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Д.В. Сокольский атындағы
«Жанармай, катализ және электрохимия институты» АҚ

ХАБАРЛАРЫ

ИЗВЕСТИЯ

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН
АО «Институт топлива, катализа и
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Қазақстан Республикасы Ұлттық ғылым академиясы «ҚР ҰҒА Хабарлары. Химия және технология сериясы» ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруда. Webof Science зерттеушілер, авторлар, баспашылар мен мекемелерге контент тереңдігі мен сапасын ұсынады. ҚР ҰҒА Хабарлары. Химия және технология сериясы Emerging Sources Citation Index-ке енуі біздің қогамдастық үшін ең өзекті және беделді химиялық ғылымдар бойынша контентке адалдығымызды білдіреді.

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9. G.A. Kozbagarova, A.A. Lange, S.P. Bukhman. Permanency of thallium amalgam in water solutions. Izv. AS KazSSR, chemical series, 1986. No.3. pp.41-45.

10. Z.N. Nyssanbayeva, S.P. Bukhman. On processing the wastes of metal amalgams. Herald of AS KazSSR, 1983. No.1. pp.29-38.

11. M.T. Kozlovskiy. Mercury and amalgams in electrochemical methods of analysis. Alma-Ata: Nauka, 1956. p.186.

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PHYTONCIDES IN THE COMPOSITION OF COMMON BIRD CHERRY

Abstract. Everyone knows that forest air is very good for health, and one of the most important reasons for this is the presence of phytoncides in it, which kill or suppress pathogens and have a healing effect. Also, phytoncides are one of the factors of the natural immunity of plants (plants sterilize themselves with the products of their vital activity). Their large number is allocated by plants. One of them is the common bird cherry. Cherry-a representative of the genus of plums of the Rosaceae family. The view includes low trees and shrubs. Cheremukha-forest orderly. Its flowers and leaves are rich in phytoncides, thanks to which they exude an alluring aroma. However, when they break down, they release prussic acid, which is dangerous for all living things. This gave them the opportunity to attract and destroy pests. Phytoncides are volatile biologically active substances formed by plants that kill or inhibit the growth and development of bacteria, microscopic fungi, and protozoa. In addition to all of the above, bird cherry has exceptional properties. The strong, somewhat intoxicating scent of flowers and leaves cleanses the air of germs. Antimicrobial properties of phytoncides have led to a large number of studies on their use in medicine, veterinary medicine, plant protection, storage of fruit and vegetable products, in the food industry and other areas of practice.

Almost all parts of the plant have bactericidal, fungicidal and insecticidal properties. In folk medicine, bird cherry has long been used as an astringent, fixing, anti-inflammatory and anti-scurvy agent. Bird cherry produces the most powerful phytoncides containing prussic acid. Protozoa die under the influence of bird cherry phytoncides in 5 minutes. On the basis of numerous studies, the time of death of protozoa after non-contact exposure to phytoncidal plants has been established. Especially a lot of phytoncides are released by young leaves in spring and summer, in autumn phytoncides are released much less.

The presence of tannins and essential oil in the fruit has an anti-inflammatory effect, which is used to treat inflammatory processes in the gastrointestinal tract and dysentery. The infusion of cherry fruits has a destructive effect on microorganisms. Preparations of the fruits of the common cherry have an antiseptic effect. They are used in dental practice in the treatment of inflammatory processes of the oral mucosa, paradontosis, toothache and hypovitaminosis.

Key words: Bird cherry, phytoncides, plant, bacteria, protozoa, useful properties.

Introduction.

Bird cherry is a representative of the Plum genus of the Rosaceae family. The species includes low trees and shrubs. The trunk of the plant is covered with dark gray bark with occasional rusty and brown spots. The young leaves are green, glistening with gold. The old ones are dull. The flowers on the pedicels are small, white and very fragrant. The fruit is a black drupe. Bird cherry is a forest orderly. Its flowers and leaves are rich in phytoncides, thanks to which they exude an alluring aroma. However, when they split, they secrete prussic acid, which is dangerous for all living things. This gave them the ability to attract and kill pests.

