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STUDYING THE ANTIOXIDANT ACTIVITY OF THE FOOD ADDITIVE “AS-AN” OBTAINED FROM THE PLANTAGO MAJOR

ИЗУЧЕНИЕ АНТИОКСИДАНТНОЙ АКТИВНОСТИ ПИЩЕВОЙ ДОБАВКИ «АС-АН», ПОЛУЧЕННОЙ ИЗ ПОДОРОЖНИКА БОЛЬШОГО

ZUBTURUM O‘SIMLIGIDAN OLINGAN “AS-AN” OZIQ-OVQAT QO‘SHILMASINING ANTIOKSIDANT FAOLLIGINI O‘RGANISH

Askarov Ibrahimjon Rahmonovich[1], Noibjonova Khurshidabonu Murodjon qizi[2]

[1]Askarov Ibrahimjon Rahmonovich – Andijan State University, professor of chemistry department, doctor of chemical sciences.

[2]Noibjonova Khurshidabonu Murodjon qizi – Andijan State Medical Institute, assistant of the department of medical chemistry

Annotatsiya

Ushbu maqolada oshqozon-ichak yarasi kasalligining ayrim kelib chiqish sabablari, uni davolashda qo‘llaniladigan sintetik preparatlar haqida bayon qilingan. “As-AN” deb nomlanuvchi yangi oziq-ovqat qo‘shilmasining antioksidantlik faolligini aniqlash uchun in vitro sharoitida autooksidlanish reaktsiyasining ingibirlanishi bilan olib borilgan tadqiqotlar natijasi muhokama qilingan.

Аннотация

В данной статье описаны некоторые причины язвенной болезни, синтетические препараты, используемые при ее лечении. С целью определения антиоксидантной активности новой пищевой добавки «Ас-АН» обсуждаются результаты исследований, проведенных с ингибированием реакции аутоокисления in vitro.

Abstract

This article describes some of the causes of peptic ulcers and synthetic medecines used in its treatment. In order to determine the antioxidant activity of the new food additive "Ac-AN", the results of studies conducted with inhibition of the autoxidation reaction in vitro are discussed.

Kalit so‘zlar: *Xelikobakter pilori, "As-AN", antioksidant, kversetin, gliklazid, flavonoid.*
Ключевые слова: *Хеликобактер пилори, «Ас-АН», антиоксидант, кверцетин, гликлазид, флавоноид.*
Key words: *Helicobacter pylori, “As-AN”, antioxidant, quercetin, gliclazide, flavonoid.*

INTRODUCTION

Currently, the demand for medicinal products derived from medicinal plants is growing every day. The increase in demand for medicinal plants and its implementation require the development of new types of biologically active additives, medicines and food additives based on the search for little-studied plants, the study of their chemical composition and biological activity.

In our republic, natural plant-based nutritional supplements have been developed that have the properties of preventing and treating diseases of the human body, such as the digestive system, urolithiasis, nervous system, motor system, leukemia, cancer, infertility, etc. Certain results are achieved and scientific researchers are faced with a number of tasks. Our goal was to determine the antioxidant activity of the new food supplement "As-AN", which is present in 4% of the world's population and has the ability to treat gastric and duodenal ulcers, and we chose the plantago plant as an object of study.

LITERATURE REVIEW

Plantago major, a plant of the Plantaginaceae family, is used in folk medicine to treat more than 80 diseases. This plant has high regenerative properties and has been used since ancient times to treat internal and external wounds.

There are many factors that cause peptic ulcers, nervous disorders, alcohol consumption, malnutrition, bacterial diseases, etc.

Helicobacter pylori is a spiral gram-negative bacterium that is one of the main causes of gastritis, gastric and duodenal ulcers, gastric mucosal lymphoma, and gastric cancer.

