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Mobile toilets chemicals: Its influence on activated sludge microorganisms

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ur work focuses on the wastewater treatment process, especially on the activated sludge. The activated sludge is composed of varied groups of microorganisms which play the crucial role in the removal of the organic matter and nitrogenous substances from the wastewater. In the previous study we found out that the chemical substances used regularly as toilet chemistry negatively influence respirometric activity of the activated sludge. Regarding this fact, we decided to isolate different bacterial strains from the activated sludge to study the influence of the chemical substances on bacterial growth characteristics and mainly on the length of the lag phase. Lag phase is defined as the period where the individual bacteria are maturing and not yet able to divide. They adapt themselves to the new growth conditions. We isolated three bacterial strains from the activated sludge obtained from the municipal wastewater treatment plant in Modřice, Czech Republic (513.000 PE). The bacterial strains were cultivated on nitrate broth medium and on the basis of morphological features and Sanger's sequencing of the DNA we have determined them as Paracoccus aminophilus, Ralstonia pickettii and Psychrobacter sp. The growth of these bacterial strains was measured by the microplate reader Tecan Sunrise[™] (Tecan Trading AG, Switzerland). The samples examined contained inoculum of the strains mentioned above (P. aminophilus, R. pickettii and Psychrobacter sp.) and the pure chemical substances in the appropriate concentrations. The results were evaluated by equations of bacterial growth. The length of the lag phase differs depending on the nature of the chemical substances. Bronopol, a substance frequently used in mobile toilets, prolongs the lag phase very significantly. On the other hand, limonene or citric acid shortens the time of bacterial adaptation. The retention time of wastewater in the activation tank lies usually in the range of 6 to 8 hours. Regarding the extended lag phase the bacterial metabolism is insufficient for the properly treated wastewater.

Biography

Vitezova M graduated her PhD studies in Microbiology in 2000 and was habilitated in 2014. She works as Head of Section of Microbiology at Masaryk University in Brno. She established the Laboratory of Anaerobic Microorganisms. She focuses on the study of methanogenic archaea and sulfate reducing bacteria in the environment, wastewater treatment process and biogas production process.

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