Cherry Berries contain a complex of antioxidants, which makes them indispensable for those who seek

to prolong youth and maintain good health until old age. According to the concentration of anthocyanins, which are included in the list of the most powerful antioxidants, they surpassed even cranberries. This plant pigment is not synthesized in the human body, but it has incredibly attractive properties. It improves vision, increases the elasticity of capillaries, prevents DNA damage, prevents the formation of tumors and slows down aging. The composition of all parts of the bird cherry includes tannins, essential oils, fruit sugar, flavonoids, organic acids, pectin and alkaloids. The mineral composition is represented by cobalt, zinc, manganese, copper and iron. Vitamin – P, E, C, A. phytoncides Present in bird cherry give it antimicrobial, choleretic and diuretic action. Attention! During the flowering period, the plant secretes prussic acid, which can provoke headache, nausea or more serious consequences.

Pharmacological properties of cherry: Berries have antioxidant, astringent, bactericidal and anti-inflammatory effects. The components included in their composition restore the functions of the stomach and intestines, normalize the acid-base balance, increase potency. However, they are contraindicated to use when planning pregnancy, as they show contraceptive activity. The juice of the fruit can be drunk in case of fever, as it has a diaphoretic and diuretic effect. In addition, the drink provides prevention of scurvy. The leaves of the plant have an expectorant, fortifying and tonic effect. Decoctions and infusions of them are drunk for colds and used for rinsing with some dental problems, for example, with gingivitis. Cherry blossoms suppress inflammation and accelerate the healing of damaged tissues. Bark is a diaphoretic and diuretic.

Materials and methods. Cosmetic properties: cherry extract is introduced into the formulations of cosmetics. It stimulates the synthesis of collagen, helping to smooth out wrinkles and tighten sagging skin. Thanks to the high concentration of vitamin C, the pores are cleaned and narrowed. A diverse vitamin and mineral composition provides nutrition to the skin. Contraindications and side effects bird Cherry is contraindicated during pregnancy and its planning. Moreover, it is impossible not only to consume the fruits of the plant, but also to inhale their aroma, since phytoncides, splitting, secrete prussic acid, which is dangerous for health. Everyone, without exception, can not use crushed fruits and berries with untreated bones, because they have the highest concentration of prussic acid. Methods of application bird Cherry can be purchased in the form of alcohol tincture, extract and dried vegetable raw materials, from which decoctions and infusions are made: Broth – 1 tbsp. l. raw materials pour 200 ml of boiling water, cook for 20 minutes, insist for 10 minutes and filter. Infusion – 10 g or 1 tbsp. l. raw materials pour 200 ml of boiling water, warm up for a couple under the lid for 15 minutes, cool, filter, bring the volume of water to 200 ml.

Everyone knows that forest air is very good for health, and one of the most important reasons for this is the presence of phytoncides in it, which kill or suppress pathogens and have a healing effect. Do not think that by releasing phytoncides, plants take care of our well – being-they protect themselves first of all.Phytoncides of plants have different chemical nature. As a rule, it is a complex of compounds-glycosides, terpenoids, tannins and other substances that do not belong to the three main classes of natural compounds – proteins, carbohydrates and fats.

Phytoncides (from Greek φυτόν — "plant" and lat. caedo - "kill") - volatile biologically active substances formed by plants that kill or inhibit the growth and development of bacteria, microscopic fungi, protozoa. The term was proposed by B. p. Tokin in 1928.

The composition of the volatile.Phytoncides are all volatile substances released by plants, including those that are almost impossible to collect in noticeable quantities. These phytoncides are also called "native antimicrobial substances of plants". The chemical nature of phytoncides is essential to their function, but the term "phytoncides" is not explicitly stated. It can be a complex of compounds, for example, terpenoids, or other so-called secondary metabolites. Characteristic representatives of phytoncides are essential oils extracted from plant raw materials by industrial methods.

The effect of volatile. Native phytoncides play an important role in plant immunity and in the relationships of organisms in biogeocenoses. The release of a number of phytoncides increases when plants are damaged. Volatile phytoncides (LAVS) are able to exert their effect at a distance, for example, phytoncides of oak leaves, eucalyptus, pine, and many others. The strength and spectrum of antimicrobial action of phytoncides are very diverse. Phytoncides of garlic, onion, horseradish, red pepper kill many types of protozoa, bacteria and lower fungi in the first minutes and even seconds. Volatile phytoncides destroy protozoa(infusoria), many insects in a short time (hours or minutes).

Phytoncides are one of the factors of natural immunity of plants (plants sterilize themselves with the products of their vital activity).

