Investigations on the Anti-diabetic Profile of the Prepared Polyherbal Tablets

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ABSTRACT

DM and its complications are the most common problems in the world today. Even though it is not a contagious disease, bad lifestyle, and unhealthy food habits cause diabetes. The causes for diabetes are bad lifestyles habits, mechanism wise it is caused due to the insufficiency of the insulin secretion of the pancreas and insulin receptor insensitivity. This leads to improper glucose metabolism and reuptake into the muscles. Numerous synthetic drugs are used effectively to treat diabetes. The drugs have those side effects and make their use as limited due to the fear of causing other problems. In this view, the herbs and medicinal plants have been used to treat numerous diseases and are found effective and safer too. There are a lot of herbs that are used to treat diabetes also, and the exact mechanism of action of all those herbs was also investigated and proven. There were chemical leads that were isolated from the herbs and are found to be effective against diabetes. In the present research, the tablet formulation which has the potency to control the blood sugar level in diabetes, which is induced by STZ. This was prepared using the extracts of *Psidium guava, Momordica charantia, Ficus religiosa* and *Piper nigrum* and the investigations for the anti-diabetic property revealed that the tablets showed a better activity compared to the standard and individual extract.

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INTRODUCTION

DM and its complications are the most common problems in the world today. Even though it is not a contagious disease, bad lifestyle, and unhealthy food habits cause diabetes. The causes for diabetes are bad lifestyles habits, mechanism wise it is caused due to the insufficiency of the insulin secretion of the pancreas and insulin receptor insensitivity. This leads to improper glucose metabolism and reuptake into the muscles [1]. Diabetes is most prevalent in the current world, and about 10million people are suffering from the DM in the world now [2]. Out of those people, the major share was taken by the elderly and obese people. There are direct complications of diabetes like DM related renal complications, neurological complications, ocular complications etc. The patient lifestyle and the dependency on others are severely affected, and the standard of living is deeply lowered due to diabetes [3]. There are a lot of mechanisms by which the DM is caused and the importance of those being the insufficient secretion of the insulin from the pancreas and the sensitivity of the receptors.

Numerous synthetic drugs are used effectively to treat diabetes. The drugs have those side effects and make their use as limited due to the fear of causing other problems. In this view, the herbs and medicinal plants have been used to treat numerous dis-

eases and are found effective and safer too. There are a lot of herbs that are used to treat diabetes also, and the exact mechanism of action of all those herbs was also investigated and proven. There were chemical leads that were isolated from the herbs and are found to be effective against diabetes [4, 5].

There are various methods to investigated diabetes in experimental animal models. Out of those methods, Alloxan induced method and Streptazotocin method are the primary and most applied methods for induction of diabetes [6]. In this work, the leaves of the plants like *Psidium guava, Momordica charantia, Ficus religiosa* and *Piper nigrum* were extracted and used to make anti-diabetic tablets and investigated for the anti-diabetic activity.

Preparation of Tablets

The leaves of all the plants were collected and dried. The dried leaves were powdered and used for extraction. The fine plant powder was extracted using distilled water and ethanol in the ration of 2:1 using maceration. The plant material was soaked in the solution mixture for about five days [7] and accompanied by occasional shaking to ensure proper mixing of the drug in the solvent. The macerate was then filtered using filter paper. The filtrate was then dried, and the thick paste was used for the preparation of the tablet and investigated for the activity in streptozotocin method.

Lab animals

Albino Wistar rats were used to investigate the anti-diabetic activity, which was procured from the supplier. The weight of the rats was 180-190g, and they were kept in the lab climate in air controlled and humidity regulated climate. The rats were kept in plastic cages and are allowed to have water freely, and the food pellets.

Animal segregation

The rats were segregated based on weights and gender. Rats were divided into six groups of animals which are having 4animals inside each group and made sure the animals were distributed randomly based on the weights. Both gender animals were divided equally [8, 9].

Group- I-(Normal/control): 1gm in 10ml suspension of sod.CMC in double distilled water that is given to the rats given at 5ml/kg

Group- II-STZ'cin induced diabetes in rats which received only 1gm in 10ml suspension of sod.CMC in distilled water that is given at 5ml/kg

Group- III–STZ'cin induced diabetic rats received Momordica extract-250mg/kg/day p.o suspended in 1%w/v of CMC;

Group- IV–STZ'cin induced diabetic rats received Guava-250mg/kg/day p.o suspended in 1%w/v of CMC;

Group- V–STZ'cin induced diabetic rats received tablet powder-250mg/kg/day p.o suspended in 1%w/v of CMC;

Group- VI-Standard-group-STZ'cin induced diabetic rats received rosiglitazone-2mg/kg p.o) suspended in 1%w/v of CMC.

INDUCTION PROTOCOL

The diabetes was induced into the rats by using streptozotocin at a dose of 45mg in a kg of the rat. The drug was dissolved in the citrate buffer which had a pH of 4.5 and used to inject via IP route to induce diabetes. The drug was given only a single dose. The rats were given the glucose solution to avoid the initial hypoglycemia that is caused due to the lowering of the sugar level. The rats which had a blood glucose level of 245mg/dL were taken and continued for the study [10, 11].

