

Abstract

Actinobacteria are important members of the soil ecosystems, where they are involved in organic matter decomposition. It is worth mentioning that their secondary metabolism allows them to produce a variety of different compounds. These compounds include antibiotics, among them aminoglycosides have a place in clinical practice. These antibiotics are significant due to a broad spectrum of activities against both gram-negative and gram-positive bacteria. However, their use currently carries a risk, mainly their toxicity and development of antibiotic resistance in bacteria. Resistance is the cause of low effectiveness of some of those antibiotics. Actinobacteria as aminoglycoside producers must protect themselves from these compounds, so a variety of resistance types was developed, out of which enzymatic inactivation is the most studied one. Actinobacteria have evolved several mechanisms, which contribute to a resistance to the agents with antimicrobial effects. Genes encoding antibiotic resistance are abundant in soil environment. Their variability is influenced by many factors, especially the selection of bacteria in soil contaminated with antibiotics and also with strains originating from human and animal waste. Significant role has a horizontal gene transfer, which allows distribution of resistance genes between phylogenetically unrelated bacteria.