

Effect of Ayurvedic Churnam on the Elevated Blood Sugars by STZ Drug

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Article History:

Received on: 10 Sep 2019
Revised on: 12 Oct 2019
Accepted on: 24 Nov 2019
Published on: 28 Dec 2019

Volume: 9 Issue: 4

Keywords:

Ayurvedic Churnam,
Withania,
Glycerrihza

ABSTRACT

Diabetes Mellitus shortly called as DM is a metabolic disorder which is due to the improper secretion of the insulin by the pancreas. The insensitivity in the reuptake of insulin also causes diabetes. This increases the blood glucose level and affects physiological functions. The majority of the population that is suffering from DM are generally obese or following unhealthy lifestyle habits. There are about half of the world population is suffering from DM and related complications. DM secondary complications include nephropathy, neuropathy, retinopathy and vascular complications like PVD and PAD. Considering the activity of herbs and the safety of the same, an ayurvedic formulation was prepared using herbs, and the same is investigated for the antidiabetic activity. The ayurvedic formulation that is designed in the study is an ayurvedic churnam preparation out of the texts of the Ayurveda books. The polyherbal churnam that is prepared showed a significantly better activity compared to the standard drug and the marketed ayurvedic formulation too. The higher dose of the extract showed higher activity compared to the lower dose of the preparation.



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eISSN: 2277-2782

DOI: <https://doi.org/10.26452/ijntps.v9i4.1343>



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INTRODUCTION

Diabetes Mellitus shortly called as DM is a metabolic disorder which is due to the improper secretion of the insulin by the pancreas. The insensitivity in the reuptake of insulin also causes diabetes. This increases the blood glucose level and affects physiological functions [1]. The majority of the population that is suffering from DM are generally obese or following unhealthy lifestyle habits. There are about half of the world population is suffering from DM and related complications. DM secondary complica-

tions include nephropathy, neuropathy, retinopathy and vascular complications like PVD and PAD [2]. In general, DM is caused by consuming unhealthy food that is lack of dietary fibre, a lot of processed food. It also includes lifestyle conditions like Stress and smoking and drinking alcohol [3].

There are synthetic drugs that are effective in the treatment of diabetes and these drugs act by various mechanisms like increasing the receptor sensitivity to the insulin, increase in the reuptake of the glucose into the tissue from blood etc. but these drugs are known to cause various side effects and in this case herbs are the alternative and best choice of treatment in treating diabetes. These herbs are known to mankind from the history of medicine and are safer and potent in comparison to synthetic drugs [4]. There are many pieces of evidence to show the activity of herbs and medicinal plants for the treatment of DM and the mechanisms of action against diabetes were also significantly published through the research [5]. Numerous scientific activities are performed in proving the pharmacological activity of the drugs in animal models with the artificial induc-

tion of diabetes into the rats. Out of all those activities, alloxan model and streptozotocin are significant and useful models [6]. Considering the activity of herbs and the safety of the same, an ayurvedic formulation was prepared using herbs, and the same is investigated for the antidiabetic activity. The ayurvedic formulation that is designed in the study is an ayurvedic churnam preparation out of the texts of the Ayurveda books.

CHURNAM Preparation

Laboratory rats

Swiss albino mice are used for testing of the antidiabetic activity of the prepared formulation. The mice were collected from the 45-50gm of weight. All the mice are in the prime age of about 2months. They are procured having both sexes equally and are maintained in the cold climate in the laboratory. They are given free access to the water and food in the form of standard pellets which was bought from the local store.

Processing of the plant material

The herbal material that is used to prepare the churnam is as per Table 1. The herbaria were made, and the specimen was submitted in the laboratory for future use. The plants were collected from the local market suppliers and are appropriately dried in the shaded area with well ventilated and elevated beds [7]. The dried plant material was then finely made into the powder using a mortar and pestle. The powder is sieved through a cloth and then stored in an airtight container for the future use of the activity.

Table 1: Preparation of the Antidiabetic Ayurvedic churnam

S.No.	Ingredients	Quantity
1	<i>Terminalia Chebula</i>	50mg
2	<i>Terminalia bellirica</i>	50mg
3	<i>Phyllanthus emblica</i>	50mg
4	<i>Withania somnifera</i>	50mg
5	<i>Azadirachta indica</i>	50mg
6	<i>Bacopa monerii</i>	50mg
7	<i>Glycyrrhiza glabra</i>	25mg
8	<i>Piper longum</i>	10mg
9	<i>Tribulus terrestris</i>	10mg

Mice separation for experiments

The Mice were divided into six batches, and in those batches, the mice were segregated randomly in concern with the weights and both the sexes. Every batch in the experiment will contain about six mice [7].

