35th Special Seminar on The IDEC Institute, SmaSo Seminar, 21th PHIS Seminar

Date: Feb,5TH , 2024, 14:00~
Place: Hiroshima University, Graduate School of Advanced Sciences of Matter Build, 6F Seminar room
Online: https://00m.in/xB68I

Title : **In situ cultivation approach to increase the culturable PGPB diversity in the plant rhizobiome**

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Abstract

The use of high-throughput DNA sequencing (HTS) has revealed the great diversity of rhizobacteria in plant rhizospheres; however, only a minor portion (≤ 1%) of rhizobacteria belonging to few taxa can be cultured under laboratory conditions. In recent years, in situ cultivation has opened a window to explore a greater diversity of bacterial taxa in the environment. In this context, the microwell chambers (MWC) and fungal highway columns (FHC) has received increasing attention as a type of in situ cultivation approach to isolate rare bacterial taxa and bacterial-fungal couples, respectively. Here, we explored culturable rhizobacterial communities associated with the rhizosphere of plants by using both MWC and FHC techniques. Our results shown that the most abundant phyla isolated were Pseudomonadota (70.4%), Bacilliota(24%), Actinomycetota (4%), and Bacteroidetes (1.5%). Members of less studied PGP taxa such as Lelliottia, Delftia, Variovorax and Bosea were obtained with MWC. Couples of fungi and associated migrator bacteria were isolated, which included the fungal genera Mucor and Fusarium, and the rare bacterial genera Brucella, Cryseobacterium, Leucobacter, Kaistia, Chitinophaga and Chryseobacterium. Notably, a higher number of strains exhibiting PGP traits (e.g., tryptophane—induced auxin synthesis [IAA] or 1-aminociclopropane-1-carboxylate deaminase activity [ACCD]) were found by using FHC compared to the MWC techinique. Additionally, a significant increase of ACCD activity were found in dual bacterial consortia with respect their single bacterial strains, particularly in consortia with Variovorax sp. strain. This study demonstrates that in situ cultivation represents a useful tool to isolate and characterize novel PGPB, which potential to use as part of cooperative microbial consortia.

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