# Assessment of prospects using the latest technology stabilization of beverage

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**ABSTRACT**

The article presents information related to microbiological stabilization of carbonated and non-carbonated beverages, including high energy value from raw materials of plant origin due to the choice of parameters and modes of heat treatment.

An analysis of the possible varieties of microflora in beverages and provides information on the selection of pasteryzatsiynyh units for its inactivation. Analyzed the relationship between osmotic pressure, pH environment and the content of carbon dioxide in beverages and their impact on the stabilization of beverages.

These schemes the terms sustainability carbonated and non-carbonated drinks in the absence of these chemical preservatives.

Ensuring the quality of Ukraine's population drinks, berry, fruit and vegetable juices require further development as a source of raw materials and processing technologies incoming material flows. An important part of production processes is to ensure microbiological purity products, or at least create a bacteriostatic environment [1-3]. Obviously, the requirement of 100 percent level guarantees aseptic condition significantly narrows the choice of methods of the latter. In this choice recently in Ukraine palm belonged thermal processing methods of products at pasteurization and sterilization. However, in the last decade rapidly growing use of chemical preservatives, including uncontrolled, creating another environmental problem.

Assessment of prospects for technologies that have a different basis to ensure stabilization of quality indicators drinks and juices is the purpose of this study.

Beverage industry higher energy value from raw materials of plant origin continues to grow, requiring revision for these microbiological requirements. Usually in these drinks no pathogenic microflora and bacteria resistant. Experience points to the possibility of the emergence and development of these acidophilic or acid-fast bacteria (Fig. 1).

In this regard, drinks, saturated with carbon dioxide may produce no heat treatment provided microbiological purity blending and packaging equipment. However, the desire to "nationalize" products based on cherries, grapes, red berries and so leads to the fact that pH 3,7 and carbon dioxide content of 6 g / l did not provide microbial protection, as is the case in orange drinks. There have been indications that this is a consequence of the ingestion of drinks lactic bacteria (Lactobacillus perolens) for packaging [3]. High level of risk associated with

high malic acid under the influence of lactic acid bacteria is converted into lactic. The result of these changes is to increase the pH or at least stabilization of the latter.

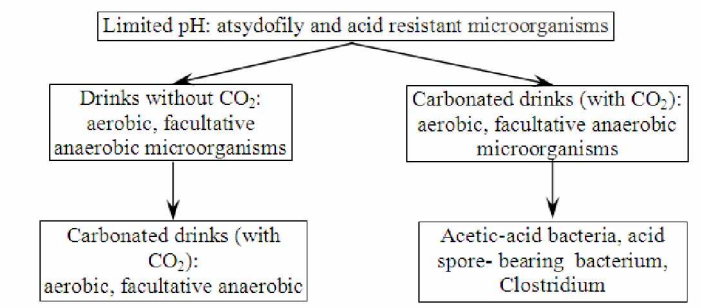


**Fig. 1. Scheme on varieties of microorganisms in beverages**

The desire to increase the biological value of drinks leads to the use of insoluble additives as ballast substances, flour from grain or fruit cells. Around these substances can be created "alkaline island" in the micro environment of germinating endospores of bacilli and kostrydiy, which will result in total damage output even with accurate exposure modes of heat pasteurization.

In these "alkali islands" also can develop pathogens (Bacillus cereus, Clostridium perfringens, Staphylokokken, Enterokokken) and thus offset the effects of such selective factor, which is the pH.

The only solution in such cases is still increasing number sterilized units, the determination of which is necessary to take into account the types of microorganisms (Fig. 2).

Among the influential factors to yield beyond regulated mikrobiological standards are upgraded to 0.1 - 0.2 mg per liter of zinc content. In lemonade and mixed drinks over time has marked the rapid growth of yeast cells. However, the drinks limited presence of zinc content of yeast cells is not shown.

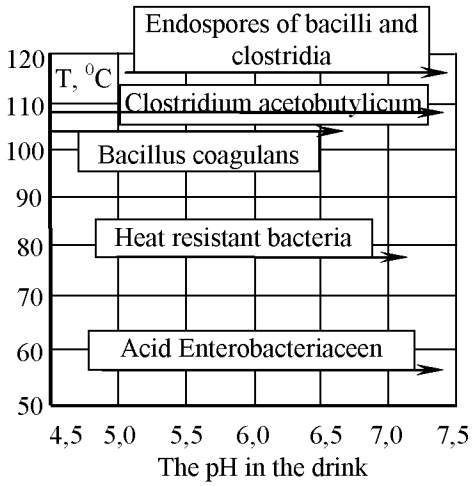


**Fig. 2. Dependencies temperature pasteurization at cutting beverages within 1 minute**

Named standart should be considered when designing new mixed drinks, and fortified with nutrients and growth substances "multi beverages" or other special drinks.

