L3 for life

Study of adaptation properties of the studied microorganisms

When entering the human gastrointestinal tract, probiotic microorganisms encounter twomajor biological barriers: high acidity conditions in the stomach (pH 1.5-3.0) and high bileconditions in the small intestine. Obviously, the microorganism needs to survive under theseconditions before it can exhibit its probiotic properties. Resistance to low pH and bile content inthe medium is an important adaptation factor for lactic acid microorganisms - potential probiotics.To study the ability to develop in the presence of bile in the medium, the studied cultures isolated from the lactic acid products "Chakka" and "Maconi" were grown in the nutrient brothwith different contents of bile. *E. faecium* L3 culture was used as a control culture capable of developing with up to 5 % of bile in the medium.

Table 1. Concentration of cells of cultures grown on medium with different contents of bile

Concentration of bile inthe medium, %	Concentration of microbial cells, lgCFU/ml				
	L. delbrueckii TS1-06	*L. fermentum* TS3-06	*L.delbrueckii* subs. *bulgaricus* LM1	*L.delbrueckii* subs. *bulgaricus* LM2	*E.faecium* L3
5	-	-	-	-	5,3±0,1
2,50	-	-	-	-	5,5±0,1
1,25	-	5,1±0,1	-	-	5,7±0,1
0,60	4,2±0,1	5,2±0,1	4,3±0,1	4,0±0,1	5,7±0,1
0,30	4,5±0,1	5,2±0,1	4,3±0,1	4,4±0,1	5,8±0,1
0,15	4,7±0,1	5,2±0,1	5,1±0,1	4,8±0,1	5,8±0,1
0	7,6±0,1	7,8±0,1	8,2±0,1	8,1±0,1	8,0±0,1

The table above shows that all strains were able to develop with up to 0.6% bile in the medium.

To determine the resistance of microorganisms to low pH, we used the technique proposed by C. Dunn et al. The results of the study are given in Table 2.

Table 2 - Survival rate of the cultures under study at different pH values, lgCFU/ml

Culture	pH	Incubation time, min			
		0	5	30	60
L. delbrueckii TS1-06	1,2 2,5	8,0 ± 0,1 8,0 ± 0,1	0 7,9 ± 0,1	0 5,3 ± 0,1	0 3,7 ± 0,1
L. fermentum TS3-06	1,2 2,5	8,8 ± 0,1 8,9 ± 0,1	0 8,8 ± 0,1	0 8,8 ± 0,1	0 8,7 ± 0,1
L. delbrueckii subs. *bulgaricus* LM1	1,2 2,5	8,0 ± 0,1 8,0 ± 0,1	0 7,8 ± 0,1	0 4,8 ± 0,1	0 3,4 ± 0,1
L. delbrueckii subs. *bulgaricus* LM2	1,2 2,5	8,0 ± 0,1 8,0 ± 0,1	0 7,7 ± 0,1	0 4,6 ± 0,1	0 3,6 ± 0,1
E. faecium L3	1,2 2,5	8,0 ± 0,1 8,0 ± 0,1	7,9 ± 0,1 8,0 ± 0,1	6,0 ± 0,1 8,0 ± 0,1	0 7,7 ± 0,1

The analysis of the ability of microorganisms to survive in the conditions encountered inside the human and animal gastrointestinal tract and which are unfavorable for microorganisms revealed that the most stress-resistant strain is the control strain E. faecium L3. Of the strains isolated from lactic acid starters, strain L.fermentum TS3-06 showed itself as the most resistant. All isolated strains were able to survive at pH 2.