

## Substantiation of using wine-making secondary products as alternative raw material for confectionery industry

Tetiana Kalinovska, Vira Obolkina

National University of food technologies, Kyiv, Ukraine

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**ABSTRACT**

The article is aimed at studying the concentration of pectin and phenol substances in grapes and in processed grapes products as well as at assessing the expediency of making them part of recipe as a valuable raw material for new kinds of confectionery.

The husks of industrial grapes obtained from wine materials production were taken as the object of research.

The results of the research conducted in respect of the quantitative composition of pectin and phenol substances in husks of industrial grapes have been performed. The applicability of processed grapes products in confectionery manufacture has been determined.

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**Corresponding author:**

Tetiana Kalinovska  
E-mail:  
tk\_88@ukr.net

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### Introduction

Food status of the population is surely to be one of the most significant factors which influence people's health. Because of extreme environmental pollution the issue of functional nourishment stands first among the rest of the world's problems.

Confectionery is labeled as the high-caloric foodstuffs with high content of carbohydrates, fat and low content of biologically active components.

The analysis of chemical composition of confectionery manufacture raw materials proves the expediency of using phytogetic substances. Recently much more attention is focused upon the scientific research and the development of ways of processing plant raw materials with high content of biologically active substances.

Fruits, berries and vegetables are of considerable benefit to one's nourishment. They contain necessary mineral substances, vitamins, organic acids, pectin substances, dietary fibers. They are the main and practically the only source of biologically active substances such as phenol compounds.

The aim of the article is to examine the content of biologically important substances in grapes and its products and determining the appropriateness of including them in recipes as a valuable raw material for new types of confectionery.

## **Material and methods**

The object of study Grape squeeze was obtained as a result of industrial wine.

When formulating the confectionery articles the nontraditional types of raw materials are not only to provide the unique biochemical properties. They are intended for bearing certain function-technological properties in order to provide the confectionery articles with original organoleptic properties (flavour, smell, structure) and with the proper quality in the course of storage.

Taking in consideration these requirements the fundamental research aimed at formulation of new nontraditional foodstuffs of plant raw materials and new kinds of confectionery articles using the first-mentioned foodstuffs is pursued at the National food technologies university.

From among the plant raw materials enriched by valuable nutritive and biologically active substances the grapes and processed grapes products can be noted.

After the grapes have been industrially processed into wine and juice plenty of secondary products are left. They constitute from 10 to 20% of the total amount of grapes being processed [1, 2].

Considerable areas intended for grapes cultivation in the south of Ukraine, large number of primary wine-making enterprises and the problem of utilization of wastes which should be treated as secondary material resources are regarded as factors defining a choice of grapes processing products as the source of raw materials.

For the confectionery manufacture the husks of grapes and the grapes seeds are of primary interest since they serve as sources of biologically active substances: vitamins, macro- and microelements, phenol compounds, cellular tissue, organic acids, essential amino acids, polyunsaturated fatty acids. Besides, the most important components of grapes which are of major interest for the confectionery manufacture are pectin and polyphenol [3].

Developing innovation techniques was the reason for the research of the physicochemical and rheological properties of vegetable products and semi-finished products, of the changes in moisture bond forms in the products, the sorption characteristics and water activity.

The traditional source of obtaining the pectin is, undoubtedly, beet marc as well as apple and tangerine residue. The husks of grapes in respect of their potential pectin-bearing function are much less perspective. Thus, the content of pectin substances, mainly protopectin, in ripe industrial grapes does not exceed 1.4%. Whereas, these are the husks of grapes which can be regarded as a rich and diverse source of microelements and biologically active compounds [4].

Pectin from the grapes belongs to biologically active substances since it is favourable to creation of complexes with heavy and radioactive substances and their further externalization from human organism. Owing to its antibacterial and anti-inflammatory properties pectin lowers cholesterol levels and blood sugar and improves digestion. This property of theirs can be applied for creating functional foodstuff [5, 6].

