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DETERMINATION OF THE OPTIMAL DOSE AND EXPOSURE TIME FOR ENZYMATIC EXTRACTION OF PECTIN FROM MELONS

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This article discusses the allocation of pectin from melons. In the study of technological modes (hydromodule, temperature) to obtain pectin-containing extract from melon pomace varieties «Torpedo», before the implementation of the enzyme preparation is carried out preliminary swelling of raw materials in water at a temperature of 48-50 ^{0}C for 12-15 hours. To work out the technological modes of obtaining pectin-containing extract from melon pomace varieties «Torpedo» by enzyme method, in the beginning worked out the optimal parameters: temperature and hydromodium to obtain pectin-containing extract.

Keywords: melon, «Torpedo», hydromodule, melon pectin, pectin-containing extract, enzyme.

БАҚША ДАҚЫЛДАРЫНАН ПЕКТИНДІ ФЕРМЕНТАТИВТІ ЭКСТРАКЦИЯЛАУ КЕЗІНДЕ ЭКСПОЗИЦИЯНЫҢ ОҢТАЙЛЫ ДОЗАСЫ МЕН УАҚЫТЫН АНЫҚТАУ

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Мақалада, бақша дақылдарынан яғни қауыннан пектин бөліп шығару. «Торпеда» сорты қауын сығындыларынан құрамында пектин бар сығынды алу үшін технологиялық режимдерді (гидромодульді, температураны) зерделеу кезінде ферментті препаратты енгізер алдында 48-50 ^{0}C температурада 12-15 сағат бойы шикізаттың суда алдын ала ісінуін жүзеге асырады. «Торпеда» қауын сортының құрамында пектин бар сығынды алудың технологиялық режимдерін ферменттік тәсілмен өңдеу үшін, алдымен оңтайлы параметрі: температуралық режим және пектинсинсты алу үшін гидромодуль өңделді.

Негізгі сөздер: қауын, «Торпеда», гидромодуль, пектин, құрамында пектин бар экстракт, фермент.

ОПРЕДЕЛЕНИЕ ОПТИМАЛЬНОЙ ДОЗЫ И ВРЕМЕНИ ЭКСПОЗИЦИИ ПРИ ФЕРМЕНТАТИВНОЙ ЭКСТРАКЦИИ ПЕКТИНА ИЗ БАХЧЕВЫХ КУЛЬТУР

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В данной статье рассматривается выделение пектина из бахчевых культур, в частности дыни. При изучении технологических режимов (гидромодуля, температуры) для получения пектинсодержащего экстракта из выжимок дыни сорта «Торпеда» перед введением ферментного препарата осуществляют предварительное набухание сырья в воде при температуре 48-50 ^{0}С в течение 12-15 часов. Для отработки технологических режимов получения пектинсодержащего экстракта из выжимок дыни сорта «Торпеда» ферментным способом, в начале отработаны оптимальные параметры: температурный режим и гидромодуль для получения пектинсодержащенго экстракта.

Ключевые слова: дыня, сорт «Торпеда», гидромодуль, пектин, пектинсодержащий экстракт, фермент.

Introduction

Sharply deteriorating environmental conditions of human habitation; air, water, soil, and therefore food contain an excessive amount of mineral, organic environmentally harmful substances, among which radionuclide's, pesticides, heavy metal salts, nitrates and much more are of importance. Therefore, it is quite understandable that close attention is paid to the problem of finding new sources of protein, dietary fibers from non-traditional plant raw materials [1].

Pectin is a special component of dietary fiber. Main thing the physiological property of pectin, predetermining its use in the production of dietary foods, is the ability of pectin to bind and remove heavy metals and radionuclides from the body. The mechanism of action of pectin in relation to the excretion of metals is as follows. Getting into the gastrointestinal canal pectin forms gels. When swelling, the mass of pectin dehydrates the digestive canal and, moving through the intestines, captures toxic substances [2].

Research in recent years has shown that more effectively use substances contained in natural foods: they do not cause side effects and give a protective effect. Such substances include pectin, which has a beneficial effect not only in the conditions of acute exposure to metals, but also with their long-term intake into the body, which is just typical for the environmental load of residents of industrial regions and modern metropolis.

The role of melons in human nutrition is difficult to overestimate. They they are the main supplier of vitamins, mineral salts, organic acids and other biologically important substances that have a beneficial effect on metabolic processes in the human body. Therefore, it is not for nothing that they say that the level of development of melons in the country depends on the level of health of the nation. In difficult environmental conditions, when there are a number of enterprises where people come into contact with heavy, including radioactive metals, as well as various toxic substances, significantly the need for inexpensive, ecological melon products with a high content of pectin substances, carotene, dietary fibers has increased [3].

One of the perspective directions of proces-sing of vegetable raw materials is production of pectin substances. Due to its natural origin, and physical and chemical characteristics, pectin cannot be replaced in many areas of medicine and food production. Pectin's contribute to the digestive process, help the human body to resist many diseases, including malignant tumors, athe-rosclerosis, diabetes, allergies. Pectin's normalize the amount of cholesterol in the blood, help to restore the mucous membrane of the respiratory and digestive tract after irritation and inflammation, have a beneficial effect on intracellular tissue respiration and General metabolism. Also, pectin substances, due to their complexing properties, can remove heavy metal ions and radioactive substances from the human body [4].

However, modern domestic industry is experiencing serious difficulties with the production of such a valuable product. Classical

pectin technologies, which previously operated enterprises, are obsolete and unsafe from the point of view of environmental protection [5].

