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TECHNOLOGY FOR THE PRODUCTION OF FUNCTIONAL FOOD SUPPLEMENT FROM POMEGRANATE FRUIT AND PEEL

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Annotation
It is known that pomegranate fruit is used only fresh, ripe, as a result of its processing various products are obtained, for example, pomegranate juice, pomegranate juice with added sugar, spices for meat and fish dishes, pomegranate extract, etc. When pomegranate juice is boiled with different amounts of sugar, a delicious and wonderfully tasty drink is formed, which is used in the preparation of lemonade.

Keywords: pomegranate fruit, pomegranate juice, sugar, canned pomegranate seeds, sugary pomegranate seeds, pomegranate compote, pomegranate and apple, oils, food supplement.

Introduction

It is known that pomegranate fruit is used only fresh, ripe, as a result of its processing various products are obtained, for example, pomegranate juice, pomegranate juice with added sugar, spices for meat and fish dishes, pomegranate extract, etc. When pomegranate juice is boiled with different amounts of sugar, a delicious and wonderfully tasty drink is formed, which is used in the preparation of lemonade.
Today, Uzbekistan produces new types of pomegranate products: canned pomegranate seeds, sugar pomegranate seeds, pomegranate compote, pomegranate and apple juice.

However, much of the fruit is used for juice, resulting in its peel and seeds being wasted, but their unique composition allows the production of a functional food supplement.

Pomegranate peel is very rich in citric acid and dyes. The bark contains a large amount of pectin.

Pomegranate seeds contain sufficient amounts of fats, 67% of which are unsaturated fatty acids, of which 40% are linolenic acid, while pomegranate seeds are rich in tacoferol.

With the above in mind, we planned to produce from the seeds a functional food additive in the form of a finely dispersed powder with high physical and chemical properties.

It is known that one of the most effective methods for obtaining food supplements is the processing of plants by chemical, mechanical methods and the use of activators for this purpose. However, before crushing, the raw material must be brought to the optimum moisture level. When choosing a drying method and drying device, it is advisable to take into account the following principles, to maximize the physiological aspects of the substances, to consider the minimum energy consumption, complete safety of the process, etc.

Then, the method of drying the raw material using infrared rays not exceeding 40% was applied.

A rotor tissue disinfectant was used, which ensures a high degree of grinding of the raw material and maintains its physiological value. The bark and seeds were crushed separately, as this requires a mechanical chemical procedure. A 66.7 Gts voltage was used for chemical treatment at a pressure frequency of 5-15MP in a rotor tissue disinfector in a vertical position for grinding purposes.

Attempts were made to keep the pomegranate seeds and peel at a temperature of 20 ○C to 50 ○C. As a result, a fine dispersion powder was obtained from the seeds. In the next stage, the organoleptic characteristics of the obtained fibers were evaluated. The data are presented in Table 1.

Table 1. Orgonoleptic characteristics of the powder

Indicator names	Value and properties of the powder	
	Pomegranate seeds	Peel a pomegranate
Taste and smell Rangi Appearance Grinding rate,	Pleasant nutty taste Light brown May disperse 99.00	Pleasant sour taste Light brown May disperse 99.00

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In the next stage of research, the chemical composition and nutritional value of pomegranate powder were studied. The data obtained are presented in Table 1.

Name of ingredients	Ingredients composition
Mass fraction,%	
Humidity	7.0 дан 8.0
Lipids	7.0 дан 8.5
Proteins	6.8 дан 7.2
Carbohydrates included	28,2
Starch	44,83,08
Cellulose	27,2
Minerals	0,24 ppm
Vitamin mass fraction, mg / 100gr	
Vitamin E	
In carotene (provitamin A)	

In the next phase of the study, the chemical and nutritional value of the pomegranate peel powder was studied. The results are given in Table 2.

Table 2 Chemical composition of pomegranate peel powder

Indicator name	The meaning of the indicator
Contents,%	
Dry substances	42,18 дан 42,54
Including mono-disaccharide	6,12 дан 6,48
Sucrose	1,5 дан 0.24
Fructose	2,75 дан 2,84
Glucose	3,18 дан 3,64
Organic acids	2,52 дан 2,76
Tannins and dyes	3,48 дан 4,56
Pectin substances	0,86 дан 0,90
Vitamin C 100 g / mg	20,72 дан 23,86

According to the data, pomegranate peel contains a large amount of tannins, dyes, as well as sufficient mono-disaccharides and organic acids, which allows them to obtain nutritional supplements with the necessary organometric parameters.

