Title: Isolation, identification, and the growth promoting effects of two antagonistic actinomycete strains from the rhizosphere of *Mikania micrantha* Kunth

Authors: Dandan Han, Lanying Wang, Yanping Luo

PII: S0944-5013(17)31270-3
DOI: https://doi.org/10.1016/j.micres.2018.01.003
Reference: MICRES 26121

To appear in:

Received date: 29-8-2017
Revised date: 24-12-2017
Accepted date: 11-1-2018

Please cite this article as: Han Dandan, Wang Lanying, Luo Yanping.Isolation, identification, and the growth promoting effects of two antagonistic actinomycete strains from the rhizosphere of Mikania micrantha Kunth.*Microbiological Research* https://doi.org/10.1016/j.micres.2018.01.003

Isolation, identification, and the growth promoting effects of two antagonistic actinomycete strains from the rhizosphere of *Mikania micrantha* Kunth

Dandan Han, Lanying Wang, and Yanping Luo*

Hainan key laboratory for sustainable utilization of tropical bioresource, Institute of Tropical Agriculture and Forestry, Hainan University, Haikou 570228, Hainan Province, China

* Corresponding author at No 58. People's Avenue, Haikou 570228, China. Tel.: +0086 89866192915; fax: +0086 89866192915. E-mail address: yanpluo@126.com

Dandan Han, 1052046071@qq.com

Lanying Wang, daivemuwly@126.com

Yanping Luo, yanpluo@126.com

Abstract

Actinomycetes are an important group of gram-positive bacteria that play an essential role in the rhizosphere ecosystem. The confrontation culture and Oxford cup method were used to evaluate the antagonistic activities of strains, which were isolated from the rhizosphere soil of *Mikania micrantha*. The two isolates were identified using morphological and physiological tests combined with 16S rRNA-based molecular analysis, respectively. The type I polyketone synthase (PKS-I) was amplified. The constituents of fermentation metabolites were analyzed by gas chromatography mass spectrometry. The plant growth promoting effect was determined. Finally, the growth of wheat seedlings was assessed using the Petri dish method. Overall, of the isolated twelve strains, WZS1-1 and WZS2-1 could significantly inhibit target fungi. Isolate WZS1-1 was identified as *Streptomyces rochei*, and WZS2-1 was identified as *Streptomyces sundarbansensis.* In particular, *Fusarium graminearum* (FG) from wheat was inhibited by more than 80%, and the inhibitory bandwidths against FG were 31±0.3 mm and 19±0.5 mm, respectively. The genes PKS-I were successfully amplified, confirming that these strains are capable of producing biosynthetic secondary metabolites. Major component analysis revealed aliphatic ketones, carboxylic acids, and esters, with *n*-hexadecanoic acid being the most abundant compound. Plant growth promoting test indicated that both strains produced IAA, presented with orange loops on CAS plates, dissolved phosphorus and potassium, fixed nitrogen, but did not