Lipopolysaccharides and proteins of the outer shell of bacteria have the property of adhering to the outer shell of the cell membranes of the gastric mucosa. Lipopolysaccharides of the outer shell of Helicobacter pylori cause inflammation of the gastric mucosa. Enzymes secreted by bacteria into the external environment - mucinase, protease, lipase - depolymerize the gastric mucosa (consisting mainly of mucin) and damage the gastric mucosa.

In bacteria, hairs help to move quickly even in the dry part of the gastric mucosa. If a bacterium senses an acidic environment, it moves to a place with lower acidity. Even if it enters the highly acidic environment of the stomach, it does not lose its viability, since this bacterium absorbs urea and produces the enzyme urease, which produces ammonia and has alkaline properties.

The resulting ammonia enters into a neutralization reaction with the strong acid HCl of gastric juice, creating favorable conditions with an average pH of 6-7 [1].

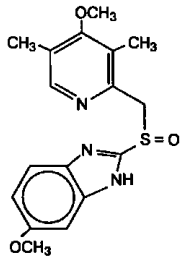
$$NH_4OH+HCl = NH_4Cl+H_2O$$

Today, more than ten synthetic agents are used in the treatment of stomach ulcers: ranisan, cimetidine, ranitidine, omeprazole are used. For example, the drug "Omeprazole" is used in the treatment of Helicobacter pylori, which causes 70-80% of stomach ulcers.

One capsule contains 20 mg of omeprazole granules. The lyophilisate contains 40 mg of omeprazole, as well as sodium hydroxide and EDTA. Ulcers of the stomach and duodenum when taking the drug; Helicobacter pylori eradication therapy (together with antibacterial drugs); prevention of aspiration of acidic stomach contents; pancreatic adenoma; treats the relief of symptoms of acid-dependent dyspeptic disorders (eliminates heaviness in the abdomen, itching, flatulence, bloating, unpleasant taste and nausea).

But synthetic drugs do more harm than good. The drug should not be used in children under 5 years of age (child weight up to 20 kg), during lactation and in case of hypersensitivity to excipients contained in omeprazole or lyophilisate. Additional effects of the drug are manifested in the following form: disorders of the digestive system (abdominal pain, stool disorders, nausea, vomiting, increased activity of liver enzymes, flatulence, taste disturbances, stomatitis, liver dysfunction, in patients with previously severe liver pathology), dysfunction of the hematopoietic organs, their symptoms are leuko-, pancyto-, thrombocytopenia, agranulocytosis, dysfunction of the musculoskeletal system (arthralgia, myasthenia gravis), skin diseases (photosensitization, skin rash, itching, alopecia, exudative erythema multiforme), with severe somatic pathologies that cause dizziness, headache, depression or agitation in patients with severe liver disease, encephalopathy, hypersensitivity reactions: bronchospasm, fever, angioedema, anaphylactic shock, interstitial nephritis, gynecomastia, peripheral edema, visual disturbances, hyperhidrosis can release [2].

Therefore, one of the main goals of modern medicine today is to replace synthetic drugs with natural, harmless ones.



Omeprazole

In this regard, the new natural preparation "As-AN" developed by us has an antiseptic, anti-inflammatory, antispasmodic, tissue regenerating and activating gastric secretion effect. Anti-inflammatory, wound-healing effect is due to the presence of polysaccharides, polyphenols, pectin and tannins, benzoic and salicylic acids. Polysaccharides activate the formation of interferon, zinc and flavonoids in the composition contribute to the normalization of phagocytosis. The combination of polysaccharides with enzymes and vitamins helps to accelerate regeneration. These effects are also closely related to the ability of cells and tissues to increase their resistance to oxygen deficiency.

In addition, the drug has an antihypoxic effect due to the presence of organic (especially citric) and phenolic (ferulic, caffeic, coumarylic) acids, flavonoids (luteolin, quercetin, dihydroquercetin and their derivatives), vitamin C, copper and zinc.

Based on the above properties, we studied the antioxidant property of the As-AN food additive, which neutralizes free radicals.

