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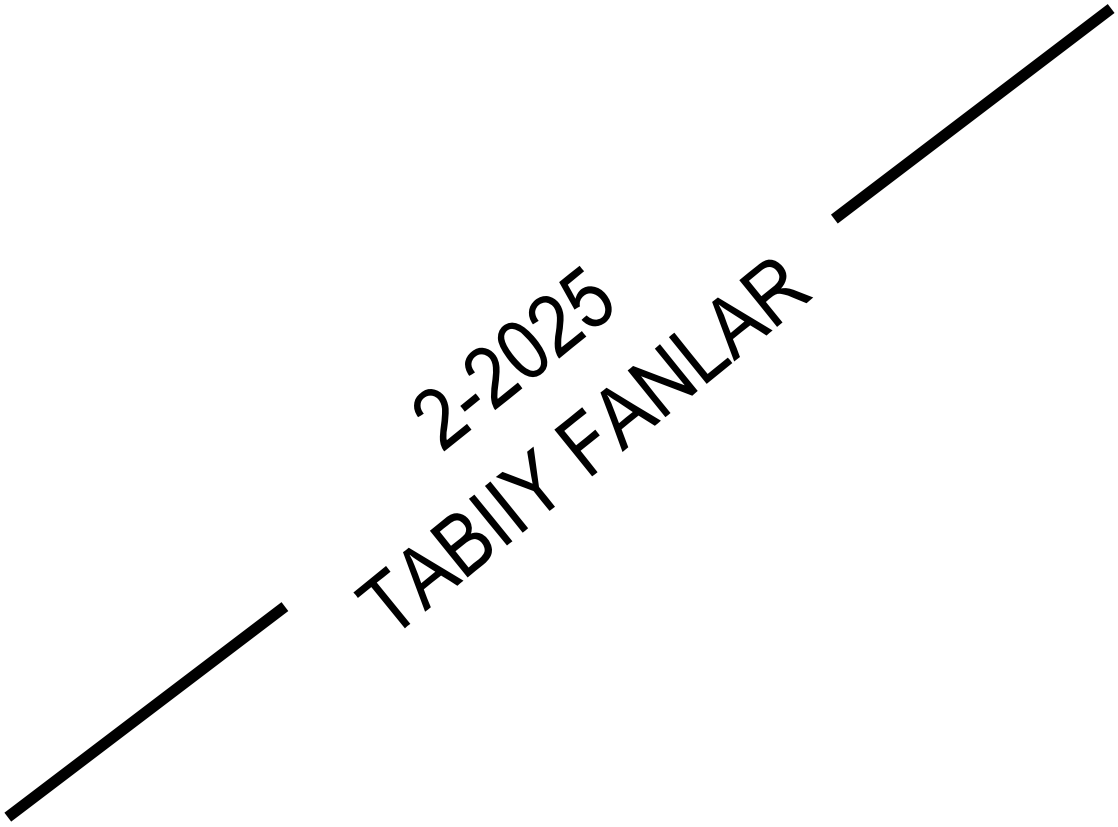

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ANALYSIS OF THE BIOLOGICAL ACTIVITY OF THE FOOD ADDITIVE "AS LUPINUS"

“AS LUPINUS” OZIQ-OVQAT QO‘SHILMASINING BIOLOGIK FAOLLIGINI TAHLILI

АНАЛИЗ БИОЛОГИЧЕСКОЙ АКТИВНОСТИ ПИЩЕВОЙ ДОБАВКИ «AS LUPINUS»

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Abstract

In this article, when examining the antioxidant activity of a mixture of Japanese safflower (lat. Styphnolobium japo‘nicum) and Lupin (lat. Lupus) plants found in Uzbekistan, high antioxidant activity was detected in a 1:1 ratio, so we created a biological food supplement for the treatment of diabetes from this 1:1 ratio and named it “As Lupinus”. In order to analyze the biological activity of the “As Lupinus” food supplement, the effect of the “As Lupinus” food supplement on the amount of glucose and insulin in rat blood plasma in alloxan diabetes was studied at the Tashkent Institute of Bioorganic Chemistry using the in vivo method. The aim of the study was to conduct preclinical testing of the biological activity of this “As Lupinus” food supplement and to create and apply it in practice.

