

(2.0) acidity of the stomach, inhibit the activity of β -glucuronidase, azareductase and nitroreductase – enzymes that are formed by intestinal microflora and are absorbed.

Conclusion. Thus, by analyzing current sources regarding the possibilities of using propionic acid bacteria for the treatment and prevention of various human diseases, we can distinguish the following effects of propionic acid bacteria: antibacterial, anticancer, immunostimulating, bifidogenic and total probiotic. Data from many studies show the relevance and potential of using propionic acid bacteria in combination with other probiotic strains to create probiotic agents for therapeutic and prophylactic action.

DEVELOPMENT OF COMPOSITION AND TECHNOLOGY OF BIOPRODUCT BASED ON PROPIONIC ACID BACTERIA AND PLANT RAW MATERIALS

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Introduction. Probiotics have been the subject of intense research focusing mainly on bifidobacteria and lactic acid bacteria. However, there is evidence that lactic propionic bacteria have simply unique and often more significant probiotic properties, whose potential resources are underestimated so far.

In this regard, the use of propionic bacteria in the manufacture of functional fermented beverages is of great interest. Propionic acid bacteria have immunomodulatory, anti-inflammatory, anti-stress and antimutagenic properties, have a bifidogenic effect.

Propionic acid bacteria increase the nutritional value of products as a result of the synthesis of B vitamins, especially the most important for human and animal health and the highly deficient B12.

It is known that the correction of intestinal microflora and, therefore, the prevention of various diseases, traditionally seek the use of lactic acid products prepared with homo-enzymatic lactic acid bacteria.

The use of propionic bacteria for this purpose has not been practiced until recently due to their inability to actively ferment milk, but when combined with propionic bacteria and bifidobacteria, this problem can be solved.

In addition, the combined use of these two types of probiotic cultures causes: the supply of bifidobacteria useful for their growth of bifidogenic substances that synthesize propionic acid bacteria, and bifidobacteria create the initial conditions for milk fermentation due to active acid formation.

That is, the use of propionic acid bacteria as a probiotic component in functional fermented beverages is promising for the development of effective therapeutic and prophylactic products.

Aim. The choice of a rational ratio of propionic acid bacteria and bifidobacteria in the composition of therapeutic and prophylactic.

Materials and methods. *Propionibacterium freudenreichii* (*Propionibacterium freudenreichii* subsp. *Shermanii*) was selected as the main probiotic component.

Dry lyophilized biomass of propionic acid bacteria has good solubility, increased hydrophilicity (85%), which indicates its good quality. Biomass has a significant number of viable cells of propionic acid bacteria $8 \cdot 10^9$ in 0.1 g. As an herbal component, we have chosen cranberry juice, which has many therapeutic effects. As the probiotic culture we have chosen bifido-containing leaven.

The work used classical microbiological methods for working with cultures of probiotics and technological methods for obtaining fermented beverage.

The identification of the cultured microorganisms was carried out by the method of "Gram staining".

Koch dilution preparation. The population of microorganisms is usually quite large, so to obtain isolated colonies it is necessary to prepare a series of consecutive dilutions by the Koch method.

Sowing of microorganisms. The desired dilution is made for 1 ml in a Petri dish; top is filled with nutrient medium Ellinger (40 °C). Performed five replicates and calculated the average result.

The method of determining the total number of bacteria is based on the count of colonies of microorganisms grown on a dense nutrient medium. Recorded were cups with the number of colonies of 150-300 pieces.

pH measurement. It was carried out on an electronic pH meter with a removable electrode to measure the amount of free hydrogen ions in water and any other liquid.

Results and discussion. There are two ways to obtain a cumulative culture of propionic acid bacteria. The first is the traditional one in which the nutrient medium with lactate and yeast extract is inoculated and incubated under anaerobic conditions. The second is the introduction of a cumulative culture of propionic acid bacteria together with the bifido-containing leaven. The advantages of co-cultivation of propionic acid bacteria through the synthesis of the first bifidogenic factors, and the second, the substances those are able to protect the propionic acid bacteria from the toxic effects of excess oxygen, have been discussed earlier. This method is used more often because it does not require additional costs to create anaerobic conditions.

In addition, it is the only possibility to create a fermented beverage based on milk, since no fermentation takes place without the addition of bifidobacteria or lactobacilli. Also, adding bifido-containing leaven will produce a fermented product of high organoleptic quality.

In order to select the optimal ratio of propionic acid bacteria and bifidobacteria, they were co-cultured in milk in the ratios of 1:1, 2:1 and 3:1, cultured and determined the number of cells and the activity of acid accumulation every 24 hours. Bifidobacteria on the surface of the medium are not sown due to severe anaerobiosis of these cultures, so the number of colonies of propionic bacteria was counted on the surface of the medium.

Table 1 - Determination of active acidity and cell number in milk fermentation by different ratios of probiotic cultures

The ratio of cultures	Duration of cultivation	Active acidity, pH	Number of cells in 1 ml
<i>P. shermanii</i> + bifido-containing leaven 1:1	24	5.67	$1.0 \cdot 10^8$
	48	5.69	$1.4 \cdot 10^8$
	72	5.71	$1.6 \cdot 10^9$
	96	5.73	$2.1 \cdot 10^9$
	120	5.74	$2.2 \cdot 10^9$
<i>P. shermanii</i> + bifido-containing leaven 2:1	24	5.79	$1.3 \cdot 10^8$
	48	5.81	$1.5 \cdot 10^8$
	72	5.85	$1.9 \cdot 10^9$
	96	5.89	$2.5 \cdot 10^9$
	120	5.90	$2.6 \cdot 10^9$
<i>P. shermanii</i> + bifido-containing leaven 3:1	24	6.01	$1.6 \cdot 10^8$
	48	6.04	$1.8 \cdot 10^8$
	72	6.09	$2.1 \cdot 10^9$
	96	6.11	$2.7 \cdot 10^9$
	120	6.12	$2.8 \cdot 10^9$

Thus, it can be concluded that the biomass accumulation is more intensive at the ratio of propionic bacteria and bifido-containing leaven 3:1. At a ratio of 2:1 - slightly behind, and at a ratio of 1:1 - the accumulation of biomass is the least. In addition, in all cases also increases the pH, which has a positive effect on the subsequent accumulation of biomass of propionic acid microorganisms.

Conclusions. Thus, for further research on the development of therapeutic and prophylactic product, the ratio of propionic bacteria and bifidobacteria 3:1 and 2:1 is possible.