Antimicrobial and antifungal activity of model drugs on the basis of food plant extracts in the systemic concept of health

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Abstract

Introduction. We analyzed the antimicrobial and antifungal activity of samples of the preparation of KTIOL-BF on standard and resistant test strains of microorganisms. The aspects of microbiology and the systemic concept of health are considered.

Materials and methods. Strains of Gram-positive and Gram-negative microorganisms were used: S. aureus, S. saprophyticus, E. coli, P. aeruginosa, S. Epidermidis, and C. albicans fungi. Model drugs based on pyruvic extracts have been studied. The method of diffusion of substances into agar was used to determine the activity of drugs in relation to strains..

Results and discussion. The present state of physical, psychological and social existence of a person contributes to the accelerated proliferation of pathogenic microorganisms and the emergence of a resistant microflora. In recent years, almost everyone suffers from fungal diseases. The problem of health and healthy lifestyle is topical. Global is the problem of providing humanity with food.

Considered aspects of microbiome (endoecological aspectsT he importance of intestinal microbiota in human health and pathophysiology is indisputable.

Suggested the systemic concept of health (The systems KTIOL®: 10 Basic Provisions for Prevention, Recovery, Treatment and Rehabilitation).

The tested microorganisms were sensitive to model specimens of the preparation KTIOL-BF (BF1-BF20). Samples of BF2, BF12, BF17 were found to be the most effective for the S. Saprophyticus test strain. It was found that the S. epidermidis test-microorganism was the most effective for the sample of the preparation BF34 (growth retardation zone was 30.40 ± 1.29 mm). The highest antifungal activity was found in samples of KTIOL-BF: BF33, BF37. Mushroom growth zones were respectively 20.76 ± 1.65 and 22.62 ± 1.44 mm.

The samples of the KTIOL-BF: BF-70, BF-87, BF-92 were shown to have a high inhibitory effect on clinical resistant strains of microorganisms. The diameter of the inhibition zone of resistant strains in KTIOL-BF87 was 22.17 mm; the diameter of the PVI control sample was 13.05 mm.

Conclusions. The raised antimicrobial and antifungal activity of KTIOL-BF preparations in relation to gram-positive and gram-negative microorganisms, C. albicans fungi and resistant strains (PVI control) were revealed.

Introduction

In the complex environmental and economic conditions of today, scientific and practical substantiation of the technologies of functional products, food supplements and preparations of gerontological and ophthalmologic direction is necessary [1,2,3]. At the same time, it is urgent to improve the concept of the endoecology of health as regards prevention, rehabilitation, treatment and rehabilitation of humans [4]. The present state of physical, psychological and social existence of a person contributes to the accelerated proliferation of pathogenic microorganisms and the emergence of a resistant microflora. This microflora interacts with human saprophytic microbes and can affect our physical health. Saprophytic microbes are trillions of microbes living on the surface and inside our body.

The review [5] substantiates the possibility of using plant products as antimicrobial agents. In recent years, the accelerated use and search of drugs and dietary supplements derived from plants. According to the author, it would be useful to standardize in vitro methods of extraction and testing for more systematic searching and ease of interpretation of results.

The study [6] confirmed the strengthening of the resistance of the microflora and drug strains to antibiotics and antiseptics, and, as a result, an increase in the incidence of secondary and postoperative infections.

The purpose of the study is to detect the antimicrobial and antifungal activity of the model specimens of the KTIOl-BF series and to present the basic provisions of the systemic health concept (KTIOL® system).

Ten health problems affecting half the planet's population. The World Health Organization (WHO) experts have announced a five-year strategic plan [7] aimed at helping the three billion people without access to universal insurance and quality health services. As part of the project, WHO experts called the main threats to the health of the planet's population. In particular, the following 10 problems:

1. Air pollution.These air is breathing today 9 of 10 people;
2. Non-communicable diseases (diabetes, cancer or heart failure);
3. The danger of a global flu pandemic. Experts do not exclude that a large-scale epidemic can burst at any moment .;
4. Severe and life-threatening conditions (crises, wars, natural disasters, etc.) endanger the 1.6 billion people (almost 22% of the planet's population);
5. The growth of bacteria resistance to antibiotics does not allow to eradicate tuberculosis and other dangerous diseases;
6. Ebola fever has not yet been cured;
7. Serious threats to humanity are the poorly developed system of primary care, which is typical of many poor countries;
8. Negative people's attitude to immunization (according to WHO data, the number of cases of measles has grown by 30% recently);
9. Dengue infectious fever (up to 390 million infected per year);
10. Undefeated opponent - HIV.

