# Influences of dynamic population on Pb immobilization in yeast

ZHIJUN WANG[1], YING ZHANG[1], YUANYUAN GENG[1], ZHEN LI[1*]

[1] College of Resources and Environmental Sciences, Nanjing Agricultural University, Nanjing, Jiangsu 210095, China (*corresondence: lizhen@njau.edu.cn).

**Abstract**

Heavy metal contaminations are threatening public health and sustainable development. Stress of heavy metals would inhibit the enzymatic functions of cells, destroy the structure of nucleic acids, and interfere with the absorption of essential nutrients. Budding yeast, undergoing asymmetric segregation during budding, has been a resonable model system to investigate influences of heavy metal stress. Previous studies have been focused on variable stress-sensitivity of individual cells. However, that how budding influences heavy metal transportation/immobilization is still unknown. We carried out the experiments based on *Rhodotorula mucilaginosa*, a typical budding yeast. We explored the dynamic population of *Rhodotorula mucilaginosa* under $Pb^{2+}$ stress via monitoring cell growth, budding rate and heavy metal heterogeneous sorption. Under Pb stress, the lag phase was extended and the maximum cell density decreased. In the logarithmic phase, buding rate of leaded cultures was double to triple that of cultures without stress. The Pb concentration on yeast cells was semi-quantitatively investigated by SEM-EDS. A total of 30 yeast cells from 72h culture (under 1000 mg/L $Pb^{2+}$ stress) was analyzed, including 19 budding cells. The EDS results showed the heterogeneous sorption of Pb cations between mother cells and their buds and half of which are Pb-free. This study elucidated that the dynamic population should be addressed during investigating metal immobilization by microorganisms.