It is known that an important factor in staying microorganisms in bacteriostatic state is osmotic pressure environments. If concentrates (base) subject to pasteurization or drinks of various temperatures, the result of condensation on the surface of water vapor formed local area with low concentration of solids and limited osmotic pressure. This creates the conditions for a rapid exponential multiplication of microorganisms and increase their concentration to levels at

which products become unfit for further use.

In this regard, regulated microbiological standards not canned bases (Table 1).

**Table 1. Microbiological standards for non-canned bases**

| | | | | |
|---|---|---|---|---|
| Total cell | max | 100 | in | 1 g |
| Yeast | max | 5 | in | 10g |
| Disputes filamentous fungi | max | 5 | in | 10g |
| Lactic acid bacteria | max | 5 | in | 1 g |
| Acetic bacteria | max | 5 | in | 1 g |
| E. Owl and bacteria Escherichia stick | absent | | in | 10g |
| Disputes bacteria | max | 10 | in | 1 g |

Effect of dissolved carbon dioxide in beverages has a dual character. Firstly it affects the pH, and secondly its effect is caused by increasing the osmotic pressure of solutions. For non-carbonated beverages without preservatives are necessary sterilized processing, the parameters of which are shown in Fig. 3.

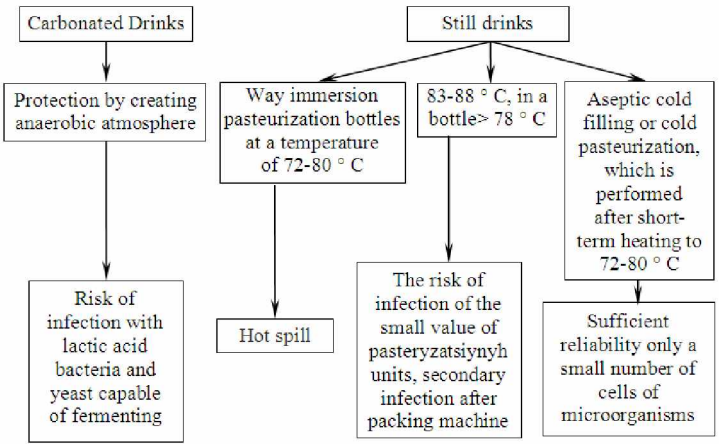


**Fig. 3. Scheme to the terms of the sustainability of carbonated and non-carbonated beverages**

High demands from the standpoint of Microbiology take place for reasons that are used in the manufacture of yoghurt. A sample of the parameters of some of them:

Banana-apple basis - 19o Brix, 2.6% acid, pH 3.4;

multifruit carrot basis - 36o Brix, 2.6% acid, pH 3.4;

orange-apple-strawberry basis - 33o Brix, 1.7% acid, pH 3.7.

Basics due to the high possibility of infection should packing aseptically and 100 g must be neither yeast or lactic acid and acetic acid bacteria. At 10 g should not be present disputes filamentous fungi. The total number of cells should not exceed 1 in 20 h, and the contents of spores of bacteria should be 10 / h. Under such conditions the resistance is 2-3 months at a temperature of 5-10 °C or 4-6 weeks at a temperature of 10-20 oC. Combining a mixture of

fruit and dairy products difficult situation microbiological and temperature pasteurization bases and finished beverages should exceed 85 oC. Although pH <4.0 should ensure microbiological stability, but significant presence in beverages particles of fruit is accompanied by the formation of "alkaline island" with all their consequences. Thanks to the latter, included with dairy products clostridia spores and spore-forming bacteria survive in parameters pasteurization.

## Conclusions

The information and analysis of the literature can note the following.

1. Refusal to use chemical preservatives in conjunction with the development of new fruit and berry foundations meet contemporary needs of society. The latter is particularly relevant with regard to baby food.

2. Select the number of units sterilized by heat treatment should be carried out with the minimum possible while maintaining aseptic packaging equipment.

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