STUDY OF FREEZING OF CABBAGE ON THE PUMP-FROEN SYSTEM

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Abstract: *On the basis of the analysis, a technological scheme of shock freezing of cabbage was developed. Optimal parameters were determined.*

Keywords: *vegetables, pepper, freezing, shock freezing, canning, blanching, technological scheme, inactivation of enzymes.*

Аннотация: *На основе анализа была разработана технологическая схема шоковой заморозки капусты. Определены оптимальные параметры.*

Ключевые слова: *овощи, перец, замораживание, шоковая заморозка, консервирования, бланширование, технологическая схема, инактивация ферментов.*

As you know, in this rapidly developing phase of science and technology, many scientific knowledge, concepts and imaginations have grown dramatically. On the one hand, there is a differentiation of science and technology through the development of new areas and departments, and on the other hand, there is a process of integration [1].

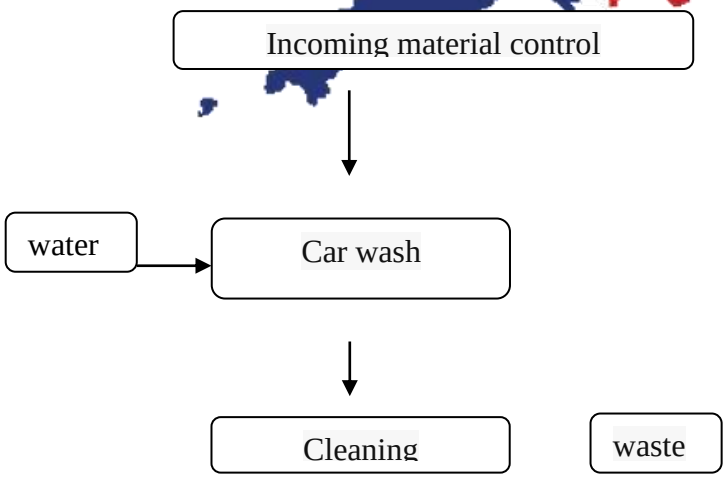
Refrigeration is an amazing area where science and engineering meet for solving the humankind's cooling and refrigeration needs in an extensive range of applications, ranging from the cooling of electronic devices to food cooling, and has a multidisciplinary character, involving a combination of several disciplines, including mechanical engineering, chemical engineering, chemistry, food engineering, civil engineering and many more. The refrigeration industry has drastically expanded during the past two decades to play a significant role in societies and their economies. Therefore, the economic impact of refrigeration technology throughout the world has become more impressive and will continue to become even more impressive in the future because of the increasing demand for refrigeration systems and applications. Of course, this technology serves to

improve living conditions in countless ways.

Refrigeration is a diverse field and covers a large number of processes ranging from cooling to air conditioning and from food refrigeration to human comfort. Refrigeration as a whole, therefore, appears complicated because of the fact that thermodynamics, fluid mechanics, and heat transfer are always encountered in every refrigeration process or application. For a good understanding of the operation of the refrigeration systems and applications, an extensive knowledge of such topics is indispensable [2,3].

The liquid overfeed or also known as pump recirculation system designs are widely used, especially in low temperature multi-evaporator systems.

The terms liquid overfeed and liquid recirculation are sometimes used interchangeably and refer to the practice of delivering a greater rate of liquid refrigerant to the evaporator than evaporates. So at the exit of the coil a mixture of liquid and vapor flow out of the evaporator. If there is desire to differentiate between liquid overfeed and liquid recirculation, it might be that liquid overfeed applies to the coil, while a liquid recirculation system incorporates the additional equipment to accommodate the overfeeding of the coil. This type of system was developed to overcome the shortcomings of the DX system whereby the refrigerant quality is only approximately 60% or in simple terms only approximately 60% of the evaporator surface is fully wetted. In such cases the heat transfer or heat flux will be low as only latent heat transfer will arise in the wetted portion and sensible heat in the vapor section or useful superheat.