Batch-1: the mice in this group were given with 2% Carboxymethyl Cellulose which is suspended in distilled water which was given a dose of 2mg/kg.

Batch-2: the mice in this group were given with 2% Carboxymethyl Cellulose which is suspended in distilled water which was given a dose of 2mg/kg, and the induction of diabetes is done to the mice using Streptozotocin.

Batch-3: the mice in this group were given with a marketed standard ayurvedic churnam preparation at the dose that is prescribed by the directions label, and the induction of diabetes is done to the mice using streptozotocin.

Batch-4,5: the mice in this group were given with the prepared ayurvedic churnam preparation at tow doses of 250 and 500mg/kg bw., and the induction of diabetes is done to the mice using streptozotocin.

Batch-6: induction agent, streptozotocin and also standard drug rosiglitazone at a dose of 1.5 mg/kg of the drug in the oral route.

Induction of the Diabetes

Diabetes in the mice was induced by the induction drug, Streptazotocin at a dose of 40mg per kg. This was suspended in the citric acid buffer which was prepared to the pH adjusted to 4.5. this suspension was injected in the mice in the intraperitoneal route. The mice went into the initial hypoglycemia state, and so they are administered with a glucose solution of 20%w/v in the distilled water. In a single shot, the glucose was normalized, and the induction was diabetes during the study [8-10].

The prepared ayurvedic churnam formulation was tested for an antidiabetic activity for about 4weeks duration. The testing of the blood glucose level was done in every week once using a digital glucometer, and the readings were noted directly [11].

RESULTS& DISCUSSION

The antidiabetic activity was induced successfully with the administration of Streptozotocin (STZ). There was a rise in the blood sugar values in the induction batch of diabetes. The sudden spike of the elevation of glucose was noticed with the induction. The prepared churnam formulation showed an improvement in the normalization of the glucose levels compared to the normal group that is batch 1. The churnam formulation effectively lowered glucose levels. Table 2

The groups that are treated with the churnam and the marketed formulation considerably lowered the elevated glucose levels, and they also acted for a

Table 2: Antidiabetic activity of Ayurvedic churnam

Groups	Blood sugar level (mg/dl)				
	1st day	8th day	15th day	22nd day	29th day
Group 1-saline	105.12±6.836	112.31±6.74	109.24±3.562	103.43±1.347	101.70±2.072
STZdiabetes group	326±5.361	328.62±5.835	325.39±6.783	317.79±6.412	319.81±8.925
Marketed preparation	332.95±6.724	287.43±7.341	263.56±5.846	194.82±5.6	140.19±6.754
Ayurvedic churnam 250mg/kg	331.23±7.193	272.14±5.942	240±6.714	179±4.646	121.42±5.811
Ayurvedic churnam 500mg/kg	326.34±6.917	263.18±0.246	222±2.347	165±7.528	104.83±7.249
Synthetic drug	323.67±5.602b	290.81±6.714	275.795.690	204.5±4.121	135.60±6.398

longer duration of time. It was comparably significant to the standard drug too. The churnam that is prepared showed a better activity at high dose compared with the same at the dose. This shows that the churnam shows a dose based enhancement in the antidiabetic activity.

The test proceeded for 4weeks wherein the blood glucose levels were normalized with the churnam formulation compared to the standard synthetic drug. This increase in the activity might be due to the variations in the herbal constituents that are present in the churnam. The antioxidant activity of the herbs that are used in this preparation might also help for the antidiabetic activity, which is often inter-related [12]. The chemical standardization of this churnam is necessary to be able to make it exportable to different countries so that the standards are met as per the guidelines of those countries.

CONCLUSION

The polyherbal churnam that is prepared showed a significantly better activity compared to the standard drug and the marketed ayurvedic formulation too. The higher dose of the extract showed higher activity compared to the lower dose of the preparation.

ACKNOWLEDGEMENT

The authors are thankful to all who have extended their constant support for the completion of the work.

Conflict of Interest

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

Funding Support

The authors declare that they have no funding support for this study.

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Cite this article: M Ramesh, J Vincent Vidyasagar, G Tharun Kumar, C R Akila. **Effect of Ayurvedic Churnam on the Elevated Blood Sugars by STZ Drug**. *Int. J Nov. Tren. Pharm. Sci.* 2019; 9(4): 71-74.

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