The investigation of the anti-diabetic activity was done for 30 days, and the daily dose of the extract was given once in the morning. The animals were tested for the blood glucose level using the Accu check strip that was attached to a digital glucometer, and the blood tests were done on the starting day, 7th day, 14th day, 21st day and on the last day too. The reading was noted and recorded.

RESULTS & DISCUSSION

With the induction of the DM using the drug, there was a spike in the elevation of the glucose levels in the blood in group II which indicates that there is an increase in blood sugar level and diabetes was successfully induced into the rats. Group 1 the sugar levels were normal because of no induction of the DM. The values of the blood glucose levels that were hiked and lowered are tabulated in table 2. In the test groups, the extracts were tested to anti-diabetic activity, and the blood glucose levels were lowered significantly.Tables 1 and 2

Anti-diabetic activity of Prepared Tablets

But when it is compared to the tablets and the standard drug, it was lesser inactivity. The standard drug has lowered the blood glucose significantly lowered the blood glucose in that group. The tablet formulations significantly lowered the blood sugar levels, showed a better and significantly better activity compared to the standard rug and the individual extracts too. This tablet formulation was proven to be potent, and the tablet is yet to subject for the stan-

Table 1: Anti-diabetic activity ofPrepared Tablets

Groups	Blood sugar level(mg/dL)				
	First day	7th day	14th day	21st day	Last day
Normal control-(1% w/v CMC)	103.81±3.674	109.93±4.52	107.99±1.265	101.14±0.823	99.51±0.936
Diabetic control	323±3.632	326.34±3.753	324.12 ±5.657	315.51±4.438	317.69±5.859
Guava Extract	330.75±4.576	285.17±5.194	261.24±3.358	192.63±3.7	138.8±4.428
Ficus Extract	329.96±5.145	270.80±3.25	238±4.513	176±2.461	119.21±3.631
Anti-diabetic Tablets	324.13±4.783	261.15±0.99	219±0.924	162±5.592	103.79±4.817
Standard drug	321.40±3.812	288.61±4.963	273.52±3.125	201.24±3.615	134.50±4.512

Table 2: Preparation of the Anti-diabetic Capsules

Sl no.	Ingredients	Quantities
1	Guava Extract	100mg
2	Ficus Extract	100mg
3	Momordica Extract	100mg
4	*Piper longum* powder	50mg
5	Starch	55mg
6	Talc	Qs to make the punch die quantity.
6	Acacia	30mg

dardization in terms of the chemical constituents and the pharmacological activity [12].

CONCLUSION

The present research the tablet formulation which have the potency to control the blood sugar level in diabetes, which is induced by STZ. This was prepared using the extracts of *Psidium guava, Momordica charantia, Ficus religiosa* and *Piper nigrum* and the investigations for the anti-diabetic property revealed that the tablets showed a better activity compared to the standard and individual extract.

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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REFERENCES

[1] Lateef H, Abatan OI, Aslam MN, Stevens MJ, Varani J. Topical Pretreatment of Diabetic Rats With All-trans Retinoic Acid Improves Healing of Subsequently Induced Abrasion Wounds. Diabetes. 2005;54(3):855–861. Available from: 10.2337/diabetes.54.3.855.

[2] www.health.com/galecontent/diabetes,accessed on 18-2-2009;.

[3] Edwin J, Balakrishnan S, Joshi C, Jain. Diabetes and Herbal Medicines. Iranian Journal of Pharmacology & Therapeutics. 2008;7(1):97–106.

[4] Jamshid M, Prakash RN. Evaluation of hypoglycemic effect of Morus alba in an animal model. Indian Journal of Pharmacology. 2009;40(1):15–18.

[5] Chauhan NS, Dixit VK. Antihyperglycemic activity of ethanolic extract of Curculigo orchioides Gaerth. Pharmacognosy Magazine. 2007;3(12):237–240.

[6] Frode TS, Medeiros YS. Animal models to test drug with potential Anti-diabetic activity. Journal of Ethanopharmacology. 2008;115.

[7] Agrawal SS, Paridhavi M. Herbal Drug Technology. Universities Press; 2007. p. 1–512.

[8] Chandra A, Mahdi AA, Ahmad S, Singh RK. Indian herbs result in hypoglycemic responses in streptozotocin-induced diabetic rats. Nutrition Research. 2007;27(3):161–168. Available from: 10.1016/j.nutres.2006.12.008.

[9] Prasad SK, Kulshreshtha A, Taj N, Qureshi. Anti

diabetic activity of some Herbal plants in streptozotocin Induced Diabetic Rats. Pakistan Journal of Nutrition. 2009;8(5):551–557.

[10] Noor A, Gunasekharan S, Manickam AS, Vijayalakshmi MA. Anti-diabetic activity of Aloevera and histology of organs in streptozotocin induced diabetic rats. Current Science. 2008;94:1070–1076.

[11] Galigher AE, Kozloff EN. Essential Practical Microtechnique; 1971. p. 77–210.

[12] Ramesh KG, Mahesh D, Burande. Elements of Clinical Pharmacy. 2007;p. 341–353.

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