As one of the factors of plant immunity, phytoncides play an important role in the relationship between the organisms that make up the biogeocenoses. One hectare of pine forest releases about 5 kg of volatile phytoncides into the atmosphere per day, juniper forest-about 30 kg, reducing the amount of microflora in the air. Therefore, in coniferous forests (especially in young pine forests), regardless of the geographical latitude and proximity of settlements, the air is practically sterile (contains only about 200-300 bacterial cells per 1 m3), which is of interest to hygienists, balneologists, specialists in urban landscaping, etc. It is established that plants of one species inhibit or, on the contrary, stimulate pollen germination, growth and development of

plants of other species. For example, phytoncides of wheat grass and oats stimulate the germination of alfalfa pollen, and phytoncides of Timothy inhibit this process. The discovery of these properties of phytoncides influenced the emergence of research in the field of allelopathy.

Antimicrobial properties of phytoncides have led to a large number of studies on their use in medicine, veterinary medicine, plant protection, storage of fruits and vegetables, in the food industry, and other areas of practice.

In addition to all of the above, the bird cherry has exceptional properties. The strong, somewhat intoxicating fragrance of the flowers and leaves cleanses the air of germs. Bird cherry produces the most powerful phytoncides containing prussic acid. Protozoa die under the influence of bird cherry phytoncides in 5 minutes. Mush from crushed cherry leaves releases substances that kill bacteria and mold spores. Mosquitoes and horseflies were placed in a glass jar with crushed cherry leaves - they died in a few seconds, and 4 crushed cherry buds killed the most persistent ticks in 15 minutes. Especially a lot of phytoncides are released by young leaves in spring and summer, in autumn phytoncides are released much less.

Results and discussions.

Method for determining the phytoncidal activity of extracts according to B.P. Tokin

The laboratory of Professor B. P. Tokin has discovered more than 500 plant species with phytoncidal properties. Of these, about 90 species of houseplants. These are white-spotted begonia, spring primrose, sweet-scented pelargonium, white oleander, elastic ficus, Andre philodendron, ferns, venus hair, sawtooth pteris, high nephrolepis. On the basis of numerous studies, the time of death of protozoa after non-contact exposure to phytoncidal plants was established.

Cheremisa vulgaris - 4-5 minutes.
Oak petiolate - 5 minutes.
Lemon tree - 5 minutes.
Atlas cedar - 3 minutes.
Pyramid cypress -6 minutes.
Berry yew - 6 minutes.
Bird cherry - 5 minutes.
Juniper Cossack - 7 minutes.
Silver poplar - 9 minutes.
Scots pine - 10 minutes.
Borodivnaya birch - 20 minutes.
Mint-25 minutes.
Maple - 20 minutes.
Yarrow - 50 minutes.

The methodology og the experiment (according to B. P. Tokin).

1. In a ceramic mortar, rub the leaves or needles of the plant under study, the action of which phytoncides must be checked.

2. Squeeze a few drops of the juice of the plant under study through a cheesecloth.

3. In a small glass (50 — 100 ml), place a lump of forest soil, add a little water, mix, let the solid soil particles settle. Take a drop of water from a glass with a pipette, apply it to the slide and cover it with a cover glass. View the drug first under a small, and then under a large magnification. You can see a variety of types of soil organisms and their active movement in a drop of water.

4. Draw different types of soil protozoa found in the preparation.

5. Add a drop of the prepared juice from the leaves of the plants under the cover glass.

6. Observe the movement of the protozoa for a few minutes. Record the results of observations.

SETTING UP AN EXPERIMENT.

1. We received the juice from the leaves of birch, poplar, oak, mountain ash, placed in different mortars. From the bark of bird cherry, pine needles received an extract. The volumes of the studied juices and extracts are equal to 0.5 ml.

2. The activity of protozoa was determined before contact with phytoncides (under a microscope).

3. Add a drop of birch sap to the soil extract on the slide.

4. Recorded the time during which the death of protozoa occurs after exposure to plant extract.

The experiment data was added to the table 1

Table 1 - Determining the activity of protozoa

PLANT SPECIES	ACTIVITY OF PROTOZOA BEFORE CONTACT WITH PHYTONCIDES	ACTIVITY OF PROTOZOA AFTER CONTACT WITH PHYTONCIDES
WARTY BIRCH	ACTIVE	TRAFFIC SLOWED, DEATH IN 20 MINUTES
BALSAMIC POPLAR	ACTIVE	QUICK DEATH IN 5 MINUTES
SCOTS PINE	ACTIVE	PASSIVE MOVEMENT DEATH IN 7 MINUTES
PEDUN CULATE OAK	ACTIVE	TRAFFIC SLOWED DOWN DEATH IN 22 MINUTES
COMMON BIRD CHERRY	ACTIVE	VERY FAST DEATH IN 4 MINUTES
MOUNTAIN ASH	ACTIVE	TRAFFIC SLOWED, DEATH IN 25 MINUTES

