

PRODUCTION OF JUICES AND SILK SEED CONCENTRATES

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ANNOTATION

The article discusses the prospects for large-scale cultivation and effective use of mulberry fruits. processing at small enterprises and production of juices, their concentrates, dried mulberries, food colors.

Key words: mulberry, mulberry tree, black mulberry, mulberry leaves, shotut, mulberry juice, concentrate, mulberry drying, food coloring.

RELEVANCE

Mulberry fruits have almost a record potassium content and will be especially needed by people who suffer from a lack of this element. In addition, the berries are rich in vitamins E, A, K, C, as well as vitamins of group B. Among the microelements there are manganese, selenium, copper, iron and zinc, and among the macronutrients - magnesium, calcium, phosphorus and sodium.

It is estimated that more than 150 000 tonnes of mulberry are grown in Uzbekistan annually. Mulberry is mainly consumed by the population within the accessible range. Mulberry trees planted in many neighboring countries such as Kazakhstan, Kyrgyzstan, Tajikistan and Turkmenistan. Their fruits are used fresh, dried, as well as in the form of juice, concentrated juice of national preparation - "shinny". In many regions of Central Asia, legends about the mulberry fruit and its importance for health have gone down in history since ancient times.

It should be noted that our elders realized the importance of dried mulberry during World War II. Currently, there is not enough information to take into account the amount of processed mulberry and multiply, involve small enterprises in the processing industry. This is an urgent issue related to the demand and state of the market and the need to form processing entities, to provide the population with mulberry products in a market economy.

In addition, mulberry cultivation has declined in recent years, while silkworm cultivation and cocoon production have declined for some time. At present, everything is being done for the development of the silk industry in the republic, the construction of intensive silk and silk rows, the introduction of innovative technologies for the cultivation and processing of cocoons, an

increase in the production and export of silk products, as well as attracting foreign direct investment.

The aim of the research is to develop an innovative technology for the production of juices and concentrates from mulberry fruits.

OBJECTS AND RESEARCH METHODS

Our study is to consider mulberry orchards as a source of mulberry fruits, which requires studying the ways of cultivation, collection, processing, consumption, including for therapeutic and prophylactic purposes.

Let's start studying general information about mulberry.

Mulberry (*Morus*) - a family of trees belonging to the mulberry family, a fruit tree, 5 species are grown in Uzbekistan. Mainly used fruits of white mulberry (*M. alba*) and black mulberry (*M. nigra*).

The existing species of mulberry (*M. multicaulis*), kagayama mulberry (*M. Kagayame*) and silkworm mulberry (*M. bonabycis*) are mainly used for feeding silkworms. Mulberry grows rapidly and is resistant to drought and frost. The bark is dense, the branches are broadly rounded, oval-pyramidal in shape. Height 15-18, sometimes 20-25 m, bark diameter reaches 1.5 m. From adult tall mulberry trees get up to 20-40 kg of leaves and 50-60 kg of fruits. There are also varieties of mulberry that are curved (serpentine) and grow downward (majnun mulberry). The tree lives from 300 to 500 years.

Mulberry varieties are widespread in the world. There are 20 species of mulberry trees in the world, mainly in the regions of East and Southeast Asia, India, temperate and subtropical regions of Africa and North America, which are mainly divided into white and black mulberries (shotut). A wide variety of mulberries are grown in China. The homeland of the white mulberry is China, and the homeland of the black mulberry is Iran and Afghanistan.

Since mulberry leaves are an essential food for the silkworm, they have always been on the list of valuable plants. In addition, since ancient times, musical instruments and writing paper have been made from mulberry trees.

RESULTS AND ITS DISCUSSION

The chemical composition of mulberry fruits has been studied. In 100 g of a well-ripe fruit, proteins accumulate - 0.7 g; fat - 0.4 g; carbohydrates - 12 g; dietary fiber - 1.6 g; water - 83 g, and also contains vitamins, minerals and organic acids. The nutritional value of the fruit is made up of proteins (5%), fats (7%) and carbohydrates (88%). Mulberry fat contains ω -3 and ω -6 fatty acids, which significantly improve its dietary properties. The energy value of mulberry fruits is 53 kcal per 100 g-ah [5, 7, 13].