Aspects of quality, safety and packaging of food and functional products. In today's social conditions, as before, the problem of health and healthy lifestyle is topical. After all, most people understand that products and preparations (biologically active ad ditives) should not only be tasty, but functional and safe.In particular, in Japan, the European Union, and the United States, especially in the context of public health, a healthy, creative and active lifestyle [8].

In the world one of the global concerns is the supply of humanity with food, which is connected with annual population growth and global warming of the climate, resulting in reduced areas of cultivated soils. It is important not only to find available sources of food supply but also to create such products that are safe and balanced by the chemical composition of nutrients [8, 9, 10].

According to the data of the group of scientists on the problem of healthy eating [11] it is expedient to introduce in rations all categories of the population, the nutrients enriched with vital, food plants, seafood, etc.).

Innovative pharmacokinetic products, drugs based on medicinal and food plants and auxiliary active ingredients are presented in [1, 4, 9, 12].

In recent years, almost everyone suffers from fungal diseases, and these diseases are not treated with pharmacy drugs. Doctors recommend abandoning the modern (yeast) wi shop bread. The use of yeast bread can lead to various types of intoxication, fungal diseases, immune disorders, chronic and other diseases [13].

In study [14] methodology for testing natural compounds for determination of antifungal activity had been developed with adaptations. The most used are bioautography and agar diffusion with a complex and no defined media. In this study, different methods for determination of antifungal activity of natural products are discussed, and the use of M27-A2 microdilution test from CLSI (Clinical and Laboratory Standards Institute, 2002), a methodology for testing plant extracts activity is recommended as a baseline.

The most common and dangerous defeat of the crumb of bread is potato disease. With the development of the disease, the breadcrumb acquires a hue of rotting fruit, etc. The disease is caused by the bacterium Bacillus subtilis - potato stick. Its spores are harmless, but at a temperature of about 40 ° C, combined with humidity and low acidity, they develop into dangerous microbes.

White bread has a shelf life of not more than 24 hours after preparation. In rye bread, these bacteria do not multiply due to high acidity. The quality of baked bread should be monitored by manufacturers. It is advisable for buyers to purchase some bread and store them in “breathing” fabric bags in a cool place. Affected bread cannot be eaten categorically [15].

As a result of the systematic, integrated approach to the innovative technologies of bakery industries and new types of products with respect to their quality and safety [16, 17] developed the composition of polycomponent oxidants "Optical 1" and "Optical 2". Their influence on the length of the technological process, the influence of additives on the biochemical, microbiological, structural and mechanical properties of the dough and bread from the mixture of rye and wheat flour has been revealed. The new types of rye-wheat bread "Metropolitan Symphony" and "New Metropolitan Symphony" [18] were developed and introduced into the recipes and technological instructions on the basis of performed experimental research.

Microbiological studies of inhibitory action on some pathogens based on films with polyvinyl alcohol with nanoparticulate TiO2 powder are presented in [19]. It was found that the best method was to treat films of TiO2 (2.5%) with UV radiation. Solutions with TiO2 did not inhibit mushroom and yeast activity. TiO2 applied to the film inhibits the growth of bacteria (E. coli IEM-1, B. subtilis BT-2), growth retardation was not observed. Antimicrobial (TiO2) and other substances to enhance the nutritional value of products (vitamins C, F, fruit and vegetable powders, probiotics and elamine) should be used to provide the functional properties of biodegradable materials. A draft technical specification for food products has been developed.

It is known that lactic acid bacteria (LABs) produce various antimicrobial compounds and play an important role in bioconservation of food and feed. LABs are of particular interest as a body of biosecurity [20].

In [21], on the basis of integrated feedbacks of wheat bread with edible coating and probiotic microorganisms, the improvement of bread quality was determined by organoleptic and microbiological parameters.

Thus, the protection of products in food technologies using a bioecological design in the form of high-quality and safe edible films or coatings is appropriate and relevant.The community of microorganisms formed during a person's life is a complex dynamic microecosystem whose change in composition can lead to illness of the oral cavity [22,23].