Based on the conducted researches it is established that melon of a grade «Torpeda» on the maintenance of the General pectin and an output of pomace are quite suitable for reception of the pectin-containing extract.

Therefore, for further research to obtain a pectin-containing extract from this variety of melon, the obtained pomace will be dried, by gentle technology, and further used to obtain pectin extract.

At the end of fermentation, the extract is filtered. Based on the conducted researches it is established that melon of a grade «Torpeda» on the maintenance of the General pectin and an output of pomace are quite suitable for reception of the pectin-containing extract.

Therefore, for further research to obtain a pectin-containing extract from this variety of melon, the obtained pomace will be dried, by gentle technology, and further used to obtain pectin extract [6].

In this case, it will be possible to create reserves of raw materials for the preparation and storage of the drug, which undoubtedly contributes to the profitability of technological processes in the production of pectin-containing extracts [7].

Objects and methods of research

Therefore, for further research to obtain a pectin-containing extract from this variety of melon, the obtained pomace will be dried, by gentle technology, and further used to obtain pectin extract.

In this case, it will be possible to create reserves of raw materials for the preparation and storage of the drug, which undoubtedly contributes to the profitability of technological processes in the production of pectin-containing extracts.

To isolate pectin from melons, in particular melons, an enzymatic preparation isolated from mushrooms Aspergillius niger with a wide spectrum of pectinolytic enzyme activity ≥1.0 U/mg was used.

Further based on the above results of researches on working off technological modes we carried out works on working off of technological mode of identification of an optimum dose of introduction of enzyme and exposure time for reception of a pectin-containing extract from pomace of a melon of a grade «Torpeda».

In this case, enzymatic treatment of plant raw materials was carried out with a minimum dose of 0.5% at temperature ranges from 38.0 to 41.0 ºС, from 4.0 to 7.0, with the weight ratio of raw materials and water in the ranges in hydromodules: 1:5, 1: 10 and 1: 15. The duration of enzymatic treatment of plant raw materials will be determined by enzymatic extraction for 3 hours.

Results and their discussion

From the presented data of the table in the studied samples the optimal dose for the enzyme complex during enzymatic extraction of pectin from melon pomace is a dose of 2.0% concentration, with a hydro module of 1:10 to dry suspension and an exposure time of 4-5 hours. The content of total pectin in the extract of melon pomace varieties «Torpedo» was the maximum at the level of 0.85-1.05%.

Table 1-Results of determining the optimal dose and exposure time for the enzyme complex during enzymatic extraction of pectin from melon pomace varieties «Torpeda»

Hydromodule	Exposuretimeinhours						
	the concentration of the enzymatic preparation/content of pectin in enzyme extract of melon, %						
	1	2	3	4	5	6	12
1.0% concentrationofenzymepreparation							
1:10	0,22	0,39	0,70	0,75	0,72	0,71	0,69
A 2.0% concentration of the enzyme preparation							
1:10	0,28	0,51	0,75	1,05	0,85	0,80	0,75
3.0% concentrationofenzymepreparation							
1:10	0,25	0,50	0,67	0,72	0,70	0,65	0,63
M+m	0,01-0,02	0,01-0,02	0,01-0,02	0,01-0,03	0,01-0,02	0,02-0,03	0,01-0,02

In the future, we obtained a pectin-containing extract from melon pomace with a volume of 1000 ml based on the optimal technological modes (temperature 40-41°C, dose of enzyme preparation 2.0%, pH of the medium-6.0 and exposure time 4-5 hours). The obtained

extracts were concentrated by vacuum evaporation using the RV 05 basic 2 - B apparatus at 58-60°C mode and vacuum discharge of 0.5-0.7 ATM., to a pectin content of 2.50-2.73±0.02% and soluble solids of 22.0-24.0±0.02%.

Conclusion

As a result of the study of the optimal technological regime: the temperature of the extract, it was found that the optimal temperature of the extract during enzymatic extraction of pectin from melon pomace varieties «Torpedo», is a temperature of 40-41°C (content 0.69-0.71%),), which for many obligate microorganisms is unfavorable, which undoubtedly has a positive effect in the process, at hydro module 1:10, while at temperatures: 38-39°C and in hydro modules 1:5 and 1:15, the resulting extracts contained lower concentration of pectin. Based on the fulfilled optimal technological modes (temperature 40-41°C, doses of the enzyme preparation 2.0%, pH of the medium - 6.0 and exposure time 4-5 hours), a pectin-containing extract from pumpkin pomace with a volume of 1000 ml was obtained. The resulting extract was concentrated by vacuum evaporation using the RV 05 basic 2-B apparatus at a vacuum discharge of 0.5-0.7 ATM at 58-60°C., to a pectin content of 2.50-2.73±0.02% and soluble solids of 22.0-24.0±0.02%.

It can be concluded that we have studied the technological regimes for obtaining pectin-containing extract from melon pomace varieties "Torpedo" by using a selected enzyme complex with a wide range of enzyme activity.

In the modern world, the role of nutrition has a huge role, but there is an imbalance of the main components of the diet. Reduce the intake of vitamins, macro-and microelements, dietary fiber and the use of natural products. As well as the impact of nonmodified genomes in food and ecology on the nutritional value of food consumed.

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ENRICHMENT OF WHEAT BREAD WITH DIETARY FIBER

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Considering that small amounts of dietary fiber in wheat flour, the aim of the work is to develop the formula and technology of wheat bread enriched with high nutritional and biological food fibers.