Free radicals cause more than a hundred diseases in humans, including atherosclerosis, arthritis, tissue ischemia and reperfusion injury, central nervous system damage, gastritis, cancer, and dangerous diseases such as acquired immunodeficiency syndrome (AIDS). Antioxidants are

needed to neutralize free radicals. Antioxidants react with free radicals in the biological system, reduce the damage caused by free radicals, and protect against the indirect effects of free radicals [3].

Antioxidants (also antioxidants, preservatives) - substances that inhibit oxidation; Many chemicals neutralize the oxidative effects of free radicals and other substances, including the body's natural products and nutrients from food.

Russian scientists led by E. L.Gerasimova determined the antioxidant activity of extracts of tea and medicinal plants by potentiometric titration using potassium hexacyanoferrate. Russian scientists led by E. I.Ryabinina determined the antioxidant activity of aqueous extracts of six local medicinal plants by the autoxidation of adrenaline in the inhibition reaction. These scientists proposed a new time criterion for assessing antioxidant activity and proved that the induction period is taken as a value that determines the antioxidant activity of plant extracts when analyzing adrenaline autooxidation in the inhibition reaction [4].

Kobesai and colleagues studied the antioxidant activity of the leaves and seeds of the plantago majoris using hot, cold water, and ethanol extracts. The activity of each extract was determined using a 1,1-diphenyl-2-picrylhydrazyl radical (DPPH) stable in vitro. The results showed that the alcoholic extract of plantago majoris leaf exhibited the highest antioxidant activity of 78% even at low concentration. At the same low concentration, the ethanolic extract of plantago majoris seeds has low activity (25%). Hot and cold aqueous extracts of plantago majoris leaves have higher antioxidant activity compared to the extract obtained from seeds [3].

DISCUSSION AND RESULT

Experimental part. We set out to study the antioxidant properties of As-AN. To do this, we determined the antioxidant activity of the As-AN preparation using a phytochemical test. The antioxidant activity of the samples is determined by the inhibition of the adrenaline autoxidation reaction in vitro and prevents the formation of the free form of oxygen. The method is based on the inhibition of the adrenaline autoxidation reaction, expressed as a percentage (%), due to the formation and autoxidation of adrenaline under in vitro conditions of drugs for a certain time.

Antioxidant activity of aqueous extracts of As-AN was analyzed by spectrophotometric analysis using a Cary 60 UV-Vis Agilet Technologies spectrophotometer. In order to study the biological activity and medicinal properties of As-AN extracts, the antioxidant activity of the water extracts taken for analysis was determined by spectrophotometric analysis from the initial solutions-concentrates prepared on the basis of the samples taken for the study. Analytical solutions were prepared using bidistilled water at concentrations of 10, 25, 50, 75, and 100% (Table 1).

Preparations based on extracts "As-AN".

Table 1

№	Preparation	Solubility	*In vitro* mkg/ml
1	“As-AN”	Water	100/250/500/750/1000

For analysis, 2.0 ml of 0.2 M sodium carbonate (Na2CO3-NaHCO3) buffer with pH=10.65 and 56 µl of 0.18% adrenaline (epinephrine) hydrochloride solution were taken. Added 30 µl of antioxidant drugs and examined on a spectrophotometer (Cary 60 UV-Vis Agilet Technologies) at a wavelength of 347 nm for 30 seconds to 10 minutes. The test amount (concentration 1 mg in 1 ml of solution) was used as a standard. As a control, 2.0 ml of 0.2 M buffer and 0.18% 56 µl (5.46 mM) of epinephrine were used.

Antioxidant activity was calculated from inhibition of adrenaline autoxidation using the following formula:

$$AA\% = \frac{D1 \quad D2 \; x100}{D1}$$

In this,

AA – antioxidant activity of analyzed solutions, %;

D1 is the optical density of the adrenaline hydrochloride solution added to the buffer;

D2 is the optical density of the investigated extract and adrenaline hydrochloride added to the buffer.

The results of the specified calculations are presented in Table 2.

