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MODEL OF THE EVAPORATION APPARATUS FOR CONCENTRATING FRUIT AND VEGETABLE JUICE

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ABSTRACT: *In the article, the process of evaporation of fruit and vegetable juice in an evaporating apparatus, despite its relatively low productivity, can be attributed to continuous-acting apparatuses, which excludes the possibility of complete evaporation of juice, but at the same time its evaporation is necessary to the required density.*

KEYWORDS: *process, fruit and vegetable juice, boiling point, evaporation apparatus.*

The peculiarity of the process of evaporation of fruit and vegetable juice in the evaporation apparatus, despite its relatively low productivity, can be attributed to continuous-acting apparatuses, which excludes the possibility of complete evaporation of juice, but at the same time its evaporation is necessary to the required density.

The initial information when constructing a mathematical model of an object is data on the purpose and working conditions of the object. This information defines the main purpose of modeling and allows you to formulate requirements for the mathematical model being developed. One of the ways to move from a meaningful to a mathematical description is to create a formal information model of the object. Let's consider the process of juice concentration by the example of using the developed evaporation apparatus with a bifurcated heating chamber . (Fig. 1).

It is obvious that the density of the evaporated juice in the evaporation apparatus depends on the flow rate and density of the initial solution, as well as the intensity of evaporation.

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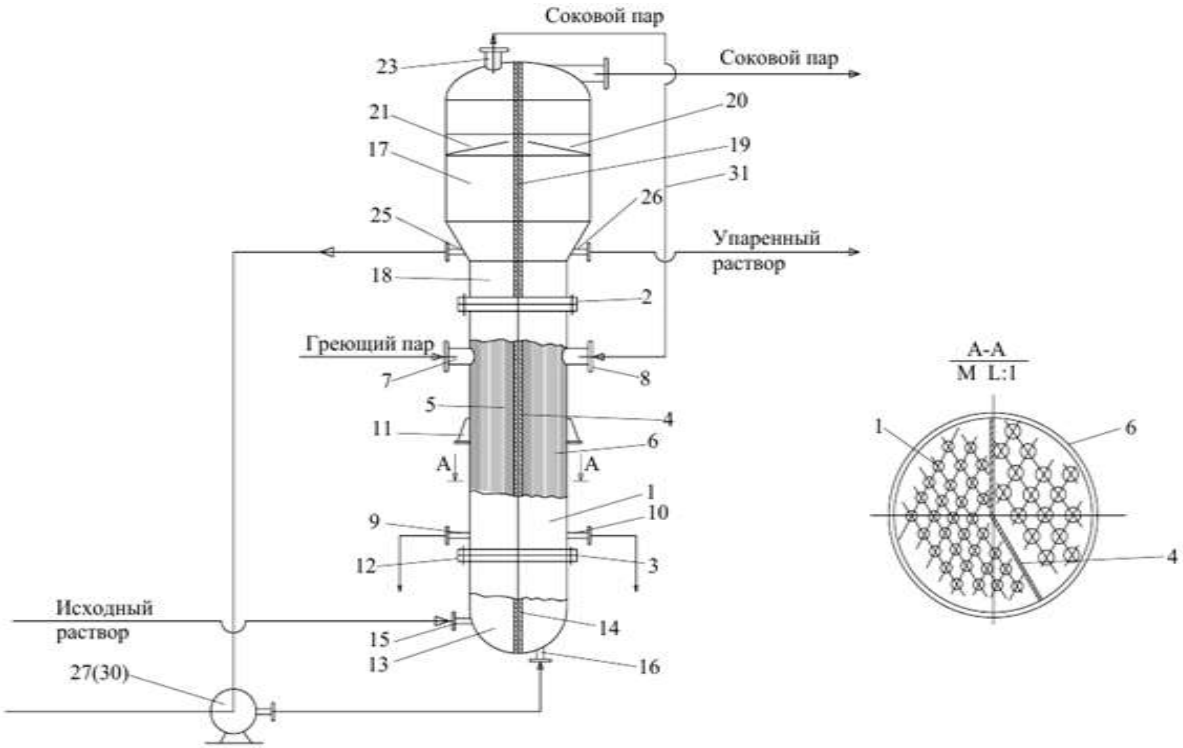

Fig. 1. Evaporating apparatus with a split heating chamber

The intensity of evaporation depends on the transfer of heat of the heating agent to the evaporated juice, the design of the heating chamber of the evaporation apparatus determined by the steam flow rate and its temperature. The boiling point of the juice depends on its density and the vapor pressure above it, while the temperature of the juice must be stabilized, т.е. $t_{кип}$= const.

