



# *Streptomyces soli* sp. nov., isolated from birch forest soil

Jialing Xing<sup>1</sup> · Xu Jiang<sup>1</sup> · Delong Kong<sup>1</sup> · Yiqing Zhou<sup>1</sup> · Miaomiao Li<sup>1,2</sup> · Xiaoyan Han<sup>1,2</sup> · Qingyun Ma<sup>1</sup> · Hao Tan<sup>1</sup> · Zhiyong Ruan<sup>1</sup>

Received: 17 November 2019 / Revised: 22 March 2020 / Accepted: 1 April 2020  
© Springer-Verlag GmbH Germany, part of Springer Nature 2020

## Abstract

A Gram-staining positive, aerobic, non-motile, rod-shaped bacterium, designated strain LAM7114<sup>T</sup>, was isolated from soil sample collected from a birch forest in Xinjiang Uygur Autonomous Region, China. The optimal temperature and pH for the growth of strain LAM7114<sup>T</sup> were 30 °C and 7.0, respectively. Strain LAM7114<sup>T</sup> could grow in the presence of NaCl up to 10% (w/v). Comparative analysis of the 16S rRNA gene sequences revealed that LAM7114<sup>T</sup> was closely related to the members of the family genus *Streptomyces*, with the highest similarity to *Streptomyces urticae* NEAU-PCY-1<sup>T</sup> (98.3%) and *Streptomyces fildesensis* GW25-5<sup>T</sup> (98.2%). The genomic G + C content was 70.0 mol%. The DNA-DNA hybridization values between strain LAM7114<sup>T</sup> and *S. urticae* CCTCC AA 2017015<sup>T</sup>, *S. fildesensis* CGMCC 4.5735<sup>T</sup> were 32.5 ± 1.8% and 27.5 ± 2.6%, respectively. The cell wall contained LL-diaminopimelic acid as the diagnostic diamino acid in the peptidoglycan. The whole-cell hydrolysates included glucose and mannose. The major fatty acids were anteiso-C<sub>15:0</sub>, iso-C<sub>15:0</sub> and iso-C<sub>16:0</sub>. The predominant menaquinones were MK-9(H<sub>6</sub>), MK-9(H<sub>4</sub>) and MK-9(H<sub>8</sub>). The main polar lipids were diphosphatidylglycerol, phosphatidylethanolamine, phosphatidylinositol, three unidentified aminophospholipids, three unidentified phospholipids, and an unidentified aminolipid. Based on the phenotypic characteristics and genotypic analyses, we propose that strain LAM7114<sup>T</sup> represents a novel species in the genus *Streptomyces*, for which the name *Streptomyces soli* sp. nov. is proposed. The type strain is LAM7114<sup>T</sup> (=CGMCC 4.7581<sup>T</sup>=JCM 32822<sup>T</sup>).

**Keywords** *Streptomyces* · 16S rRNA gene · Soil · Polyphasic taxonomy

## Introduction

The genus *Streptomyces* belongs to the family *Streptomycetaceae* and was first described by Waksman and Henrici (1943) and currently encompasses more than 854 species with validly published names (<https://www.bacterio.net/streptomyces.html>) (Parte 2013, 2018). They have been found to be widely distributed in various habitats including soil (Také

et al. 2018; Mohammadipanah et al. 2014), rhizosphere soil of wheat (Tian et al. 2018), animals (Bai et al. 2016; Liu et al. 2016), potato tubercle (Da Silva et al. 2013), and fresh water (Ray et al. 2014). Isolates in *Streptomyces* are used extensively in the medical industry due to their ability to produce antibiotics, enzymes, enzyme inhibitors and anti-tumour agents (Ma et al. 2017; Chun et al. 1997). *Streptomyces* isolates are aerobic, Gram-stain positive actinobacteria that have a high DNA G + C content (66.0–78.0 mol%) (Kämpfer 2012). In the present paper, we report the classification and characterization of strain LAM7114<sup>T</sup> and propose a novel species of the genus *Streptomyces*.

Communicated by Erko Stackebrandt.

**Electronic supplementary material** The online version of this article (<https://doi.org/10.1007/s00203-020-01878-z>) contains supplementary material, which is available to authorized users.

✉ Zhiyong Ruan  
ruanzhiyong@caas.cn

- <sup>1</sup> Institute of Agricultural Resources and Regional Planning, CAAS, Beijing 100081, China
- <sup>2</sup> College of Bioscience and Engineering, Jiangxi Agricultural University, Nanchang 330045, People's Republic of China

## Materials and methods

### Isolation and cultivation of bacterial strains

During an investigation on tetracycline resistant bacteria, a novel bacterial strain, designated LAM7114<sup>T</sup> was isolated