ANALYSIS OF THE ANTAGONISTIC PROPERTIES OF HERBAL SUPPLEMENTS FROM ALHAGI PSEUDALHAGI

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ABSTRACT

The article substantiates the expediency of using herbal supplements from Alhagi pseudalhagi (M.Bieb.) Desv.ex Shap. - False yantak (false camel thorn) in the production of bread to prevent its microbial infection and the development of bread diseases during storage and sale. The data of specialized information sources on the prospects for the use of medicinal plants in the baking industry are considered.

1.Introduction

Recently, more and more attention has been paid by food manufacturers and scientists to the search for natural additives with fungicidal and bactericidal activity to replace synthetic preservatives and improve food safety. In medicine and certain food technologies, these properties of preparations from medicinal plant materials (MPs) are widely used: aqueous, alcoholic, essential, oily, dry and other extracts, infusions, powders, juices, essential oils and other individual biologically active compounds [1, p. .1897-1901; 2, pp. 4-14].

One of the most important groups of natural biologically active compounds that make up medicinal plants are flavonoids (from the Latin "flavus" - yellow). Flavonoids are the most numerous class of natural phenolic compounds, which are characterized by structural diversity, high activity and low toxicity. Being evolutionarily adequate to the human body, they have antioxidant, angioprotective, choleretic, hepatoprotective, diuretic, neurotropic and other important pharmacological properties [3, p.1152-1155].

The attention of producers of bread and bakery products is increasingly attracted to medicinal and aromatic plants due to the unique chemical composition, high biological activity, immunomodulatory, antioxidant, antimicrobial properties that can also manifest themselves in bakery products [4, p.14-16].

Yorgacheva E.G. and Lebedenko T.E. [5, p.101-107] shows the main areas of application of phytoadditives to improve the quality of bakery products by leveling deviations in the properties of raw materials, improving accelerated dough preparation methods, and developing special-purpose products. The presence of compounds with bactericidal properties in relation to pathogenic microflora in medicinal and aromatic plants, the resistance of fermentative microflora to them makes it promising to use these raw materials and products of its processing (phytoadditives) to develop methods for stabilizing the biotechnological properties of wheat starters, liquid yeast, sourdough, wheat test, as well as a means of preventing microbiological spoilage of finished products. It is recommended to use herbal supplements from the following raw materials: common hop cones, medicinal melissa, peppermint, domasskaya rose, wormwood, tarragon, tarragon. To improve the accelerated methods of dough preparation, promising herbal supplements are chokeberry and common mountain ash, blood-red hawthorn, common barberry, stinging nettle, St. John's wort, marigolds. When developing special-purpose products, it is recommended to use chamomile, common hop cones, and medicinal sage.

Gardaushenko A.M., Kozhevnikova V.O., Lebedenko T.E. [6, p.127] in the technology of bakery products, 5 types of phytoadditives were used: St. It has been established that the introduction of this raw material in the form of a powder or puree

worsens the organoleptic properties of finished products, therefore, in the studies, aqueous extracts of phytonutrients were used, replacing them from 5 to 100% of the water used to make bread. Wheat bread, obtained by replacing 5% water with extracts of sage and St. John's wort, 25% extracts of mountain ash and wild rose, and 100% hawthorn extract, is characterized by high organoleptic and physico-chemical quality indicators. The use of extracts makes it possible to slow down the microbiological spoilage of products.

Kolomnikova Ya.P. [7, p.3-20] developed the technology of wheat bread with the use of such antibiotic phytoadditives as a powdered product from parsnip roots with honey, an enzyme preparation lysozyme, water-honey extract of St. does not require the consumption of the main raw material of bakery production - flour. It has been established that the introduction of 6.0% phytonutrients reduces the contamination of bread with bacteria B. subtlis and B. mesentericus by more than 100 times, and also prevents its molding; products have improved quality indicators in terms of porosity by 19.0%, specific volume - by 8.0%, antioxidant activity - by 34.0%.