Annotatsiya

Ushbu maqolada O‘zbekistonda uchraydigan Yapon saforasi (lat. Styphnolo‘bium japo‘nicum) daraxti va Lupin (lat. Lupus) o‘simligi aralashmasi tarkibidagi antioksidantlik faolligi tekshiriliganda 1:1 nisbatda yuqori antioksidant faolligi aniqlanganligi uchun ushbu 1:1 nisbatdagi aralashmadan diabet kasalligini davolash uchun bilogik oziq-ovqat qo‘shilmasi yaratib unga “As Lupinus” deb nom berdik. “As Lupinus” oziq-ovqat qo‘shilmasini bilogik faolligini tahlil qilish maqsadida alloksan diabetda kalamush qon plazmasidagi glyukoza va insulin miqdoriga ta’siri in vivo usuli bo‘yicha Toshkent biorganik kimyo institutida o‘rganildi. Tadqiqotdan maqsad ushbu “As Lupinus” oziq-ovqat qo‘shilmasining bilogik faollini klinikagacha bo‘lgan tekshiruv tadqiqotlarini o‘tkazib, qandli diabet kasalligini davolashda qo‘llanadigan antidiabetik oziq-ovqat qo‘shilmalari yaratish va amaliyotga tadbiq etish.

Аннотация

В данной статье мы проверили антиоксидантную активность смеси японского сафлора (лат. Styphnolobium japo‘nicum) и растения люпин (лат. Lupus), произрастающего в Узбекистане, и обнаружили, что высокая антиоксидантная активность была обнаружена в соотношении 1:1. Поэтому из этой смеси в соотношении 1:1 мы создали биологическую добавку к пище для лечения диабета и назвали ее «As Lupinus». С целью анализа биологической активности пищевой добавки «Ас Люпинус» в Ташкентском институте биоорганической химии методом in vivo изучено влияние аллоксана на уровень глюкозы и инсулина в плазме крови крыс, больных сахарным диабетом. Целью исследования является проведение доклинических исследований биологической активности пищевой добавки «As Lupinus», а также разработка и внедрение антидиабетической пищевой добавки для лечения сахарного диабета.

Key words: *Japanese safflower (lat. Styphnolobium japo‘nicum), Lupine (lat. Lupus), glucose, insulin, MDA, mPTP, mitoKATF, LPO, Alloxan ("Lachema" "Chemapol" Czech Republic), EGTA, EDTA, KH_2PO4, K_2HPO_4, Hepes, KCl, $MgSO_4$, succinate, oligomycin, rotenone, ATF ("Serva", Germany); sucrose, tris-HCl, $CaCl_2$.*

Kalit so‘zlar: *Yapon saforasi (lat. Styphnolo‘bium japo‘nicum), Lupin (lat. Lupus), glyukoza, insulin, MDA, mPTP, mitoKATF, LPO, Alloksan («Lachema» «Chemapol» Chexiya), EGTA, EDTA, KH_2PO_4, K_2HPO_4, Hepes, KCl, $MgSO_4$, suksinat, oligomitsin, rotenon, ATF («Serva», Germaniya); saxaroza, tris-HCl, $CaCl_2$.*

Ключевые слова: *Японский сафор (лат. Styphnolobium japo‘nicum), люпин (лат. Lupus), глюкоза, инсулин, МДА, мПТП, митоКАТФ, ПОЛ, аллоксан («Lachema» «Chemapol» Чехия), ЭГТА, ЭДТА, KH_2PO_4, K_2HPO_4, Hepes, KCl, $MgSO_4$, сукцинат, олигомицин, ротенон, АТФ («Serva», Германия); сахароза, трис-HCl, $CaCl_2$.*

INTRODUCTION

Currently, there is increasing interest in compounds obtained from plant raw materials due to their ability to restore tissue and cell damage in various pathological conditions, and there is a need to study their mechanisms of action. Today, one of the important tasks facing modern pharmacology and physiology is to study the biological activity of compounds belonging to various pharmacological groups that are not toxic to tissues and cells. Plant substances differ from synthetic drugs in that they have properties that restore cell damage in diabetes mellitus. Plant substances can have a hypoglycemic effect by reducing the amount of glucose in the blood in diabetes mellitus. In this experiment, the effect of "As Lupinus" on the amount of glucose in the blood of rats under alloxan diabetes was studied.