When removing the evaporated solution from the apparatus, the material balance must be maintained at the same level, i.e. to maintain equality between the amount of dissolved substance leaving the apparatus and the amount of substance entering with the initial solution. Therefore, the solution level in the apparatus is the main parameter of the evaporation process, since the thermal and hydrodynamic mode of operation of the apparatus depends on it. The main requirement for the mathematical model of the evaporation apparatus is a description of the dynamic relationships between the main technological variables, taking into account the dynamics of physical processes occurring in it. Reproduction of dynamic relationships between input and output variables in the model is necessary for conducting computational experiments of possible variants, and changes in

these variables must correspond to real ranges. Figure 2. shows the composition of the input and main output variables of the mathematical model of the evaporation apparatus for concentrating melon juice in accordance with the established requirements.

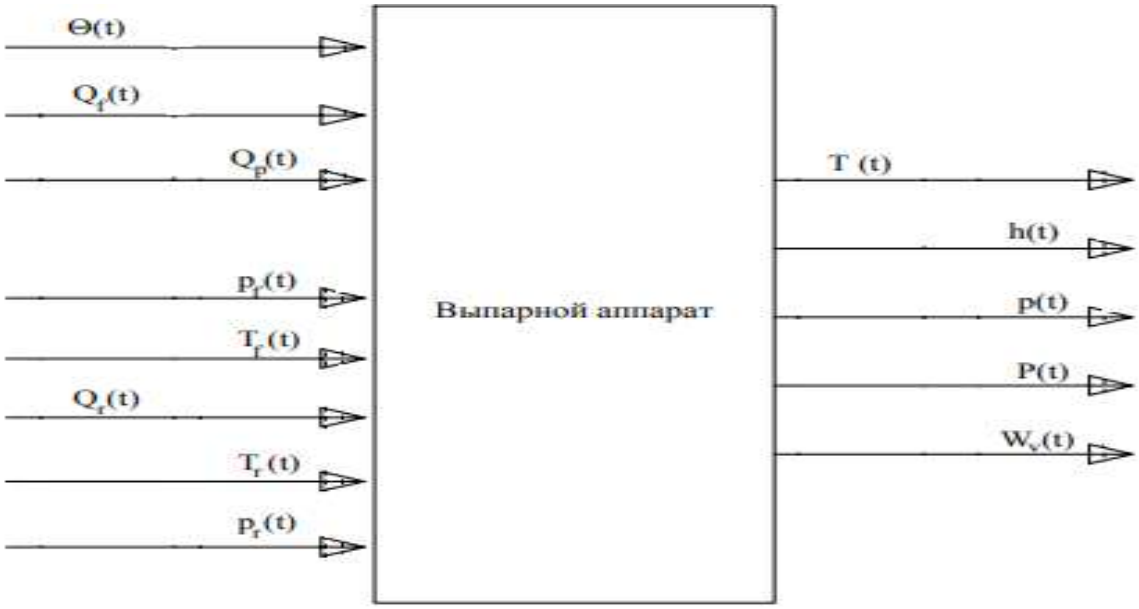

Fig.2. Composition of the main variables of the computer model of the evaporation apparatus

The analysis of the variables of the computer model showed that for the process of evaporation of melon juice to be stable, it is necessary to ensure intensive circulation and stabilization of the temperature of the solution in the apparatus.

REFERENCES

1. Artikov A.A. Processes of food production apparatuses (Mathematical modeling, heat exchange processes, evaporation). Tashkent, -Ukituvchi, 1983- With

2. Artikov A., Masharipova Z. A. Program for determining the equilibrium temperature of water when drying food 07.02.2020. DGU07696.

3. ArtikovA., Masharipova Z. A. Mukhiddinov D.N., Murtazaev K.M. On the issue of computer algorithmization of the water evaporation process// "Kimeviytechnologiya. Nazorat va boshkaruv", 2017. No. 3. pp. 64-74 4. Einstein V.G. General course of processes and devices of chemical technology: 2002 Vol.2. M.: Publishing House: Binomial. LZ. 2014. — 1758 p.

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