In the production of bakery products, crushed powders of medicinal plants are used: leaves and flowers of spring primrose, dandelion leaves, peppermint and thyme grass. It has been established that the addition of powders from wild raw materials to the formulation of these products improves their biological value [8, p.23].

A known method for the production of bread, which includes the additional introduction during kneading as enrichers puree from a mixture of carrots, pumpkin, pumpkin seed powder and medicinal plants: St. John's wort, yarrow and licorice. The resulting products are distinguished by improved organoleptic and physicochemical parameters, as well as high nutritional and biological value [9].

A known method of preparing a composition for making bread containing wt.%: soaked crushed grain and sprouted crushed grain 30.0 ... 70.0 sea buckthorn juice or celandine extract, or alfalfa extract up to 7.0, whey up to 7.0, condensed milk product "Laktonik" or nuts up to 2.1, emulsifier 0.3-0.5, soybean and/or soy akara 1.0-25.0, drying oil 0-0.00015, water - the rest. This composition can be used in the production

of dietary bakery products to improve their therapeutic and prophylactic properties, as well as for the production of specialized bakery products for nutrition, for example, athletes [10].

Phytoadditives are also used in the production of flour confectionery products. Studies on the use of phyto-powder from dry extracts of sage, motherwort, lemon balm, hawthorn and valerian in the recipe of a biscuit semi-finished product showed that due to the enrichment of the latter with antioxidants, the semi-finished product acquires special functional properties, while improving the structural-mechanical and organoleptic quality indicators of the resulting products, increasing their life storage, the degree of digestion of proteins increases and the amount of aromatic substances in the product increases [11, p.63-64].

As a result of an analytical review of data from profiling literature sources, it was found that it is recommended to use herbal supplements from medicinal plants to prevent microbial contamination of bread.

2. The purpose of the study.

The aim of the work was to study the antagonistic properties of phytoadditives against the main pathogens of bread diseases.

Objects of study: extract and powder from Alhagi pseudalhagi.

3. Methods and materials.

The above-ground part of Al. pseudalhagi were collected during the flowering period. To obtain the extract, the method of maceration (infusion) was used at a ratio of crushed raw materials and water in wt. shares 1:20; duration of extraction on a water bath with frequent stirring 30 min. The infusion was carried out with a tightly closed infunder. After the specified time of extraction, the infunder was removed from the water bath and infused (cooled) at room temperature for 5 min, then the mass was squeezed and filtered without waiting for complete cooling in accordance with the requirements of the State Pharmacopoeia (SP). The mass fraction of solids in the extract varied within 7.0±0.6%.

The powder was obtained from the aerial part (grass), which was washed, then dried and ground using a Retsch GM200 knife mill (Germany) to a particle size of not more than 5.0 mm (sieve No. 50) in accordance with the requirements of the Global Fund. It should be noted that the process of extracting biologically active substances is the faster, the more thoroughly the drug is crushed. However, significant grinding of the raw material can slow down the diffusion process. The mass fraction of solids in the extract varied within 90.4±0.52.

The sensitivity of test cultures to the action of plant extracts was determined by diffusion into agar using wells in agar medium. Dense agar nutrient media were used as nutrient media: MPA (for spore-forming bacteria), wort agar (for fungi and yeast). The diameter of the zone of inhibition (absence) of microorganism growth was measured using a ruler with an accuracy of ±1 mm. Growth retardation zone up to 14 mm - low sensitivity, from 15 to 25 mm - sufficient sensitivity, over 25 mm - high sensitivity to the antibiotic. Test organisms were 18...20 hour cultures of microorganisms grown on slanted MPA. Suspensions of microbes were added at the rate of 106 microbial bodies per 1 cm3 of nutrient medium [12].

A series of trial baking was carried out according to the generally accepted method according to GOST 27669-88 “Baking wheat flour. Method of trial laboratory baking of bread” and SanPiN No. 0257-08 “Hygienic requirements for the production of bread, bakery and confectionery products and their transportation” using laboratory equipment from Wiesheu GmbH (Germany).

