Characterization of endophytic *Streptomyces* from cocoyam (*Xanthosoma sagittifolium* L. Schott) roots, their antagonistic activities and plant growth promoting effects on cocoyam tissue culture plantlets.

P.F. Kouomou Djuidje[1,2]. T. Boudjeko[1,3*]. W. Asultan[4]. S. B. Nouemssi[1]. S. Lerat[2]. C. Beaulieu[2] and M-Y Wong[4,5*]

[1] Laboratory of Phytoprotection and Valorization of Plants Resources, Biotechnology Centre-Nkolbisson, P.O. Box 3851, Messa, Yaoundé, Cameroon;
[2] Centre SEVE, Département de Biologie, Université de Sherbrooke, J1K2R1 Sherbrooke, Quebec, Canada;
[3] Department of Biochemistry, Faculty of Science, University of Yaoundé 1, P.O. Box 812, Yaoundé, Cameroon;
[4] Department of Plant Protection, Faculty of Agriculture, Universiti Putra Malaysia, 43400 Serdang, Malaysia;
[5] Institute of Plantation Studies, Universiti Putra Malaysia, 43400 Serdang, Malaysia.
***Corresponding author: djuidjepeguy@gmail.com**

Abstract

The focus of this study was to isolate, evaluate and characterize endophytic actinobacteria from cocoyam roots collected in the localities around Mount Cameroon for their potential antagonistic activities against *P. myriotylium*, the major limit of growth and productivity of this crop in Cameroon and worldwide, and their ability to promote plant growth. 171 actinobacteria were isolated from healthy white cocoyam roots. Seven of the tested actinobacteria inhibited the hyphal growth of *P. myriotylum*, *P. megkarya*, *F. oxysporum* and *C. gloeosporioides* in vitro. Four of them (PERM1, PERM2, PERM4 and PERM5) were further selected on the basis of their strongest antagonistic activity in vitro *against P. myriotylum*. These four isolates were subsequently identified using phenotypic and molecular tests, characterized for extracellular hydrolytic enzymes, plant growth promoting (PGP) traits and their effects were evaluated on tissue culture-derived cocoyam plantlets. The sequencing of the 16S rRNA genes and alignment with sequences retrieved from GenBank databases indicated that PERM2 and PERM4 were clustered alone in a different subclade although closely to *Streptomyces samsunensis* and *Streptomyces brunneogriseus* respectively. The comparisons of some physiological and biochemical property of PERM2 and PERM4 with the most closely related *Streptomyces* species show that these strains differs phenotypically. PERM2 and PERM4 might represent new species. All selected *streptomyces* were able to produce siderophores, IAA, ACC deaminase and phosphate solubilisation. The isolate PERM2, with maximum IAA (20.30 µg/ml) produced, increased significantly root length compare to positive control. These results suggest the possibility of using endophytic *Streptomyces* strains especially isolate PERM2 in the protection of cocoyam against root rot disease and in the promotion of cocoyam roots growth.

Keywords Cocoyam (*Xanthosoma sagitifolium*), *P. myriotylum*, endophytic *Streptomyces*, characterization, dual culture assay, Plant Growth Promotion.