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PERSPECTIVE DIRECTION IN CROP RAW PROCESSING FROM SUGAR SORGHUM

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Actuality sorghum cultivation in climatic conditions of Ukraine is devoted. The list of products, including food syrup, raw materials for the production from sugar sorghum was written. Submitted the fundamental technological scheme of production and purification of edible syrup sorghum.

Sugar sorghum, processing, cleaning, food syrup, biofuels.

Nowadays there are a lot of problems for humanity such as global warming, environmental degradation, food crisis and so on, which have increasingly stronger negative impact on the global economy. Touched topic is quite relevant for Ukraine. Quite substantial losses for these conditions and undergo agricultural production. Growing trend unpredictable of weather conditions and aridity climate in Ukraine makes studying and rotation of certain groups of crops that tolerate soil and air drought, normally develop at high temperatures and provide high and stable yields of grain and green mass that can be promising raw materials for processing industries.

One such crop is sugar sorghum. It is the main food crop in countries such as Morocco, Sudan, Ethiopia, taking the average of the world at least 50 million hectares of sown area annually, second only to wheat, rice, corn and barley. [1] Sorghum annual, tall, upright plant. Her homeland is Asia, it is known in culture

for more than 3 thousand. Years. In Europe, began to grow sorghum on XV, and in Ukraine in the XVII century. Today it is grown in large volumes in Pakistan, China, Hungary, Australia, Italy, India and other countries. In Ukraine, the area sown sorghum is about 100 thousand hectares, its main focus areas in the southern region, Mykolayiv, Odesa, Dnipropetrovsk, Donetsk regions and in Crimea. However, in recent years expanded area of cultivation of sorghum and central regions, including Kiev, Chernigov, Vinnitsa and in Western Forest Steppe Ukraine.

An exceptional biological feature of sorghum sugar is its ability to grow at high temperatures and minimal moisture reserves. Sorghum by drought and salt suitable ranks is the first among the crops in the world. Due to the developed root system and a waxy coating on the leaves it transpiration rate is low, only 200, while for maize it is 450 in soybean - 500, and in alfalfa - 700 [2]. For sorghum characterized by stable performance in harsh soil and climatic conditions and with proper cultivation technology gives yields of green mass at 30-55 t per ha, and under favorable growing conditions from one hectare sorghum crop can be harvested sugar yields of green mass of over 100 tons.

In addition, sorghum has a very important environmental aspect: 1 hectare sugar sorghum during the growing period (90-130 days) absorbs 55 tons of carbon dioxide, while stressing the atmosphere 40 tons of oxygen. For comparison, coniferous forest in the same area allocates about 30 tons of oxygen, and foliage - only 16 tons. [3]

Sorghum light-short-day culture, does not tolerate shade. On appearance - its raceme sorghum resembling millet, but unlike millet, rather hairy hollow stalks of sorghum has large, smooth, fleshy heart-filled stems that reach 3 ... 3.5 m tall. The juice of the stems of sugar sorghum at the end of the growing season (wax phase and full ripeness) accumulated more than 20% carbohydrate. It consists of 55 ... 75% of sucrose and 25 ... 45% fructose and glucose.

Therefore, given such good characteristics as high adaptability, resistance to drought, rapid growth, significant carbohydrate content and high biomass yield,

sugar sorghum is well suited for growing in climates of our country and can be promising raw materials for the food industry, feed processing and bioenergy.

According to international experience, including the US, Canada, Australia, India, Hungary, Romania, very promising is the use of sugar sorghum as feedstock for sugar-products. Since the US established industrial production of sugar syrup and sorghum is 10 million liters per year [4]. In Australia, production of sorghum syrup organized in factories that process sugar cane by advanced technology. In Italy, Hungary and Romania there are studies to obtain products of sugar and ethanol from sorghum [5]. In India scientist complicated the technology of food production from sugar syrup sorghum varieties Madhura [6]. The current interest to the world of culture confirms the need for more detailed study of the possibility of industrial production of edible syrup from sugar sorghum. For this purpose, the laboratory department of sugar products and ingredients IFR NAAS of Ukraine conducted a series of studies to obtain the syrup from the juice of the stems of sugar sorghum.

The aim of research was to develop technology for the food syrup from the juice of the stems of sugar sorghum by improving effective ways juice purification of macromolecular compounds and hydrolysis of starch.

Materials and methods. The research was done in the laboratory of sugar contained products and ingredients in IFR NAAS Ukraine in 2013-2014 with getting sugar syrup from sugar sorghum and it was studied several methods of its cleaning that devoted temperature dividing of high completed substances, clueing of its starch and its enzyme decreasing. It was tested several methods of treating diabetes sorghum juice that predicted temperature coagulation non sugars, gluing starch and its enzymatic cleavage, purification and juice liming, using food acids, bleaching juice natural and organic adsorbents, filtration under pressure and watering with various fillings (filtroperlit, kieselguhr , diatomite, various types of pulp, etc.); thickening the juice to the syrup with intermediate filtration it and without it.