The increasing clinical and microbiologic resistance of Candida spp. isolates to several antifungal agents are becoming a serious problem. It is now reasonable to propose the use of antifungal susceptibility testing in Candida spp. isolates from patients who have failed conventional therapy, before the selection of empirical therapy. The good diffusion test is simple, easy to reproduce, inexpensive, easy both to read and interpret and has a good correlation to the reference NCCLS microdilution test and may represent an alternative method for antifungal drug susceptibility testing of Candida spp., mainly in laboratories with few resources [24].

In [25]studed of antimicrobial and antifungal activity of different concentrations of the drug on the representative's oral microflora. It was concluded that the drug has antibacterial activity, and it is not selective. An increase in antimicrobial activity was observed with an increase in the concentration of the drug. Antifungal has indicated the effect of high concentrations of the drug.

The diverse collections of microorganisms associated with humans and other animals, collectively referred to as their “microbiome,” are critical for host health, but the mechanisms that govern their assembly are poorly understood. This has made it difficult to identify consistent host factors that explain variation in microbiomes across hosts, despite large-scale sampling efforts. These results illustrate the importance of microbial dispersal to animal microbiomes and motivate its integration into the study of host–microbe systems [26].

Repair of tissue wounds is a fundamental process of restoring the integrity of tissues and regular function. It is important that infection is a major contributor to wound healing. Multicellular organisms have developed an arsenal of host defense molecules, including antimicrobial peptides (AMPs), aimed at controlling the proliferation of microbial organisms and modulating the host's immune response to a variety of biological or physical stroke. The role of AMR as endogenous wound healing mediators and their promising therapeutic potential for the treatment of skin-friendly skin and other epithelial injuries is showing [27].

According to the author's team [28], the importance of intestinal microbiota in human health and pathophysiology is indisputable. Despite the abundance of metagenomics data, the functional dynamics of gut microbiota in human health and disease remain elusive. Urolithin A (UroA), a major microbial metabolite derived from polyphenolics of berries and pomegranate fruits displays anti-inflammatory, anti-oxidative, and anti-ageing activities. Cumulatively, the results highlight how microbial metabolites provide two-pronged beneficial activities at gut epithelium by enhancing barrier functions and reducing inflammation to protect from colonic diseases.

Systemic concept of health (The systems KTIOL®: 10 Basic Provisions for Prevention, Recovery, Treatment, and Rehabilitation). The study of antimicrobial and antifungal model samples of drugs is based on the theory and practice of using KTIOL-I and KTIOL-II systems [1, 3, 4, 8, 9, 12].

The preamble to the Charter of the WHO states that health is not only a lack of illness or physical defects but a state of complete physical, mental and social well-being. That is, health is the living conditions of the Personality when all organs fulfill their vital functions.

The system KTIOL-I (Comprehensive Technologies, Engineering, Equipment, Lines) was initially aimed at the synthesis of lipid-containing products of special purpose. Thus, based on the use of a systematic approach and analysis of identified problems, effective products, materials, drugs were created. In particular, for the oil and oil, petrochemical and metallurgical industries, the lipophilic substitute for palm oil K2, the lubricating and cooling technological equipment, technological and special mea m users correct twice as many mistakes as free users, on average: T6P, TVS, KTIOL-76, 77, 15. For the production of a range of special paste made of micron artificial diamonds and/or carbide - titanium fractions justified the use of hydrophilic - lipophilic systems based on oil, fatty, and substitutes of a number of KTIOL®.

Basic principles of the system KTIOL-I are:

- providing the structure of the product (preparation) on the micro and nano levels;
- ecological and economic efficiency;
- a systematic approach to the methodology of safe food production, pharmaceutical and cosmetic products and drugs.

The system of KTIOL-II (Integrated therapy of individual health improvement) was started by analyzing indicators of quality and safety of water, food products, nutritional supplements and preparations, environmental and endoecological aspects of personal health.

The system KTIOL-II includes the following provisions (keywords and phrases):

A. Hygiene of thoughts. This is a positive, critical, rational thinking.

B. With Prevention. This is self-monitoring and periodic systemic examinations: ophthalmologic, dental, endoecological, electrocardiographic, gerontological, control of the body mass index, blood control for cholesterol, sugar, iodine, etc. It's time to spend time on your own health;

C. Water for health. Drinking water for consumption in a set of indicators should meet international standards of quality and safety. Drinking water of high quality should be specially prepared. The water that we constantly consume and in the required amount (approximately 30 ml per kg body weight) should be a healing o-treatment. Quantity, conditions and time of consumption of good water are specified individually and seasonally. Good water has a positive effect on the quality of blood, on metabolic processes in the body and, accordingly, on the improvement of the health of the person;

D. Healthy eating. This is food therapy and a correct, individual gerontological balanced diet. Given the age, profession, state of the organism, active and creative life, nutrition in the realities of the present must be individually oriented: preventive, recreational, health-curative, medical and rehabilitation. Everyone should be identified and give up inappropriate food. It should also be remembered that vitamins that come from food are very important biological compounds for the normal functioning of all systems of the body.