Table 2 - Determination of the activity of houseplants

PLANT TYPE	ACTIVITY OF PROTOZOA BEFORE CONTACT WITH PHYTONCIDES	ACTIVITY OF PROTOZOA AFTER CONTACT WITH PHYTONCIDES
WHITE-SPOTTED BEGONIA	ACTIVE	DEATH IN 12 MINUTES
SPRING PRIMROSE	ACTIVE	TRAFFIC SLOWED, DEATH IN 20 MINUTES
PELAR GONIUM SCENTED	ACTIVE	VERY FAST DEATH IN 3-4 MINUTES
ELASTIC FICUS	ACTIVE	DEATH IN 15 MINUTES

Setting up an experiment with houseplants similarly obtained juice from the leaves of white-spotted begonia, spring primrose, sweet-scented pelargonium, and elastic ficus.

We got the following results:

Conclusion.

Plant extracts with phytoncidal properties destroy microorganisms several times faster than extracts of non-phytoncidal plants.

Experiments have shown that the most destructive for protozoa are the extract of cherry juice. In landscaping areas of a residential city, it is necessary to use phytoncidal plants: bird cherry, birch, oak, pine, poplar, and in offices, white-spotted begonia, spring primrose, fragrant pelargonium, elastic ficus.

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КӘДІМГІ МОЙЫЛ ҚҰРАМЫНДАҒЫ ФИТОНЦИДТЕР

Аннотация. Орман ауасының денсаулыққа өте пайдалы екенін бәрі біледі, және мұның маңызды себептерінің бірі-қоздырғыштарды өлтіретін немесе басатын және емдік әсері бар ұшпа заттардың болуы. Сондай-ақ, фитонцидтер өсімдіктердің табиғи иммунитетінің факторларының бірі болып табылады (өсімдіктер өздерінің өмірлік белсенділігінің өнімдерімен зарарсыздандырылады). Олардың көп бөлігі өсімдіктерді ерекшелейді. Олардың бірі-құс шие. Құс шие-Rosaceae тұқымдасының өрік тұқымының өкілі. Олардың түріне төмен ағаштар мен бұталар кіреді. Құс шие-орман тазалағыш. Оның гүлдері мен жапырақтары фитонцидтерге бай, соның арқасында олар тартымды хош иіс шығарады. Алайда, бөліну кезінде олар барлық тіршілік иелері үшін қауіпті гидроциан қышқылын шығарады. Бұл оларға зиянкестерді құртуға және жоюға мүмкіндік берді. Ұшпа-бактериялардың, микроскопиялық саңырауқұлақтардың, протозоидтардың өсуі мен дамуын өлтіретін немесе тежейтін өсімдіктер түзетін Ұшпа биологиялық белсенді заттар. Жоғарыда айтылғандардың бәрінен басқа, құс шие ерекше қасиеттерге ие. Гүлдер мен жапырақтардың күшті, аздап мас күйінде хош иісі микробтардың ауасын тазартады. Фитонцидтердің микробқа қарсы қасиеттері оларды медицинада, ветеринарияда, өсімдіктерді қорғауда, жеміс-көкөніс өнімдерін сақтауда, тамақ өнеркәсібінде және тәжірибенің басқа салаларында қолдану бойынша көптеген зерттеулерге әкелді.

Өсімдіктің барлық дерлік бөліктері бактерицидтік, фунгицидтік және инсектицидтік қасиеттерге ие. Халықтық медицинада құс шие ежелден тұтқыр, бекітетін, қабынуға қарсы және анти-зинготикалық агент ретінде қолданылған. Құс шие құрамында гидроциан қышқылы бар ең күшті ұшпа заттар шығарады. Протозоа 5 минуттан кейін құс шиенің Ұшпа әсерінен өледі. Көптеген зерттеулер негізінде фитонцидті өсімдіктердің жанаспайтын әсерінен кейін протозоидтардың өліп қалу уақыты анықталды. Әсіресе көптеген фитонцидтер көктем мен жазда жас жапырақтармен ерекшеленеді, күзде фитонцидтер аз бөлінеді.

