

Direct Screening and Isolation of Microorganisms for a Biofertilizer Formulation

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Among genomic tools, metagenomics has the potential for characterizing large-scale population of bacterial genomes from environmental samples, without the need of isolation and growth. In this work, a metagenomic survey for bacteria present in three different substrates, namely soil, compost and digestate, were carried out. Bacteria belonging to genus with agricultural importance, such as plant growth promotion (PGP), were selected for further analysis. Briefly, bacteria with putative PGP activities were isolated and cultivated toward the goal of formulating a biofertilizer. Samples from soil, compost and digestate were culture in selective media (NBRIP, Pikovskaya Agar, Ashby Agar, NFB, R2A, FMA and Chitin Agar for the isolation of *Lysobacter*, *Varioborax*, *Azospirillum*, and *Paenibacillus*). A total of 152 strains were isolated, corresponding to 47, 42 and 63 from soil, compost and digestate; respectively. Then, pure bacterial strains were assessed as PGP agents by evaluating the production of indol acetic acid, gibberellic acid, and siderophore, as well as seed germination. Forty bacterial strains that showed PGP activity were tested for antagonistic behaviors. At last, 17 strains were selected for PGP effects on *Dactylis glomerata* L. Strains with the higher PGP activities were identified as *Microbacterium* sp., *Enterobacter ludwigii* and *Rahnella aquatilis*. Taken together, the combination of metagenomic information and classical lab procedures allowed to formulate a novel biofertilizer for plant growth promotion, which is the first step to improve crop productivity.

Biography:

M. C. Laura Jeannette García Barrera is a Researcher of CIBA-IPN, México. She studied Environmental Engineering at UPAEP, México. She has a Master's degree in Sciences in the specialty of Biotechnology from CINVESTAV, México. Has experience evaluating the antifungal activity of plant extracts and works with molecular biology of viruses, bacteria and fungi. Has participated in projects in collaboration with the industry and is currently studying the use of biofertilizers and their impact on microbial communities in soils.