In today's ecological and social conditions, people are beginning to think about the quality and safety of food in public and fast food establishments. In place of fast food, there are lay-foods – institute ions of leisurely wellness nutrition. It is known that the health or illness of a person depends, besides other factors, whether it eats the bacteria fermenting or rotting, and also consumes enough food with enough food fibers;

E. Healthy breathing.

F. Motion is life. More physical exercise in the wild should be used: walking, swimming, water excercises, active walks, Nordic walking, ball games, yoga exercises, etc. All these individual excercises contribute to the improvement of the organism and its

immunity, especially in clear sunny weather. Keep track of your feelings, control your own pulse, the frequency of breathing, relax in time;

G. Microbial - is an individual, diverse collection of microorganisms in the body (preferably without their resistance). The microbial condition in the body is influenced by a healthy, active lifestyle, water, nutrition therapy, acid-base balance control, personal know-how, etc.);

H. Massage. Massages are known to be used for daily activation of the body and prevention. In particular, morning (immediately after sleep), general, local, point (for example points E-36, GI-4, etc.), combined and special. Massages significantly contribute to strengthening the body's protective forces;

I. Individual know-how: personal and/or based on the use of the systemic health concept (KTIOL® system). This is the personal possession of tech, that is, knowledge, skill (skills, experience) and individual art with respect to its organism, self-control, self-perfection, and management of its own microbiome.

From the above provisions, we see that in addition to the hygiene of thoughts, systematic prevention, and improvement of the body, changes in nutrition and the influence of other factors, each person for the individual physical and mental well-being must have a high level of quality and safe microbial.

Materials and methods

Materials to be explored

Strains of Gram-positive and Gram-negative microorganisms were used: S. aureus (ATCC 6538), S. saprophyticus (ATCC 15305), E. coli (ATCC 25922), P. aeruginosa (ATCC 9027), S. Epidermidis and C. albicans fungi. The density of the microbial suspension was determined according to the standard of turbidity 0,5 by McFarland (equal to 1.5x108 colony-forming units (CFU)/ml).

The study used samples of KTIOL-BF series. These functional and antioxidant drugs have been obtained on the basis of the systemic concept of health. The drugs of KTIOL-BF (biologically functional) series were used as model samples [4, 8].

Povidone-iodine, PVI (e.g., BETADINE, which is based on a solution of povidone-iodine, surface-active and auxiliary substances) were used as a control.

Research order

- Methodology analysis
- Preparation of exploratory strains of Gram-positive and Gram-negative microorganisms, model preparation of KTIOL-BF series and control drug
- Execution of planned research, processing and discussion of the results, conclusions.

Evaluating research results

According to the diameter of the microbial growth inhibition zone the following degrees of susceptibility to the antibacterial solutions were adopted:

- highly susceptible to drug sample – if the diameter of the growth inhibition zone of microorganisms exceeded 20 mm;
- susceptible if the diameter was from 14 to 20 mm;
- low susceptible - from 8 to 14 mm.

All tests were performed triplicate, and average values were recorded.

After the second layer of the agar was sealed, the cylinders were also removed in the formed wells; the samples of the investigational drugs were 0.3 ± 0.03 ml. In one cup, Petri studied the activity of four or five different samples.

The seeds were incubated at 37 ° C. for 48 hours. The results were determined in the presence of zones of growth retardation test-microorganisms, which were clearly visible around the walls.

By the degree of sensitivity of microorganisms to antibacterial solutions, we measured the diameter of the zone of suppression of microorganisms.

As a scientific and practical basis in the planning and implementation of this study, the systemic concept of health [4, 8] was used. This concept includes two systems of KTIOL.

Antimicrobial activity screening of KTIOL-BF against Candida spp.

The objects of study were KTIOL-BF numbered from 1 to 37. The antimicrobial activity screening of KTIOL-BF against Candida spp. According to WHO recommendations the test-strain *C. albicans* ATCC 885-653 was used to investigate their antifungal effects.

