Abstract

Yeasts are unicellular microorganisms which are able to form colonies. The morphology of colonies is characteristic for the strain and differs according to particular growth conditions. *Saccharomyces cerevisiae* colonies are able to produce volatile ammonia which functions as a signalling molecule alarming nutrient depletion (PALKOVÁ *et al.* 1997). Changes in gene expression, metabolism and ammonia production occur during the development of giant *S. cerevisiae* colonies. Genes with changes in expression have been identified to be involved in ammonia transport, amino acid metabolism and also in nucleotide metabolism. Genes, whose deletion may affect the induction of ammonia production have been described (ČÁP *et al.*, 2010), (VÁCHOVÁ a PALKOVÁ 2005), (PALKOVÁ *et al.* 2002). This work is focused on studying of an impact of deletions of selected genes involved in nucleotide metabolism, as well as of changes in extracellular concentrations of different bases on growth, morphology, ammonia production, cell morphology and differentiation of giant *S. cerevisiae* colonies. *S. cerevisiae* strains producing Gfp-tagged proteins (Ade4p-Gfp, Adk1p-Gfp, Urk1p-Gfp, Fcy2p-Gfp, Fur4p-Gfp, Fcy22p-Gfp) have been constructed and analyzed. Development of *S. cerevisiae* giant colonies with deletions of selected genes (*ADE5,7, ADE4, ADK1, APT1, HPT1, FCY22, URA3*) was monitored during their cultivation on media with various concentrations of added purine or pyrimidine bases; colony growth, morphology, ammonia production, cell morphology and differentiation was followed. It was found that colonies of strains with deletions of genes involved in purine metabolism significantly reduce ammonia production and in some cases exhibit altered morphology and cell differentiation (deletions of ADK1, ADE4 and ADE5,7 genes). Changes in concentrations of purine bases (adenine, guanine) in the media may affect cell morphology, differentiation and morphology of colonies of mutant strains.