The susceptibility of bread to potato disease and molding was judged by its signs, which manifest themselves after a certain time when keeping the samples in a thermostat at a temperature of a steam-air medium of 37 ... 400C and its relative humidity of 80.0 ... 85.0% [13, p.150-151].

4. Results and discussion.

Particular attention was paid to medicinal plants of the region. It is the proximity of raw materials to the consumer that contributes to the rational use of the raw materials of the regions themselves, increasing the economic efficiency of production, including

food production, reducing costs and enriching food products with essential nutrients of non-alimentary origin. It has been established that in Central Asia, including Uzbekistan, Alhagi pseudalhagi (M.Bieb.) Desv.ex Shap grows massively. - false yantak (false camel thorn).

It has been established that this herb contains a rich complex of biologically active nutrients, including organic acids, essential oils, rubber, alkaloids, vitamins (C, K, B groups, carotene), tannins, catechins, flavonoids (rutin), leukoanthocyanidins, coumarins, sterols (cholestenol). The roots contain alkaloids (0.2%), vitamin C, coumarins (0.2%), tannins (3.9%). Saponins, steroids, organic acids, traces of alkaloids, phytoncides were found in the grass. Preparations from Al.pseudalhagi have wound healing, hemostatic, astringent, choleretic and antimicrobial effects [14; 15, pp. 307-308].

However, the biotechnological potential of this unique medicinal plant as a food raw material for the production of bread and bakery products has not been practically studied. Especially promising is its use as an antibiotic additive to prevent microbial infection of bread products.

It has been established that preparations based on camel thorn exhibit a pronounced bactericidal and antimicrobial effect on staphylococci, streptococci, dysentery bacillus and other pathogenic microorganisms. According to the results of screening studies, the camel thorn extract was classified as a non-toxic drug of the IVth class of toxicity, that is, to substances that are not life-threatening [16].

The fungistatic properties of phytoadditives on test cultures of Bacillus subtilis VKM-B-501, Escherichia coli IEM-1, Staphylococcus aureus BMS-1, Aspergillus niger P-3, Penicillium crustosum VKM-F-4080, Mucor racemosus VKM-F-541 were studied by the method wells in the thickness of a dense agar nutrient medium with the measurement of zones of growth inhibition of these test cultures.

The results of the study of the antimicrobial activity of the aqueous extract and powder from Al.pseudalhagi in experiments with "pure" cultures of microorganisms are presented in Table 1.

Table 1. Antimicrobial activity of herbal supplements from Al.pseudalhagi

Strain microorganism	Diameter of growth retardation zones of test-cultures of microorganisms under the influence of phytoadditives, mm			
	extract	powder, in %		
		1,0	3,0	5,0
Bacillus subtilis BKM-B-501	11,2±0,5	18,0±0,6	21,4±0,4	24,7±0,5
Escherichia coli IEM-1	7,4±0,6	16,5±0,5	18,4±0,6	23,0±0,5
Staphylococcus aureus БМС-1	9,0±0,3	17,4±0,6	21,2±0,4	24,0±0,5
Aspergillus niger P-3	9,2±0,6	18,1±0,5	21,4±0,6	28,2±0,5
Penicillium crustosum BKM-F-4080	8,0±0,5	16,4±0,4	19,8±0,5	25,2±0,3
Mucor racemosus BKM-F-541	8,2±0,4	18,4±0,6	21,3±0,4	25,2±0,4

It has been established that the aqueous extract of camel's thorn has an unstable effect of inhibiting the growth of the above-mentioned strains of microorganisms. Thus, disks with water extract of Al.pseudalhagi were characterized by a narrow inhibition zone of 7.4…11.2 mm, and the powder in these dosages has a microbostatic effect on putrefactive microorganisms. With an increase in the dosage of the powder, its antimicrobial effect increased, especially in relation to mold fungi As. niger, P. crustosum, and M. racemosus. This is probably due to the fact that the composition of herbal supplements includes components containing biologically active compounds that have an antimicrobial effect on the above microorganisms, in particular, essential oils and tannins.

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