

The Effect of Hazel - Leaf Decoction on Blood Glucose Reduction in the Diabetic Rats

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Abstract: Regarding the various complications of diabetes, searching for methods and means for its treatment are necessary. Since some people use the hazel - leaf decoction for this purpose, the researchers were motivated to test the effect of it on rats and study its mechanism in the succeeding surveys in case of its efficacy. Fifty mg kg⁻¹ of streptozocin was injected intraperitoneally to 12 rats. Then, they were divided into two groups. The experimental group was given 10% Hazel - leaf decoction and control group was received drinking water. The blood glucose level was measured for both the experimental and control groups on the days: 0, 3, 7, 15 and 30. The research revealed that this decoction given reduced blood glucose from the day 7, 15 and 30 significantly ($p < 0.007$, $p < 0.001$, $p < 0.001$, respectively) as compared to the control group.

Key words: Glucose • Hazel - leaf • diabetic rats

INTRODUCTION

Diabetes is a chronic and lifetime disease, which is considered as one of the most important endocrine disorders. The chief manifestations of DM are hyperglycemia and fat and protein metabolic disorders. Major complications of this disease are protracted adverse effects in the eye, kidneys, nerves and blood vessels [1, 2].

Two main types of DM are insulin- dependent diabetes mellitus (IDDM or type I) and no- insulin-dependent diabetes mellitus (NIDDM or type II).

Basic rate of insulin secretion from beta cells is low, however, it increases by several stimulators especially glucose. Insulin facilitates fat and glucose storage in the target cells and promotes the cellular growth.

A large number of substances can increase insulin secretion. Drugs like sulfonylureas elevate the release of endogenous insulin and also increase the peripheral effect of insulin. Biguanides can decrease blood glucose level in the absence of beta cell functioning [3]. Thiazolidinediones enhance glucose uptake and oxidation in muscles and adipose tissues [4].

On the contrary, some chemical agents can induce diabetes including thiazides, streptozocin, adrenocortical steroids and oral contraceptives.

In 1970, it was reported that long-term use of tolbutamide was associated with increased cardiovascular mortality as compared to insulin or placebo [5]. Lactic acidosis is one of the adverse effects of biguanides [6].

Because of several complications of DM and significant adverse effects of hypoglycemic agents, researchers have been motivated to consider herbal medications for the treatment of diabetes [4]. An investigation conducted on the effects of several plants on the serum biochemical parameters of rats revealed that celery could lower blood glucose and cholesterol [1]. It has been shown that wormwood can effectively decrease blood glucose [7] and caloric decreases blood glucose in rats [8]. Extract of *Teucrium polium* has a hypoglycemic effect in rats [9].

Since some individuals use hazel - leaf decoction to decrease their blood sugar and there is no reliable evidence indicating its efficacy, it was decided to carry out a research evaluating the effect of this decoction on the blood glucose of rats.

MATERIALS AND METHODS

This was an analytical lab trial. Twelve male rats aging eight weeks with similar weight were made diabetic by injection 50 mg kg⁻¹ streptozocin intraperitoneally.

Table 1: Comparison between blood glucose of control and experimental group*

Time of blood collection (days)	Blood glucose level mg dl ⁻¹		P.value
	Experimental group Mean ± SD	Control group Mean ± SD	
0	400.83±92.44	432.17±86.34	0.559
3	265.17±86.00	309.83±80.35	0.375
7	195.17±63.10	346.00±89.17	<0.007
15	63.67±21.30	341.00±129.98	<0.001
30	56.50±24.93	223.33±71.19	<0.001

* Experimental group received 10% hazel - leaf decoction

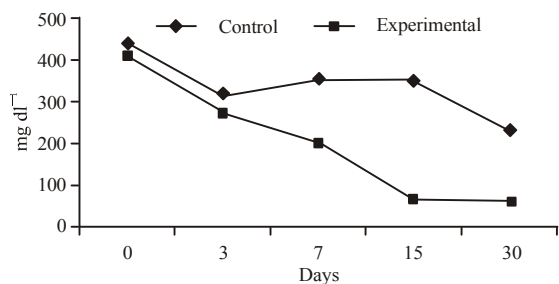


Figure 1: Average of blood glucose level in the control and experimental diabetic rats in different days

Then, they were divided into two groups. Each group was kept in the same cage and sufficient food was given to them throughout the day. Water was provided for the control group, while the experimental group received 10% hazel - leaf decoction. On days 0, 3, 7, 15 and 30 rats were placed in a box containing cotton soaked in ether.

After rats became unconscious, blood was collected from the corner of their eyes by a heparinized tube. Serum was separated by centrifugation and glucose level was measured using RA-1000 autoanalyzer. Statistical analysis was performed by student t-test using SPSS software p-value less than 0.05 was considered as significant.

RESULTS

No significant difference was noticed between the blood glucose levels of the experimental and the control groups on the third day (Table 1).

On days 7, 15 and 30, blood glucose reduced significantly in the experimental group (p<0.007, p<0.001 and p<0.001, respectively) as compared to the control group. Figure 1 illustrates blood glucose levels of the two groups in different days.

DISCUSSION

Diabetes is an important metabolic disorder associated with severe adverse effects such as ketosis, hyperosmolar coma, lactic acidosis and protracted complications like retinopathy, neuropathy and nephropathy.

Considering the problems associated with marketed hypoglycemics, health care providers have been looking for a safe substitute for them. Currently, several herbal medications with different mechanisms of action have been found to have hypoglycemic effect [1, 2, 7-11].

The current research revealed that 10% hazel - leaf decoction given orally encompasses a hypoglycemic effect in diabetic rats. Glibenclamide increases insulin secretion from beta cells in rats [12], while Teucrium polium exerts its hypoglycemic effects through improvement of peripheral metabolism of glucose [13]. On the other hand, allylpropyl disulfide, a substance obtained from plants, decreases blood glucose by increasing serum insulin level [14]. The exact mechanism of action of hazel - leaf decoction remains to be found.

Since unlike other herbal hypoglycemic extracts, hazel - leaf decoction has a sweet taste and is readily edible, further researches should be conducted to study its effects in more details.

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