In the next phase of the study, the optimal ratio of pomegranate seed and pomegranate peel powder was determined.

Additives added in this ratio are recommended for use in the manufacture of confectionery products, bread products and various types of flour.

However, during the study, when the proportions of the powder mixture obtained from pomegranate seeds and peel were changed, a food supplement with different properties and a wide range of applications was obtained.

For example, food emulsion, mayonnaise, mayonnaise sauces. used in production. This increases the durability of the emulsion, reduces the content of modified starches, as well as prolongs the shelf life of the finished product.

For example, food emulsion, mayonnaise, mayonnaise sauces. used in production. This increases the durability of the emulsion, reduces the content of modified starches, as well as prolongs the shelf life of the finished product.

From the above experiments, it can be concluded that a new promising food additive production technology based on secondary raw materials from pomegranate fruit residues has been created.

As a result of mechanical and chemical processing of pomegranate seeds and skin, it was possible to obtain a product rich in vitamins, unsaturated fatty acids, which increase the antioxidant activity, and can be stored for a long time.

To this end, extensive research has been conducted to achieve a comprehensive increase in the chemical composition and value of the food supplement, and to determine the saturation activity of microbes.

Antimicrobial activity of compounds derived from pomegranate peel

The antimicrobial activity of a collection of compounds isolated from pomegranate peel using various solvents is given in Table 3.

Table 3. Antimicrobial activity of a collection of biologically active compounds derived from pomegranate peel

№	Samples of the obtained unit 30 mg / ml	Diameter of growth stop zone, mm							
		Pseudomonas aeruginosa	*Staphylococcus aureus*	*Proteus mirabilis*	*Escherichia coli*	*Serratia marcescens*	*Candida albicans*	*Bacillus subtilis*	*Listeria monocytogenes*
1	96o ethyl alcohol	0	0	0	0	0	0	0	0
2	Cefazolin	17,2±0,1	17,6±1,2	0	0	0	0	17,2±0,6	0
3	Ethanol extract of pomegranate peel	26,1±0,5	30,5±1,1	0	25,1±1,3 б.с.	0	0	30,3±0,5	0
4	Aqueous extract of pomegranate peel	26,6±0,8	25,7±0,6	0	27,6±0,4 б.с	16,5± 0,5	0	25,1±1,2	0

Note: b.s. - bacteristatic effect

An aqueous solution of ethanol extract of pomegranate peel effectively stopped the growth of 4 of the 8 microorganisms studied. Under the influence of this substance, large-diameter growth inhibition zones were noted in the lawn where Pseudomonas

aeruginosa, Staphylococcus aureus, Escherichia coli and spore microorganism Bacillus subtilis grew.

Effective cessation of growth of Pseudomonas aeruginosa, Staphylococcus aureus, Escherichia coli, Serratia marcescens and spore microorganism Bacillus subtilis was noted under the influence of substances obtained from the extract and fraction of pomegranate peel.

The antimicrobial activity of the extract and fractions is denoted by the following conditional numbers.

The figures are in accordance with the sequence of items in Table 12.

1. sp. - 960 ethyl alcohol, 2. cefazolin, 3- dried aqueous part of ethanol extract of pomegranate peel, 4- fraction of dried aqueous part of pomegranate peel cleaned in a column with SiO2.

