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Diversity and stability of lactic acid bacteria and yeast in dense rye sourdough while continuous propagation

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Traditional biotechnology for the bread production is based on sourdough, which is a complex microbial ecosystem mainly constituted by Lactic Acid Bacteria (LAB) and yeasts. The use of pure cultures of LAB and yeasts for starter gives sourdough with desired consuming properties, taste and aroma characteristics. In present work, the changes of starter microorganisms was established during long-term propagation (back-sloping) of sourdough. The bacterial and fungal metagenome in rye-based sourdough was tracked versus time by 16S rRNA and ITS gene pyrosequencing. Viable plate counts of presumptive LAB and yeasts, LAB/yeasts ratio, and acidification rate demonstrated microbial and biochemical changes in the sourdough. Initial flours were mainly contaminated by metabolically active proteobacteria families Enterobacteriaceae and Pseudomonadaceae (genus *Pseudomonas*) and fungi of the genera *Alternaria* (26.26%), *Fusarium*, *Dothideomycetes* and of the orders Capnodiales, Pleosporales, Dothideales. An extremely low content of LAB of the genus *Lactobacillus* (0.1%) was found in rye flour, and yeast was not detected at all. In sourdough prepared with starter cultures of LAB and yeasts after 1 day of propagation, flour microbial population was almost completely inhibited except for the Enterobacteriaceae (15%) and fungi *Alternaria*– (11%). LAB and yeasts were almost exclusively dominative microorganisms. Studies of the microbiota of thick rye starter culture have shown that the species composition of lactobacilli significantly changed during the process of starter culture, which affected the quality indicators of starter cultures. The content of lactic and acetic acids during long-time sourdough fermentation changed significantly along with the change in the type of LAB. The *C. milleri* yeast strain was retained throughout the entire period of sourdough propagation. Funded by Russian foundation for basic research, project № 19-016-00085.

Keywords: Lactic Acid Bacteria, Yeast, Sourdough, Microbiome, Metagenome, Rye Flour.

Biography:

Vadim K. Khlestkin is a Graduated from Novosibirsk State University (NSU) in 1994, defended PhD in Novosibirsk Institute of Organic Chemistry in 1998 (synthesis of nitrogeous heterocycles, hydroxylamine derivatives, nitroxides), 2001 - 2002 Postdoc practice in KU Leuven, Belgium; 2006 - Visiting scientist in University of York (UK); 2006 – 2018 –lecturer in NSU, 2016 – 2018 - Senior Researcher in Novosibirsk Institute of Cytology and Genetics; 2018 – 201 Head of St.Petersburg Branch of the Research Institute of Baking Industry; now – Head of Head of Russian Research Institute of Farm Animal Genetics and Breeding - Branch of the L.K. Ernst Federal Research Center for Animal Husbandry (St.Petersburg, Russia).