## **Results and discussions**

In order to corroborate the industrial significance of the husks of grapes as a valuable pectin-bearing raw material we have pursued a research to determine the pectin substances content in the husks of industrial grapes which are cultivated in the Southern Coast of Crimea. The research samples were selected in the state of biological ripeness of grapes at the wine-making plant State-run enterprise “Alushta” of SC NPAM “Massandra”. As the research

samples we have picked out the husks of main industrial grapes left after the grapes have been processed into wine materials, they are Cabernet-Sauvignon, Merleau, black Muscatel, white Muscatel, Isabella.

As a result of the research conducted it has been established that the content of water-soluble pectin in puree produced from the husks of grapes under test made up 0,225% from Cabernet-Sauvignon, 0,810% from Merleau, 0,893 % from Isabella, 0,897 % from black Muscatel, 0,585% from white Muscatel to the mass of dry matter. The principal pectin quality factor is the degree of etherification, which indicates the quantity of methoxylation carboxyl groups of polygalacturonic acid. It has been established that the quantity of etherified groups of grapes pectin constitutes 61,0 – 62,5%. It is indicative of the fact that the grapes pectin belongs to the pectins which found a wide application in confectionery manufacture.

It has been found experimentally that when the husks of grapes puree with 60 % of sugar is boiled it is converted into solid jellies, which means that the grapes pectin possess good jelly-forming properties. Therefore, with regard to these criteria the husks of grapes prove to be the perspective source of pectin substances, whereas the semi-products made of ones are to find proper application in confectionery manufacture.

The concentration of phenol substances in the grapes under test makes up 475 mg/100 g. That is, the samples of grapes under test are characterized by the high content of phenol substances making it possible to use the processed grapes products for enrichment of confectionery products with the biologically active substances.

We have initiated certain research as for the application of the processed grapes products for saccharine confections. There was developed a technology for processing the husks of grapes which results in obtaining puree with high content of pectin, owing to partial destruction of protopectin contained in the cell membranes and in the intercellular walls of a grape.

The puree and the jam obtained from the husks of grapes can be used as the boilings filler and the filling for biscuit dough, for fondant confectionery production in order to improve its organoleptic properties and to extend the confectionery consumption expiration date, for foam type confectionery mass (such as soufflé and nougatines), for fruit and jelly candy centers, marshmallow and marmalade.

Powder made of grapes seeds is recommended to be used when preparing icing, candy substance and waffle filling.

Newly developed kinds of confectionary were displayed at the international professional contests “Sweet triumph” carried out in the frames of international exhibition “Lasoschi – 2012” and received awards under the following nominations: “Grand-prix” and Triumph of innovations”.

## **Conclusions**

Thus, according to the research results, the application of processed grapes products enables creation of a new expanded range of confectionery production by means of use of natural colors, antioxidants, with higher nutritive and biological value and with unique organoleptic properties.

## **References**

1. Косюра В.Т., Донченко Л.В., Надькта В.Д. Технология виноделия. – М.: ДеЛи принт, 2004. – 440 с.

2. Шольц-Куликов Е. П. Валуйко Г. Г. Виноделие по-новому – Симферополь : Таврида, 2009. – 320 с.
3. Донченко Л.В., Фирсов Г.Г. Пектин: основные свойства, производство и применение – М.: ДеЛи принт, 2007. – 276 с.
4. Mukhsddinov Z.K., Khalikov D.Kh., Abdusamiev F.T., Avloev, Ch.Ch. Isolation and structural characterization of a pectin homo and rhamnogalacturonan / The International Journal of Pure and Applied Analytical Chemistry, Vol.53, pp. 171 – 176, 2000.
5. Авидзба А.М., Иванченко В.И., Загоруйко В.А., Огай Ю.А. Перспективы разработки новых биологически активных продуктов питания на основе винограда "Магарач". Виноградарство и виноделие. – 2001. – № 1. – с. 30 – 31.
6. Валуйко Г.Г., Домарецкий В.А., Загоруйко В.О. Технология вина. – Київ. - 2003. – 592 с.