LITERATURE ANALYSIS AND METHODOLOGY

Research materials and conditions:

The research material included the establishment of an experimental diabetes model, determination of glucose, total cholesterol and insulin levels in blood plasma, separation of liver mitochondria by differential centrifugation, determination of mitochondrial membrane ionic permeability, lipid peroxidation, MDA content, mPTP permeability and mitoKATF-channel activity. In addition, the use of methods for determining mitochondrial LPO products, determination of blood glucose levels by glucose oxidase and determination of mitochondrial protein levels was planned.

The research was carried out in vivo. In this work, a 1:1 mixture of leaves and fruits of Styphnolobium japónicum (*Japanese saphora*) and seeds from the flower part of Lupin (*lupine)* was used. It was found that the composition of the mixture of Japanese safflower and lupine plants consists of flavonoids, vitamins and amino acids. The presence of many flavonoid compounds in the composition of this mixture indicates their high biological activity.

The following pharmacological preparations and reagents were used in the experiments: Alloxan ("Lachema" "Chemapol" Czech Republic), EGTA, EDTA, KH_2PO_4, K_2HPO_4, Hepes, KCl, $MgSO_4$, succinate, oligomycin, rotenone, ATF ("Serva", Germany); sucrose, tris-HCl, $CaCl_2$. All reagents used have chemical purity qualifications for the experiment.

Procedure of conducting the study:

The experiments were conducted on white male rats with a body weight of 180-200 g. Feeding of laboratory animals with protein-rich products was carried out in vivarium conditions under standard ration conditions. The experiments were carried out in vivo in the following stages:

–first, the effect of “As Lupinus” on the level of glucose and insulin in rat blood plasma and the activity of some antioxidant enzymes in liver homogenate under alloxan diabetes was studied;

–the effect of “As Lupinus” on the functional parameters of rat liver mitochondria under alloxan diabetes was studied.

Alloxan monohydrate was used to induce a diabetes model in animals. Each experimental group consisted of 4 animals. A total of 64 male white laboratory rats were used in the experiments. Cases of death of rats in the diabetes model groups were also observed, which amounted to 20%. The experiments were repeated 4 times.

Alloxan diabetes model:

In experiments, a diabetes model is used to study pathophysiological changes in diabetes and to evaluate the hypoglycemic effect of glucose-lowering drugs and plant substances. Currently, many methods have been developed to induce experimental diabetes models, of which the alloxan model, which is widely used in experiments, was used. To study the effect of "As Lupinus" on changes in alloxan diabetes, white male rats were divided into IV groups. Group I - control (n = 4), group II - alloxan diabetes (n = 4), group III - alloxan diabetes + 1: 1 mixture (n = 4) and group IV - alloxan diabetes + glucosamulin substance (n = 4).

To induce diabetes in laboratory animals of groups II, III and IV, after a one-day fast, a solution of alloxan 150 mg/kg (0.2 ml of 5% dis. water) [Agzamov X., 1983] was injected subcutaneously into the abdominal cavity. Blood was taken from rats with alloxan-induced diabetes every 3 days and the glucose level was determined. 12 days after alloxan injection, when the blood glucose level exceeded 11 mmol/l, animals of group II were administered 0.2 ml of 0.9% NaCl solution once a day, group III of the experiment received the research substance - “As Lupinus” in an amount of 20 mg/kg, and group IV received the antidiabetic drug glucosamulin substance in an amount of 50

mg/kg orally (per. os) once a day for 10 days. Studies were conducted after the blood glucose level decreased to 11 mmol/l.

RESULTS AND DISCUSSION

In the studies, group III of the animals called alloxan diabetes group was orally administered “As Lupinus” at a dose of 20 mg/kg and group IV was orally administered the existing hypoglycemic drug glucosamulin at a dose of 50 mg/kg for 10 days. Blood was taken from the tail of the animals that underwent pharmacotherapy, and the blood glucose level was checked every 3 days. According to the results obtained, there was no dynamics in the blood glucose level of the animals in the control group and it was 5.5 mmol/l (Figure 1). It was found that 12 days after alloxan administration, the blood glucose level of the animals in groups II, III and IV exceeded 11 mmol/l.