Results and discussion. As a result of the research has been identified as the best way to juice processing phosphorus acid, enzymes alpha-amylase to break down starch and lime milk. Filtering should best be made with alluvial layer of kieselguhr and cellulose. The basic technology of obtaining food syrup from sugar sorghum scheme shown in Fig. 1.

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In addition, the organization of processing of sugar sorghum for food production area of waste, such as solid phase stems - bahasa can be used as raw material for biofuel production, which significantly reduce energy dependency and help to reduce the production cost of product produced.

As a reason of the high density of the fibrous structure of the sugar sorghum and generation of homogeneous plates possible another direction bahasy use - as raw material for pulp and paper industry. Sorghum stalk sugar contains 14-18% cellulose. Out of cellulose from sugar sorghum is 7,5-15 t / ha. [7]

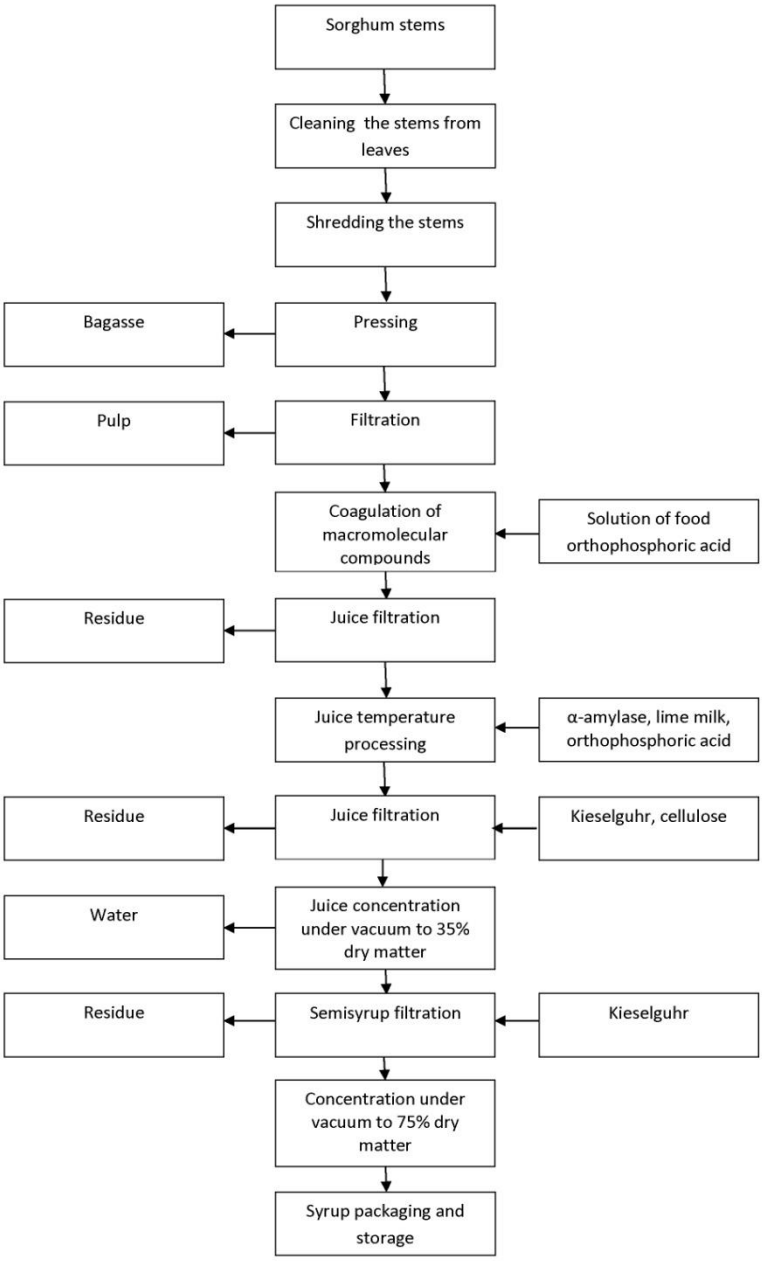

Fig. The fundamental technological scheme of processing sugar for food sorghum syrup

Conclusions. Thus, complex processing sugar sorghum has great prospects. Manufacturing a wide range of products from different parts of sorghum can positively influence the development of the sugar industry, in particular to expand the range of products, create jobs, increase the number of days of plants

(Sorghum can be processed as of mid-August, which will work actively sugar factories to start processing sugar beets).

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