Mulberries contain 82.9-86.2% water and 10.9-12.7% sugars. When mulberries are dried, raisins are obtained from mulberries, and when consumed, the level of sweetness of the product increases even more. The sugar content in mulberry raisins is 73, 29-83, 71%. In addition, mulberries are rich in vitamins B, C, E, K, PP. Accordingly, it is recommended to use it for persons weakened by the disease, often suffering from colds.

Vitamins: A-0.4%; beta carotenoids -0.4%; B1-2.7%; B2-1.1%; choline-2.5%; B5-1.6%; B6-2.5%;

B9-1.5%; B12-undefined; C-11.1%; D-not defined; E-5.8%; H 1.2%; K-6.5%; PP-4%; K-14% [2.4]. The amount of macro- and microelements: Ca-2.4%; Si-33.3%; Mg-12.8%; Na-1.2%; Pl-4.8%; Cl-0.1%; Fe-10.3%; I 0.7%; Co-10%; Mn 0.9%; Cu-6%; Mo 3.6%; Se 1.1%, P 0.3%; Cr-14%, Zn-01% [1, 3, 6].

Mulberries are eaten whole, juicy, fresh or dried (mulberry raisins). Mulberry is also used for making a variety of pastries, jams and marmalades, molasses.

Mulberry seeds contain up to 24-33% fat and other nutrients, due to the high content of phosphorus, mulberry is considered beneficial for people involved in mental activity. For pregnant women, the mulberry fruit is also a source of essential nutrients for the good development of the fetus.

Mulberries strengthen the immune system, strengthen the body's defenses against infectious diseases, protect the skin from premature wrinkles, improve vision and protect against diseases such as retinal damage. Mulberry juice is also widely used to cleanse the blood, increase blood flow. Prepare and drink a tincture of dried mulberry and compote, it cures impotence, helps to lose weight, cleanses the body.

Mulberry syrup - medicinal effect for asthma and bronchitis; increases frost resistance; gives great strength to the body; contributes to the development of the child; strengthens mental energy. Two tablespoons of mulberry juice, consumed in the morning, satisfies the body's daily need for calcium, iron, magnesium minerals and vitamins.

Our great compatriot Abu Ali ibn Sina used mulberry as a remedy. In his "Healing instructions" about mulberry it is written: "Sour mulberry restores the swelling of the mouth and throat, its leaf is useful for swelling on both sides of the throat. Rinsing your mouth with sour mulberry leaf juice relieves toothache. All types of mulberries should be eaten before meals so that they do not harm the stomach. " Mulberry fruits and mulberry juice are used to treat swelling in the mouth and throat. Salted and dried mulberries treat diarrhea. In the treatment of kidney and cardiovascular diseases, mulberry is a diuretic that cleanses the body of excess fluid.

CONCLUSIONS

It should be noted that mulberries are not processed in the country's canning factories, although the process of obtaining a concentrate from juice can be carried out on the basis of the technology for producing a concentrate from fruits such as apples, grapes and pomegranates.