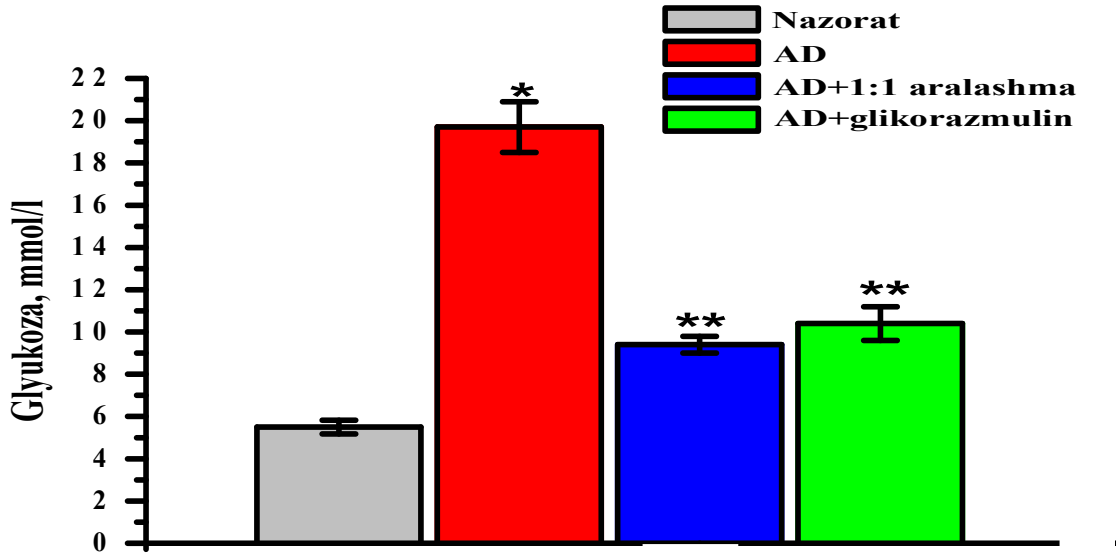

Figure 1. Effect of “As Lupinus” on blood plasma glucose levels in rats with alloxan diabetes. *R<0.05; **R<0.01; n=4.

After the administration of the study substances to these animals in groups III and IV for 10 days, the blood glucose levels were 9.5 mmol/l and 10.4 mmol/l, respectively. However, it was found that the blood glucose levels of group II rats, which were induced by alloxan diabetes, increased to 19.7 mmol/l after 22 days (Figure 1).

“As Lupinus” showed hypoglycemic properties by reducing the blood glucose levels in rats under alloxan diabetes. In this case, it was found that the hypoglycemic properties of “As Lupinus” were clearly manifested. In the case of hyperglycemia, in the absence of insulin, a sharp metabolic disorder is observed. First of all, the utilization of glucose in the blood is inhibited. Its level in the blood can increase due to a decrease in the permeability of glucose transporters. In addition, hyperglycemia is observed when the pituitary gland secretes more adrenocorticotropic hormone than necessary and stimulates the adrenal cortex to process and secrete glucocorticoids. The hypoglycemic activity of As Lupinus in hyperglycemic conditions may be due to the increased glucose adsorption on cell membranes and the increased function of glucose transporters.

CONCLUSION

The composition of the biological food supplement "As Lupinus" contains the fruit and leaves of Japanese safflower, and the seeds of Lupin flowers in a 1:1 ratio. In order to analyze the biological activity of this food supplement, the effect of this food supplement on the level of glucose and insulin in the blood plasma of rats with alloxan diabetes was studied in vivo. According to the results, oral administration of "As Lupinus" to rats with experimental diabetes at a dose of 20 mg/kg for 10 days reduced the level of glucose and total cholesterol in their blood plasma. It was found that insulin secretion increased. Combining scientific medicine and folk medicine, it is recommended to produce and put into practice "As Lupinus" antioxidant food supplements that

help prevent and treat diabetes, anti-inflammatory, nervous diseases, joint diseases, gastrointestinal inflammation, liver, spleen, cardiovascular diseases, and many diseases caused by immunodeficiency.

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