

ABSTRACT

Streptomycetes, primary soil saprophytic microorganisms are at the center of interest in many research groups, mainly because of their ability to produce a wide range of biologically active substances useful in medicine, biotechnology and agriculture. The marginal, and little explored areas are the interactions that streptomycetes create with humans. Recent metagenomic studies have shown that streptomycetes colonize the skin, the respiratory and possibly the urogenital tract of humans. In addition to apparent pathogens such as *S. somaliensis* and *S. sudanensis*, the clinical impact of these streptomycetes on human health is unknown. For this reason, a unique collection of non-pathogenic streptomycetes isolated from human clinical specimens was developed. The isolates were collected by the National Reference Laboratory for Pathogenic Actinomycetes in Trutnov, Czech Republic. On the basis of pilot studies, an isolate labeled TR42 was selected from the Trutnov collection, showing a very broad spectrum of biological activities. This strain was isolated from sputum from a patient with unknown respiratory diagnosis. The TR42 strain exhibits considerable biotechnological potential and after following a thorough study, it could be a source of new biologically active substances with pharmaceutically attractive properties. The present work is focused on the identification and characterization of specific adaptation mechanisms of the TR42 strain to the human lung environment, especially in production of hemolytic, antimicrobial and immunomodulatory agents. In particular, the effect on lung microbiome (both physiological and pathological) and human monocytic cells from the THP-1 line are investigated. The findings are used to evaluate the clinical impact of TR42 streptomycetes on human health.