

## Nonculturability and nisin production of *Lactococcus lactis*

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We studied formation of nonculturable forms of three bacteriocin producing strains of *Lactococcus lactis* ssp. *lactis* MGU, 729 and F116 under carbohydrate starvation stress. Two different types of inoculum were applied: A) cells washed twice with normal saline, B) unwashed cells with culture liquid. Resulting total numbers of cells were  $0.637-1.0 \times 10^8$  cells/ml. Populations obtained using type B inoculum demonstrated active growth phase within first 24 hours of incubation (up to  $2.33 \times 10^9$  cells/ml) while those obtained using type A inoculum didn't grow within that period. Type A population of strain MGU showed phenotypic dissociation that resulted in appearance of microcolonies. After that, we observed active growth phase (up to  $5.15 \times 10^9$  cells/ml). Type A cultures of strains 729 and F116 didn't grow during the whole experiment. It was shown that type B populations shifted into nonculturability faster than type A. This is due to differences in metabolic strategies and stress sensitivity of these types of populations. After 10 months of incubation, culturability decreased by 3 orders of magnitude for type A and by 6 orders of magnitude for type B populations. We also observed considerable reduction of cell size for type B populations of strains 729 and F116. Studies of bacteriocin activity showed that in type B population cells were up to 70 times more productive compared to those of type A cultures. This phenomenon can be explained by differences in survival strategies of populations that use antibacterial potential of bacteriocins for their benefit.

### Biography

Pakhomov Yu D. graduated from Lomonosov Moscow State University in 2007 at the age of 24 years. Now, he is a junior researcher and Ph.D. student at FGBU "Mechnikov Research Institute for Vaccines and Sera" RAMS. He has published more than 20 papers in Russian and international journals. He has good reputation in scientific community.

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