In vitro studies were conducted using the wells method. Standardization of the substances diffusion into agar was provided using the thickness of nutrient media of 10 mm and the size of well 6 mm. A suspension of the daily culture of the test microorganism was added at a concentration of 10^7 CFU/ml, which was determined by optical turbidity standard by McFarland. After inoculation of the test-strain onto the nutrient medium, the wells were filled with drops of BF. Further, Petri dishes were placed in an incubator at 37 ° C. After 24 hours the results were registered by measuring the diameters of microbial growth inhibition around the well in millimeters. The evaluation of fungal susceptibility was performed according to the following criteria:

the absence of inhibition zone and zone up to 10 mm were evaluated as unsensitivity of *C. albicans* to KTIOL-BF;

- the inhibition zone from 11 to15 mm – low sensitivity of test-strain to BF;
- the inhibition zone from 15 to 20 mm – sufficient sensitivity of test-strain to BF;
- the inhibition zone more then 20 mm – high sensitivity of test-strain to BF.

Povidon-iodine was used as a positive control.

The antifungal activity of each substance was checked out 10 times. Statistical analysis of the obtained results was carried out by the method of variation statistics.

Results and discussion

Taking into account the principles of the systemic concept of health and the physiologically functional system of KTIOL-II, samples of type KTIOL-BF [4, 8] included hydrophilic lipophilic extracts from plant and/or animal raw materials, antioxidants, biologically active and auxiliary components. The results of the study are presented in Tables 1, 2, 3 and 4.

Table 1

Research of model samples of KTIOL-BF (BF1-20)

KTIOL-BF	Microorganisms / growth retardation zone, mm			
	Gram-positive microorganisms		Gram-negative microorganisms	
	S. aureus	S. saprophyticus	E. coli	P. aeruginosa
BF1	12,25±1,07	16,81±1,08	12,40±1,50	12,63±1,71
BF2	12,41±1,50	20,25±1,16	12,71±1,34	13,45±1,57
BF3	11,78±1,83	16,57±1,80	11,49±1,67	11,86±1,92
BF4	12,65±1,54	12,24±1,64	15,73±1,58	14,58±1,34
BF5	10,54±1,56	14,12±1,73	10,08±1,73	13,44±1,39
BF6	14,07±1,08	18,46±1,24	14,54±1,60	14,46±1,68
BF7	13,60±1,81	16,58±1,75	10,41±1,47	12,18±1,81
BF8	14,69±1,06	16,47±1,24	13,80±1,08	14,72±1,08
BF10	11,58±1,72	11,51±1,45	13,35±1,53	12,54±1,37
BF11	14,03±1,59	13,72±1,87	13,43±1,51	12,67±1,65
BF12	16,27±1,62	20,49±1,39	22,13±1,73	20,43±1,60
BF13	12,29±1,58	13,36±1,56	12,04±1,94	11,86±1,53
BF14	11,90±1,90	13,80±1,09	12,06±1,87	11,74±1,76
BF15	12,72±1,65	11,71±1,63	10,08±1,54	13,40±1,35
BF16	16,47±1,43	15,76±1,69	12,82±1,08	14,87±1,25
BF17	14,20±1,82	20,47±1,23	16,32±1,55	12,48±1,70
BF18	12,09±1,08	15,41±1,83	12,49±1,39	12,28±1,64
BF19	16,53±1,87	17,56±1,62	16,34±1,65	18,36±1,52
BF20	16,98±1,04	15,71±1,09	14,49±1,82	12,46±1,09

Table 2

Research of model samples of KTIOL-BF (BF 23-39)

