

Inter- and intraspecies variability among yeasts isolated from dairy products

sciforum-103420: Liubov Zelena^{1,*}, Nataliia Tkachuk² and Svitlana Zahorodnia³

¹ Zabolotny Institute of Microbiology and Virology, National Academy of Sciences of Ukraine

² T.H. Shevchenko National University "Chernihiv Colehium"

³ Zabolotny Institute of Microbiology and Virology, NAS of Ukraine

Introduction: Yeasts are usually considered the spoiling agents of food products, although they can be used in many fermentation processes, in particular in milk products. As lactic acid bacteria, they contribute some beneficial properties affecting the organoleptic features of dairy products and acting as probiotics. Studying the variability of yeasts isolated from dairy products can broaden our understanding of yeast genome organization and functioning and define some genetic markers to differentiate their species and strains. The purpose of the present study was to examine inter- and intraspecies variability among yeast species isolated from Ukrainian dairy products with the help of several molecular genetic markers.

Methods: Species of *Saccharomyces*, *Kluyveromyces* and *Rhodotorula* genera isolated from dairy products were used in this study. Bioinformatic analysis was carried out on nucleotide sequences of 18S rRNA, 26S rRNA and ITS-sequence from GenBank using the FaBox (1.41), MEGA 10 and Geneious R6 programs. Molecular genetic analysis was performed by ISSR PCR and RT-qPCR.

Results: The results of the bioinformatic analysis showed a strict differentiation between *Ascomycota* and *Basidiomycota* species using conservative sequences of rRNA genes and ITS-sequences. Molecular genetic analysis using ISSR markers revealed a high level of inter- and intraspecies variability of yeast species. The size of the amplification products varied from 300 to 3000 bp; the number of amplicons in the total spectrum for each species was 16–33; and the percentage of intraspecies polymorphisms was 68–100%. A high level of variability in the expression of flocculin genes, which could be associated with different adhesive properties, was also detected between the various species and strains.

Conclusions: The results obtained in this study showed that the highest level of polymorphic loci was observed between *K. marxianus* strains using ISSR markers. Relevant and informative markers were suggested to analyze the inter- and intraspecies diversity of yeast isolated from dairy products.



© 2024 by the author(s). Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).