

CORRECTION OF METABOLIC INDICATORS WITH THE USE OF CABBAGE (BRASSICA OLERACEA) EXTRACT IN ANIMAL MODELS WITH DIABETES***Chorshanbiyev Shohzod****Master of Turon University****Kuziev Sherali****Associate Professor of the**National University of Uzbekistan, PhD**kuziev.sherali@gmail.com*

Abstract. In this study, the correction of key metabolic parameters such as blood glucose, insulin levels, and water consumption was studied in diabetic (DM) model animals using an extract prepared from cabbage leaves (*Brassica oleracea*). The results of the study showed that cabbage extract has hypoglycemic and insulinotropic properties. Since this plant is widely distributed in Uzbekistan, it has the potential to be used as a natural remedy for the treatment of diabetes in local conditions.

Keywords: Diabetes, cabbage extract, *Brassica oleracea*, glucose, insulin, animal model, natural products.

Introduction. Type 2 diabetes is a metabolic syndrome characterized by impaired glucose metabolism in the body, accompanied by insulin deficiency or insulin resistance [1]. Current drugs cause many side effects, so the search for safe, affordable and effective alternatives is an urgent issue [2]. Cabbage (*Brassica oleracea*) is a widely cultivated plant in Uzbekistan, which contains flavonoids, polyphenols, vitamin C, potassium and other antioxidant substances [3]. There is scientific data on the hypoglycemic and antioxidant effects of these bioactive substances [4].

Materials and methods. Animals: Healthy male Wistar rats (200–250 g) were used for the experiment.

Model establishment: Diabetes was induced using streptozocin (STZ) at a dose of 55 mg/kg (intraperitoneal) [5].

Experimental groups:

- Group 1 – healthy control (n=6)
- Group 2 – diabetic control (STZ, no treatment)
- Group 3 – diabetic + cabbage extract (400 mg/kg, given orally for 14 days)

Extract preparation: Fresh cabbage leaves were dried, powdered, and extracted using 70% ethanol. The concentrated extract was mixed with water and administered to the animals.

Indicators assessed:

- Blood glucose level (via biochemical analyzer);
- Insulin level (ELISA method);
- Water consumption (based on daily monitoring).

Results. According to the results of the experiment, cabbage (*Brassica oleracea*) extract had a significant positive effect on the main metabolic parameters - blood glucose, insulin levels and water consumption in animals with diabetes. The results are analyzed below for each parameter:

1. Blood glucose:

In rats induced with STZ (group 2), a significant increase in glucose levels was observed (hyperglycemia). In group 3 animals given cabbage extract, when glucose levels were monitored

for 14 days, an average decrease of 28% was observed compared to the initial hyperglycemic state ($p < 0.05$).

This glucose reduction may be due to the flavonoids (e.g. quercetin), antioxidants and other phytochemicals in cabbage leaves increasing insulin sensitivity or reducing glucose absorption [3,4]. This is also explained by the suppression of the activity of enzymes such as glucose-6-phosphatase and phosphoenolpyruvate carboxykinase, which slows down the process of gluconeogenesis [6].

2. Insulin levels:

In animals in the diabetic group (group 2), insulin secretion was reduced due to damage to β -cells under the influence of STZ. In animals treated with cabbage extract, insulin levels increased by 36% compared to the diabetic group ($p < 0.05$).

This result may be due to the fact that bioflavonoids and polyphenols in cabbage protect β -cells from oxidative stress and stimulate insulin secretion [2,5]. At the same time, microelements (e.g. potassium, magnesium) present in cabbage can also improve the ability of insulin to bind to receptors [3].

3. Water consumption (polydipsia):

In diabetic animals, elevated glucose levels caused polyuria (frequent urination) and consequent polydipsia (frequent drinking). Water consumption was significantly normalized in the treated group (~25% reduction compared to group 2).

Cabbage extract not only has a hypoglycemic effect, but also affects the main pathogenetic links of diabetes mellitus by restoring the activity of β -cells, enhancing antioxidant defenses and normalizing water-electrolyte balance. These results indicate that plant-based treatments are promising as a pharmacological alternative.

Discussion. The results of the study showed that cabbage extract has a positive effect on glucose metabolism in diabetes. Its flavonoids and antioxidants can reduce glucose levels, increase cell sensitivity, and activate insulin secretion [6]. These results are consistent with previous scientific studies and confirm that *Brassica oleracea* extract can be used as a hypoglycemic agent [7]. At the same time, cabbage is also notable for its availability and affordability.

Conclusion: Extract of the cabbage plant, which is widely grown in Uzbekistan, improves metabolic status in a diabetic model by reducing blood glucose and water consumption, and increasing insulin levels. This indicates the need for its further study and involvement in clinical trials as a natural anti-diabetic agent.

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