Indicators of spectrophotometric and antioxidant activity (AA%) of As-AN extracts.

Table 2

№	Analyzing Solutions	Control D_1	Experiment D_2	AA %
1	(10%) 100 mg/ml	0.1894	0.1636	**13.65**
2	(25%) 250 mg/ml	0.2100	0.1784	**15.02**
3	(50%) 500 mg/ml	0.2451	0.2026	**17.34**
4	(75%) 750 mg/ml	0.2669	0.2171	**18.67**
5	(100%) 1000 mg/ml	0.3397	0.2743	**19.24**
	Gliclazide			10,03%
	Quercetin			36,94%

For the purpose of a comparative analysis of the antioxidant activity of the test samples, gliclazide ($C_{15}H_{21}N_3O_3S$), used in pharmaceuticals and medicine, exhibiting antioxidant properties, and quercetin ($C_{15}H_{10}O_7$), used as a biologically active additive (BAA) in the food industry, were used as a standard sample [6].

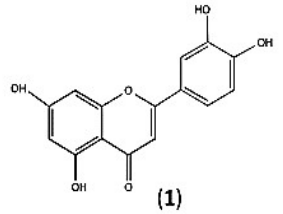
To test the activity of preparations isolated from the As-AN extract, 5 different concentrations of 100/250/500/750/1000 µg/ml were prepared and work began with the screening of substances.

The antioxidant activity of the preparations was determined by the in vitro adrenaline autoxidation method. The antioxidant activity of the studied preparations was evaluated using phytochemical tests.

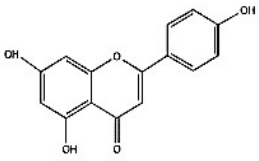
The antioxidant activity of the preparations was determined by the inhibition of the adrenaline autoxidation reaction in vitro and the prevention of the formation of a free form of oxygen. the preparations were compared with the standard antioxidants quercetin and gliclazide antioxidants. This shows that the resulting preparations have antioxidant properties.

CONCLUSION

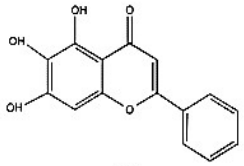
The preparation contains polyphenolic compounds: flavonoids such as luteolin (1), apigenin (2), baicalin (3) and hispidulin (4), ursolic (5), ferulic (6), oleinolic (7) acids and has strong antioxidant activity. they can neutralize carcinoma cells. In addition, As-AN extracts have a cytotoxic effect on breast adenocarcinoma and melanoma cells, which is explained by the presence of a flavonoid in the plant: luteolin-7-O-beta-glycoside (8) [7].



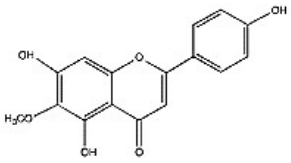
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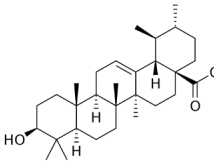
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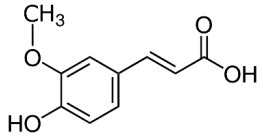
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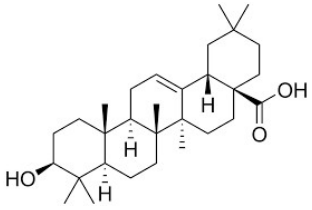
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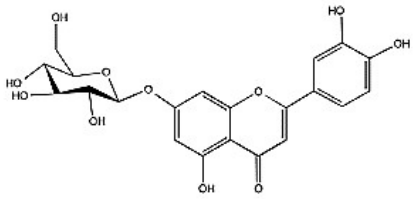
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(6)



(7)



(8)

The antioxidant compounds found in As-AN, a dietary supplement made from the psyllium plant, have been shown to help treat a variety of injuries. Due to the availability of the psyllium plant in many countries and its therapeutic benefits, various medicinal products derived from this plant are recommended as a dietary supplement in addition to conventional treatments.

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