to reduce the blood glucose level. Formulaiton 2 showed higher activity as compared to the Formulation 1 (Table 3 and 4). This may be because of the fact that some of the herbal counterparts in the Formulation 2 viz. bark of babul and gudvel, (Table 1 and 2) were not present in the Formulation 1 may possess a higher anti diabetic activity. A deeper insight into these herbs may lead to development of more potent anti diabetic formulations.

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