of *B. velezensis* IMV B-8134 and the complex inoculation of Ryzobin^{K} + *B. velezensis* IMV B-8134. In the variant with bioprimed plants, the number of infected plants was three times lower than the control. At the same time, soybean yield in the variants with complex inoculation and with bioprimed plants was 20.9 % and 38.4 % higher than the control, respecttively. This effect was probably achieved due to the synergistic action of the studied rhizobial and non-rhizobial endophytic bacteria, which improved nitrogen nutrition, provided protection against biotic and abiotic stresses, and stimulated soybean growth and productivity.

Thus, the obtained results indicate that the use of a complex inoculant based on the association of complementary rhizobia and the non-rhizobial endophytic strain *B. velezensis* IMV B-8134 contributed to the reduction of soybean damage by Alternaria blight under natural infection background, as well as to the increase in productivity. These effects persisted in the next generation of plants.

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PRODUCTION OF BIOETHANOL AND HIGH-VALUE SUBSTANCES BY NON-CONVENTIONAL YEASTS

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Abstract. The non-conventional yeasts *Ogataea polymorpha* and *Candida famata* were studied as hosts for the production of ethanol, L-lactic acid, and riboflavin from xylose, glycerol, and lignocellulosic hydrolysates. Metabolic engineering and selection improved ethanol production by

O. polymorpha from pentose sugars and enabled L-lactic acid production from lignocellulosic substrates. Metabolic engineering of *C. famata* resulted in strains with increased riboflavin production from xylose, lignocellulosic hydrolysates, and crude glycerol. The obtained strains provide a basis for further development of yeast-based production processes using lignocellulosic sugars and glycerol as carbon sources.
Keywords: *Ogataea polymorpha, Candida famata*, bioethanol, L-lactic acid, riboflavin, metabolic engineering.

Production of the bioethanol and high-value chemicals from lignocellulosic hydrolysates has important economic and environmental issues. We study ethanol, lactic acid and riboflavin synthesis by the industrially important non-conventional yeasts *Ogataea polymorpha* and *Candida famata*. Using approaches of metabolic engineering and classical selection, strains of the thermotolerant yeast *O. polymorpha* have been constructed accumulating more than 20 g/L of ethanol from abundant lignocellulosic sugar xylose which 50 times exceeded ethanol production by the wild-type strain. Ethanol production from another important pentose sugar L-arabinose was also increased. Constructed strains also accumulated increased amounts of ethanol in lignocellulosic hydrolysates. The strains of *O. polymorpha* producing enhanced amounts of ethanol from pure and crude glycerol also have been isolated.

Recombinant strains of *O. polymorpha* producing lactic acid in lignocellulosic hydrolysates were constructed. Yeast *C. famata* is capable of riboflavin overproduction under iron starvation. Previously, robust genetically stable *C. famata* riboflavin overproducers in iron-rich glucose media have been isolated. Using metabolic engineering approaches, the strains of *C. famata* accumulating elevated amounts of riboflavin from xylose, lignocellulosic hydrolysates and crude glycerol (by-product of biodiesel production) have been constructed. Future prospects of the current research and possible industrial implementation will be discussed.

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WHOLE-GENOME SEQUENCING, BIOACTIVITY, ADAPTIVE POTENTIAL AND PHYTOSTIMULATORY PROPERTIES OF *AMYCOLATOPSIS ROODEPOORTENSIS* Y13 ISOLATED FROM WAR-IMPACTED SOIL

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Abstract. The actinomycete strain *Amycolatopsis roodepoortensis* Y13, isolated from war-impacted soil, was subjected to whole-genome sequencing, biosynthetic gene clusters for secondary metabolites together with resistance determinants for heavy metals were detected in the genome. The strain tolerated elevated concentrations of copper and zinc as well as increased salinity, displayed high sensitivity to aminoglycosides and vancomycin, and exhibited antagonistic activity against several