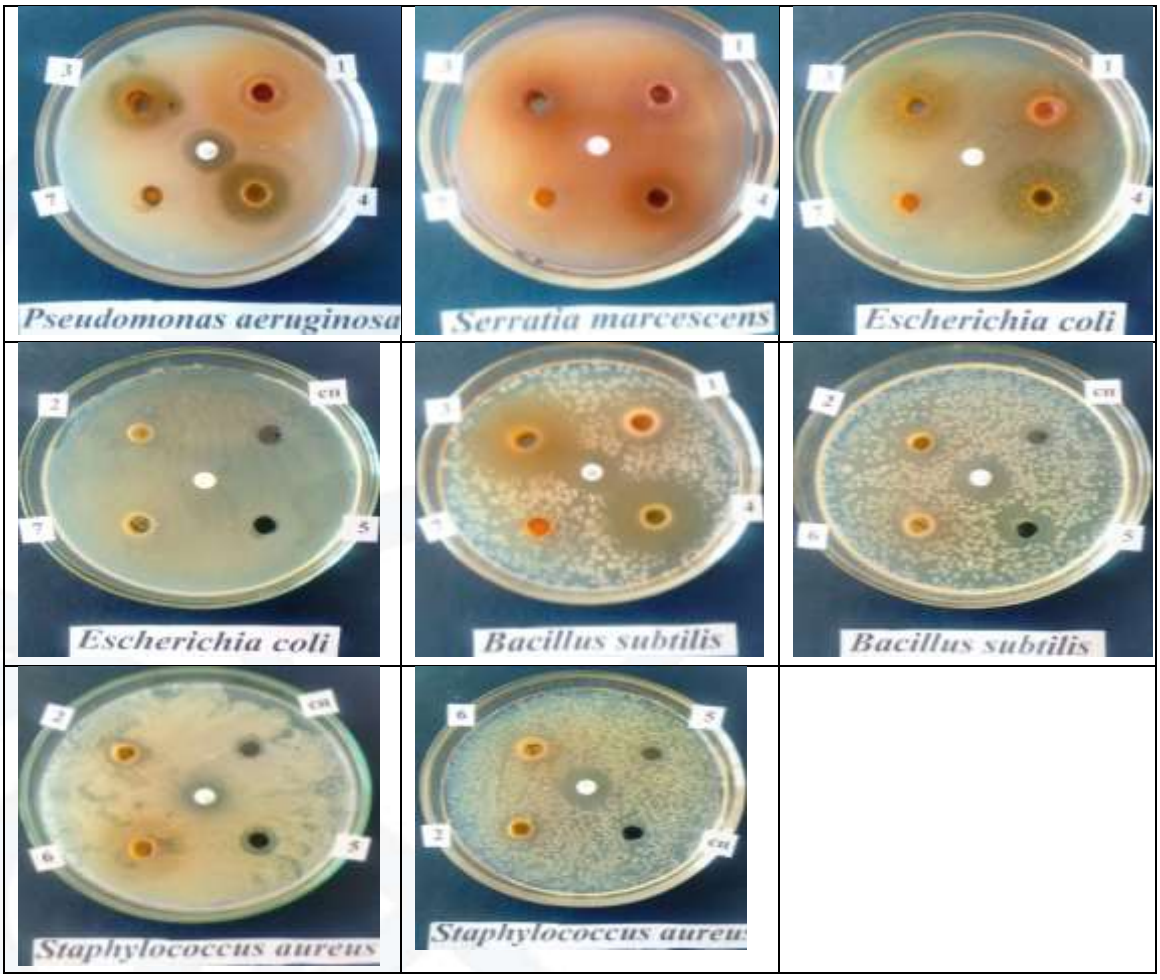

Fig. 2 Antimicrobial activity of the studied extracts and fractions against opportunistic pathogens and pathogenic microorganisms.

List of Used Literature

1. O‘zbekiston Respublikasi Prezidentining 2016-yil 12-apreldagi PQ-2520-son “Meva-sabzavot, kartoshka va poliz mahsulotlarini xarid qilish va ulardan foydalanish tizimini takomillashtirish chora-tadbirlari to‘g‘risida”gi qarori
2. Jia L., Guoliang W., Chen H., Jianke L., Ying L., Baicun L. Punicalagin and ellagic acid from pomegranate peel induce apoptosis and inhibits proliferation in human HepG2 hepatoma cells through targeting mitochondria // Food and agricultural immunology, 2019, Vol 30, No. 1, P. 898-913.
3. Alighourchi H. R. Effect of sonication on anthocianins, total phenolic content, and antioksidant capacity of pomegranate juices/H. R. Alighourchi, Barzegar M., Sahari M. A. and Abbasi S.//International Food Research Journal, 2013. - vol. 20 (4). - P. 1703-1709.