KTIOL-BF:	Microorganisms / growth retardation zone, mm			
	Gram-positive microorganisms		Gram-negative microorganisms	
	S. aureus	S. epidermidis	E. coli	P. aeruginosa
BF23	16,56±1,28	20,09±1,67	14,72±1,54	16,53±1,09
BF24	12,80± 1,52	13,93±1,82	14,56±1,20	12,80±1,41
BF25	18,27±1,71	14,08±1,30	16,49±1,85	0
BF26	14,53±0,57	15,42±1,43	14,60±1,63	0
BF27	16,39±1,71	16,47±1,84	13,82±1,67	0
BF28	17,57±1,64	18,09±1,41	16,87±1,72	0
BF29	18,45±1,60	24,53±1,39	14,81±1,40	16,70±1,84
BF30	15,71±1,79	20,47±1,68	12,49±1,71	14,39±1,60
BF31	14,70±1,36	18,60±1,72	11,62±1,83	13,81±1,72
BF32	18,37±1,59	27,49±1,74	16,83±1,80	18,71±1,41
BF33	14,40±1,73	18,71±1,52	17,29±1,73	12,84±1,60
BF34	0	0	0	30,40±1,29
BF35	19,61±1,80	20,58±1,40	18,59±1,42	18,61±1,67
BF36	15,72±1,71	14,55±1,60	15,81±1,56	12,73±1,34
BF37	16,76±1,43	20,70±1,32	13,67±1,75	12,55±1,39
BF38	12,59±1,27	16,72±1,38	10,20±1,09	0
BF39	14,82±1,67	17,86±1,81	12,57±	12,48±1,46
BF40	12,80±1,52	14,07±1,86	11,50±	0
PVI	**11,86±1,39**	**11,57±1,81**	**0**	**0**

Table 3

Degree of susceptibility of the C. albicans ATSC 885-653 to the tested KTIOL-BFs

N	KTIOL-BF:	Zone of growth inhibition, mm	Degree of susceptibility of *C. albicans* ATCC 885-653
1	BF1	12,12±1,09	low sensitivity
2	BF2	12,14±1,34	low sensitivity
3	BF3	14,07±1,53	low sensitivity
4	BF5	12,05±1,56	low sensitivity
5	BF6	13,45±1,72	low sensitivity
6	BF7	14,06±1,64	low sensitivity
7	BF8	16,05±1,52	sufficient sensitivity
8	BF10	10,06±1,46	no sensitivity
9	BF11	12,42±1,24	low sensitivity
10	BF12	17,38±1,92	sufficient sensitivity
11	BF13	10,08±1,48	no sensitivity
12	BF14	12,24±1,32	low sensitivity
13	BF15	9,84±1,89	no sensitivity
14	BF16	14,24±1,43	low sensitivity
15	BF17	13,83±1,08	low sensitivity
16	BF18	12,05±1,59	low sensitivity
17	BF19	15,82±1,44	sufficient sensitivity
18	BF20	16,04±1,81	sufficient sensitivity
19	BF23	12,65±0,98	low sensitivity
20	BF24	18,42±1,59	sufficient sensitivity
21	BF25	15,93±1,57	sufficient sensitivity
22	BF26	11,83±1,28	low sensitivity
23	BF27	16,07±1,52	sufficient sensitivity
24	BF28	15,75±1,46	low sensitivity
25	BF29	17,61±1,88	sufficient sensitivity
26	BF30	16,64±1,34	sufficient sensitivity
27	BF31	13,72±1,08	low sensitivity
28	BF32	18,04±1,43	sufficient sensitivity
29	BF33	20,76±1,65	sufficient sensitivity
30	BF34	0	no sensitivity
31	BF35	18,29±1,37	sufficient sensitivity
32	BF36	15,82±1,72	low sensitivity
33	BF37	22,62±1,44	sufficient sensitivity
34	BF38	17,31±1,90	sufficient sensitivity
35	BF39	17,55±1,31	sufficient sensitivity
36	BF40	17,09±1,69	sufficient sensitivity
37	PVI	14,02±1,87	low sensitivity

Table 4

Testing of KTIOL-BF specimens on clinical polyresistant strains

KTIOL-BFN	E. coli	P.aeruginosa	S. aureus 5	S. aureus 6	S. aureus 5	Citrobacter	In average
	Intestinal rod	Blue-purulent sticks	Golden Staphylococcus	Golden Staphylococcus	Golden Staphylococcus	Zitrobakter	
BF70	24	18	18	22	20	20	20,3
BF82	14	18	10	18	12	14	14,33
BF83	14	16	10	12	0	14	11
BF87	26	20	21	20	22	24	22,17
BF88	18	0	16	15	16	-	13
BF89	20	16	13	12	14	20	15,83
BF92	24	16	20	22	22	20	20,67
BF93	22	16	14	18	18	14	17
BF98	18	18	24	16	18	16	18,33
BF99	22	22	22	18	16	16	19,33
PVI	12	10	14	18	12	12	
	14	10	12	15	10	10	
	12	10	20	18	12	14	
In average: PVI	12,66	10	15,33	17	11,33	12	13,05

As shown in the results obtained (Table 1), the samples of the KTIOL-BF sample tested with the antimicrobial activity of different strength were relatively promising test microorganisms.