Жемістерде таниндер мен эфир майының болуы қабынуға қарсы әсерге ие, ол асқазан-ішек жолдары мен дизентериядағы қабыну процестерін емдеу үшін қолданылады. Микроорганизмдер черемуханың жеміс тұнбасының бүлінуін көрсетеді. Құс шие жемістерінің препараттары антисептикалық әсерге ие. Стоматологиялық тәжірибеде ауыз қуысының шырышты қабығының қабыну процестерін емдеуде, парадонтоз, тіс ауруы және С гиповитаминозымен қолданылады.

Түйін сөздер: мойыл, фитонцидтер, өсімдік, бактериялар, қарапайымдар, пайдалы қасиеттер.

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ФИТОНЦИДЫ В СОСТАВЕ ЧЕРЕМУХИ ОБЫКНОВЕННОЙ

Аннотация. Всем известно, что лесной воздух очень полезен для здоровья, и одной из важнейших причин этого является наличие в нем фитонцидов, которые убивают или подавляют болезнетворные микроорганизмы и оказывают целебное действие. Также фитонциды являются одним из факторов естественного иммунитета растений (растения стерилизуют себя продуктами своей жизнедеятельности). Их большое количество выделяют растения. Одним из них является черемуха обыкновенная. Черемуха-представитель рода сливы семейства розоцветных. Вид включает в себя невысокие деревья и кустарники. Черемуха-лесной санитар. Его цветы и листья богаты фитонцидами, благодаря которым они источают манящий аромат. Однако при расщеплении они выделяют синильную кислоту, которая опасна для всего живого. Это давало им возможность привлекать и уничтожать вредителей.Фитонциды - летучие биологически активные вещества, образующиеся растениями, которые убивают или подавляют рост и развитие бактерий, микроскопических грибов, простейших. Помимо всего вышеперечисленного, черемуха обладает исключительными свойствами. Сильный, несколько опьяняющий аромат цветов и листьев очищает воздух от микробов. Антимикробные свойства фитонцидов привели к большому количеству исследований по их применению в медицине, ветеринарии, защите растений, хранении плодоовощной продукции, в пищевой промышленности и других областях практики.

Почти все части растения обладают бактерицидными, фунгицидными и инсектицидными свойствами. В народной медицине черемуху издавна используют как вяжущее, закрепляющее, противовоспалительное и противоцинготное средство.Черемуха производит самые мощные фитонциды, содержащие синильную кислоту. Простейшие погибают под воздействием фитонцидов черемухи через 5 минут. На основании многочисленных исследований установлено время гибели простейших после бесконтактного воздействия фитонцидных растений.Особенно много фитонцидов выделяется молодыми листьями весной и летом, осенью фитонцидов выделяется гораздо меньше.

Наличие в плодах дубильных веществ и эфирного масла оказывает противовоспалительное действие, которое используют для лечения воспалительных процессов в желудочно-кишечном тракте и дизентерии. Настой плодов черёмухи оказывает губительное действие на микроорганизмы. Препараты плодов черёмухи обыкновенной оказывают антисептическое действие. Применяются в стоматологической практике при лечении воспалительных процессов слизистой полости рта, при парадонтозе, зубной боли и гиповитаминозе С.

Ключевые слова: черемуха, фитонциды, растение, бактерии, простейшие, полезные свойства.

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REFERENCES

[1] B. P. Tokin, Phytoncides, 2nd ed., Moscow, 1951, http://www.real-aroma.ru/Tokin/Tokin_fiton.htm ;

[2] Phytoncides and their role in nature, L., 1957; Verderevsky D. D., immunity of plants to parasitic diseases, M., 1959, https://bookree.org/reader?file=1426756 ;

[3] Phytoncides and their biological role and significance for medicine and national economy. K., 1967; Zelepukha S.I., https://www.researchgate.net/publication/341035236_IODINE_THE_BIOLOGICAL_ROLE_AND_SIGNIFICANCE_FOR_MEDICAL_PRACTICE

[4] Antimicrobial properties of plants used for food, K., 1973; Tokin B. P., https://www.researchgate.net/publication/326199888_The_potential_antibacterial_properties_of_plants_used_in_food_preparations

[5] Medicinal poisons of plants. The tale of phytoncides, 2 ed., L., 1974, https://knigifb2.org/medichina-zdorovie-krasota/4793-boris-tokin-celebnye-yady-rasteniy-povest-o-fitoncidah-1974-pdf.html