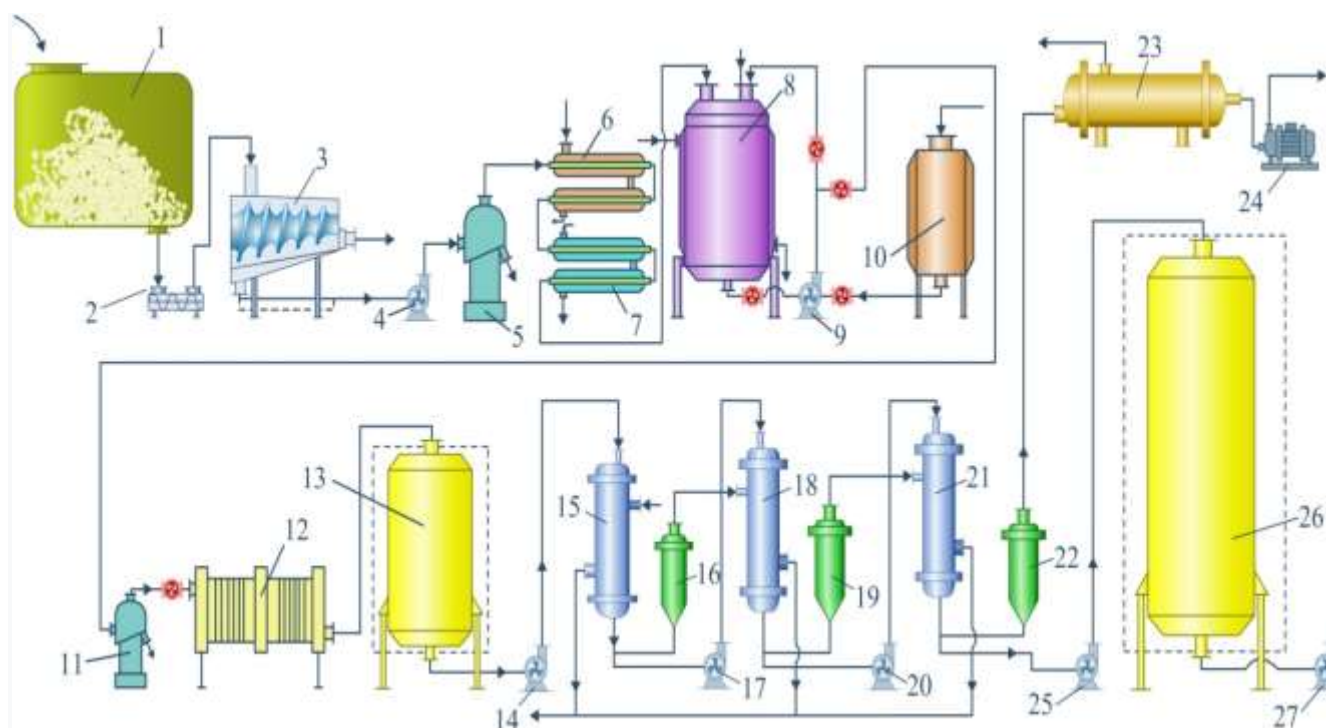
The fact that mulberries are not processed is one of the main reasons for the loss of mulberries. The production of mulberry molasses by the population has long been a tradition, and the fact that mulberry molasses is a useful product for human health is confirmed by accurate data.

In this regard, we can effectively use the grown mulberry fruits by deploying a large-scale cultivation of mulberries, processing in workshops and the production of dried mulberries - raisins, mulberry juice and concentrate.

It is desirable to obtain a concentrate from mulberry sap on the technological line shown in picture 1.

Mulberries are harvested in special containers in the garden and sent to the workshop for processing. In the process of processing, the mulberry fruit is fed to a screw press by means of a screw pump, its juice is squeezed out and separated from the mulberry juice, particles of dust,

soil, tree leaves, pieces of fruit, juice particles are first separated through the squeezed juice [8-12].



Picture 1. An innovative technological line for the production of juice and concentrate from silkworm fruit.

1-intake of mulberry fruits; 2-screw pump; 3-screw press; 4, 9, 14, 17, 20, 25, 27-pumps; 5-11 separator; 6-tube-in-tube heater; 7-pipe-in-pipe cooling device; 8-fermenter; 10-hydrolysis motor park; 12-filter; 13- container for collecting juice; 15 - casing of the first stage of the vacuum evaporator complex (VVK); 16 - separator of the first stage VVK; 18-case of the second stage of the VVK; 19 - separator of the second stage VVK; 21-hull of the third stage of the VVK; 22-separator of the third stage VVK; 23-secondary steam condenser; 24-vacuum pump; 26- aseptic concentrate storage tank.

In the production of clarified juice and mulberry concentrate, the starch and pectin in the juice is broken down by fermentation. First, the resulting juice is heated to 90 ° C and pasteurized. In this process, the starch attaches water and gelatinizes, swells, pasteurizes and in the next stage is cooled to 45-50 ° C for fermentation and breakdown of starch and pectin. The fermentation process takes place in the fermenter, and the solid particles are cleaned by separation, and the juice is filtered and accumulated for evaporation. The juice is evaporated in a vacuum evaporator. The resulting concentrate is collected in an aseptic container for further unpacking into aseptic bags [13].

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