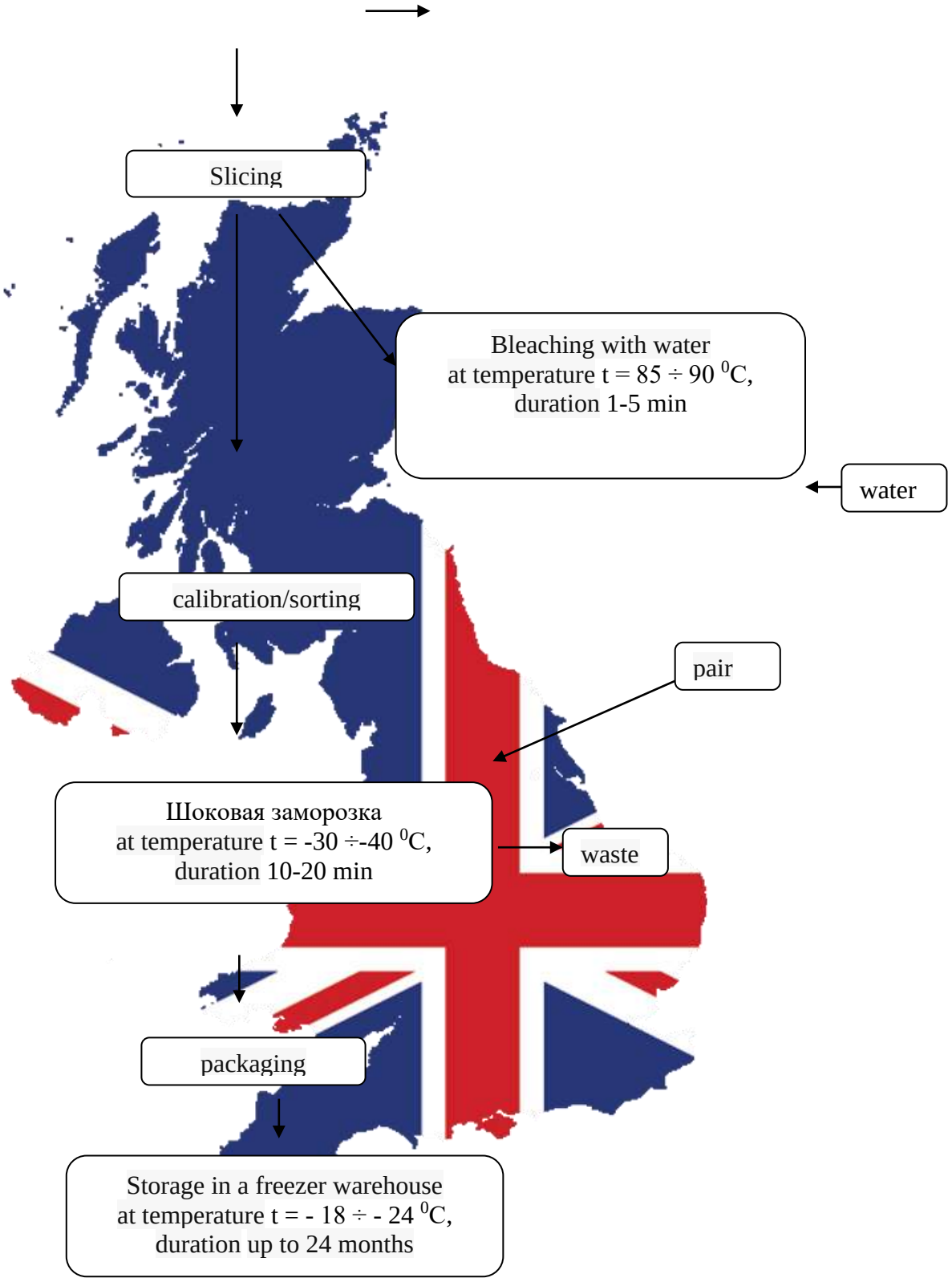


Figure 1. The scheme of the optimized technological of shoch freesing of cabbage.

A liquid overfeed evaporator is essentially the same as in the DX system except that the means of distributing the liquid among the circuits of the coil may be somewhat different [4]. Overfeed implies that more liquid is fed to the coils than will be evaporated (or boiled off), and in fact, the overfeed rate is typically about 2 to 3:1. Which is the ratio of units of liquid that exit the evaporator to units of vapor that exit the evaporator. While running with raw products on the system in general there is differentiation in output of products from IQF. If we are gonna provide broccoli crops to the system as an example, opening case study shows that the biochemical composition and physicochemical properties of three different variety of broccoli crops. Florets, leaves and stalks of broccoli were frozen at -43 degrees C, and the florets were analyzed for proximate composition, amino acid profile, fatty acid composition, and physicochemical properties. The florets showed the highest protein content and the lipid content was similar in the leaves and stalks. The stalks had high crude fiber content and low protein content. All florets presented a high water absorption index. Tyrosine, aspartic acid, glutamic acid, praline and valine were found in larger concentration. The most abundant fatty acids in the lipids were linoleic acid , palmitic acid and linoleic acid. Broccoli florets prepared in this study are good source of nutrients. The sequence of technologies of processing frozen broccoli is about several steps. One of the decisive part of freezing such kinda product is blanching. Blanching incorporates different regimes and speeds according to products relatively.

№	Products	Processing time	Temperature	Tara
1.	Broccoli	180 second	97 degree C	6 kg
2.	Cauliflower	210 second	95 degree C	8 kg

The florets showed the highest protein content (22.41 g/100 g)

Large-scale broccoli crops breeding in Uzbekistan, optimization of the use of the latest technologies and innovations, as well as the study of products depending on theirs technological processes, increasing the country's export potential at the

same time leads to success in the political, economic and scientific fields.

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