[6] Phytoncides. Experiment. Research, questions of theory and practice, K., 1975. B.P. Tokin.https://www.researchgate.net/publication/269583382_Critical_Thinking_Theory_Research_Practice_and_Possibilities

[7] Takibayeva A.T., Kulakov I.V., Kapbassova A.S., Sydykova D.M., Rakhimberlinova Zh.B. Optimization of methods of quantitative determining flavanoids in knotweed raw material// News of the Academy of sciences of the Republic of Kazakhstan, series chemistry and technology. – 2019. № 5. – P. 88-91. https://doi.org/10.32014/2019.2518-1491.58.

[8] Rakhimberlinova Zh.B., Mustafina G.A., TakibayevaA.T., Kulakov I.V., Iskakov A.R., Nazarova O.G. Synthesizing nitrile-containing glyconitrile (co)polymers // News of the National Academy of sciences of the Republic of Kazakhstan, series chemistry and technology. – 2020. № 3. – P. 73-79. https://doi.org/10.32014/2020.2518-1491.46

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DISSOLUTION OF STAINLESS STEEL IN SODIUM CHLORIDE SOLUTION AT POLARIZATION BY NON-STATIONARY CURRENT

Abstract. Stainless steel is in great demand due to its mechanical strength, heat resistance, and resistance to corrosive environments. This article presents the result of a study of the electrochemical dissolution behavior of a stainless steel electrode (12X18H10T) at polarization by 50 Hz alternating current in a neutral medium (NaCl). Preliminary experiments have shown that the main processes do not take place when two stainless steel electrodes are polarized with an alternating current. It was observed that by the polarization of the "stainless steel – titanium" pair electrodes with alternating current, the alloy is intensively dissolved with the formation of iron (II) and chromium (III) ions. This is due to the "valve" properties of the oxide layer formed on the surface of the titanium electrode. A change in the value of the current density of the titanium and steel electrodes significantly affects the process of electrochemical dissolution of the alloy. At high current densities, the dissolution rate of the alloy decreases due to the deterioration of the current correcting properties of titanium. With an increase in the electrolyte concentration, the current efficiency is reduced as salt passivation occurs. A maximum value of the current efficiency of dissolution of stainless steel was observed at a current frequency of 50 Hz. High frequencies of the alternating current do not provide an adjustable duration of the anodic half-cycle for the oxidation reaction due to the frequent change of half-cycles of the alternating current. It was observed that increasing the temperature of the electrolyte reduces the current efficiency of the electrochemical dissolution of stainless steel electrodes. The effects of main electrochemical parameters on the electrolysis process have been investigated, and the optimal conditions of the alloy dissolution were established (iT_i = 60 kA/m^2, iSS = 800 A/m^2, [NaCl] = 2.0 M, t = 30, ν = 50 Hz.).

Key words: stainless steel, titanium electrode, alternating current, electrochemical dissolution, chromium (III) ions, iron (II) ions, current density, and current efficiency.

Introduction.

The rapid development of innovative technologies has led to the emergence of new metal alloys with special properties. 12X18H10T stainless steel is highly resistant to the harshest conditions due to the presence of various alloying elements. Stainless steels consist mainly from chromium and nickel. The corrosion resistance of austenitic stainless steels depends on high chromium chemical content. When immersed in a corrosive medium, it forms a protective oxide layer, which reduces the rate of dissolution [1]. Due to its strength, impact resistance, and corrosion resistance, it is widely used in the production of chemical, nuclear, aerospace, and heavy aircraft components [2].

The corrosive properties of stainless steel type 12X18H10T have been studied in several works [3-5]. A.V. Jarochuk and et al considered the effect of annealing and neutron irradiation parameters on the microstructure and corrosion properties of 12X18H10T stainless steel. The voltage dependence of the anode current density has been determined. Research results revealed that the corrosion resistance of steel in the chloride-containing medium depends on the intensity of redox processes on the surface of the metal, on the state of the structure at micro- and nano-levels [3]. The corrosion resistance of 12X18H10T stainless steel and new high-strength 05X22AG15H8M2F austenitic steel has been studied comparatively. Laboratory and field tests have shown that steel 05X22AG15H8M2F has higher corrosion resistance than steel 12Cr18Ni10Ti [4]. Corrosion

МАЗМҰНЫ – СОДЕРЖАНИЕ – CONTENTS

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