Samples of the KTIOL-BF (BF1-BF20) to which test-microorganisms were susceptible were detected. Samples of BF2, BF12, BF17 were found to be the most effective for the S. Saprophyticus test strain. The growth retardation zones of S. saprophyticus were respectively 20.25 ± 1.16, 20.49 ± 1.39 and 20.47 ± 1.23 mm.

Based on the results of the analysis of Table 2 data, samples of KTIOL-BF (BF23-BF39) showed the antimicrobial activity of varying strength in relation to the proposed test microorganisms.

The test strain of S. epidermidis was insensitive to only 2 drugs: BF24, BF34. It was found that the S. epidermidis test-microorganism was the most effective for the sample of the preparation BF34 (growth retardation zone was 30.40 ± 1.29 mm). But to other test strains, this sample was inert.

Good antimicrobial activity among others was demonstrated by BF32 and BF35. The PVI control test was low-susceptible to gram-positive and non-susceptible to gram negative test microorganisms.

The KTIOL-BF (BF1-BF39 specimens) have also been shown to have antimicrobial activity in relation to the C. Albicans ATCC 885-653 microbial test strain (Table 3). The test strain was insensitive to only 4 KTIOL-BF specimens (BF10, BF13, BF15, BF34). The C. albicans anti-yeast fungi were KTIOL-BF samples: BF8, BF12, BF17, BF19, BF24, BF28,

BF29, BF30, BF32, BF35, BF37. The inhibition zones of fungal growth were 13,25 ± 1,19 mm on average. The highest antifungal activity was found in samples of KTIOL-BF: BF33, BF37. Mushroom growth zones were respectively 20.76 ± 1.65 and 22.62 ± 1.44 mm.Test strain C. Albicans ATCC 885-653 was sensitive to 5% of PVI (Povidone-iodine) in the low-grade - 12.09 ± 1.92 mm.

According to Table 4, according to the diameters of the inhibition zone of resistant strains of microorganisms, the following is observed.

Samples of KTIOL-BF: BF-82, BF-89, BF-93, BF-98, BF-99 were sufficiently susceptible to the diameter of the inhibition zone of growth of microorganisms. The high susceptibility of resistant strains to samples of KTIOL-BF: BF-70, BF-87, BF-92 was revealed. The best sample of KTIOL-BF87 (22.17 mm) was the best in the largest diameter of the inhibition zone of resistant strains of microorganisms from the three samples of KTIOL-BF (BF-70, BF-87, BF-92).

The average diameter of the zone of inhibition of growth of microorganisms in the control sample PVI was 13.05 mm, that is, the inhibition of growth of microorganisms was low in susceptibility**.**

time the possibility of high antimicrobial action of samples of the preparation of KTIOL-BF32 and38 on the E. coli strain (30 mm growth retardation diameter) was confirmed.

It was found that samples of the KTIOL-BF model preparations compared with the control agents (BETADINE /PVI, Chlorophyllipt) showed higher and good antimicrobial pro perties for S. Aureus, S. Saprophyticus, E. coli, P. Aeruginosa, and integral strains.

The obtained data confirmed the expediency of further in- depth studies of antimicrobial and antifungal activity of hydrophilic and/or lipophilic drugs of a number of KTIOL in the systemic concept of health, in particular in the treatment of ophthalmic and gerontological prophylaxis, treatment and rehabilitation.

Conclusions

On the basis of analytical and experimental research, new data on the antimicrobial properties of samples of model preparations of KTIOL-BF on the basis of two-phase extracts from animal and plant raw materials were obtained.

For the first time, the possibility of high antimicrobial action of samples of the preparation of KTIOL-BF32 and38 on the E. coli strain (30 mm growth retardation diameter) was confirmed.

It was found that samples of the KTIOL-BF model preparations compared with the control agents (BETADINE /PVI, Chlorophyllipt) showed higher and good antimicrobial pro perties for S. Aureus, S. Saprophyticus, E. coli, P. Aeruginosa, and integral strains.

The obtained data confirmed the expediency of further in- depth studies of antimicrobial and antifungal activity of hydrophilic and/or lipophilic drugs of a number of KTIOL in the systemic concept of health, in particular in the treatment of ophthalmic and gerontological prophylaxis, treatment and rehabilitation.

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