The Limits of Pseudomonas chlororaphis O6 under Osmotic Stress

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Pseudomonas chlororaphis O6 (PcO6) is a naturally-occurring bacteria that grows on wheat roots in commercial fields in Cache Valley, Utah. PcO6 allows plants to survive longer in droughts by triggering the closure of stomata and inhibiting root growth in order to decrease the amount of water loss. This leads to the wider question of whether PcO6 can have application in agriculture in arid environments. One issue is that arid soils often are highly saline. This research tests whether PcO6 grows under high levels of osmotic stress. Single colonies were isolated and eight sets of a ten-fold serial dilution of the cells were prepared. Broth media were made with 0.00, 1.5, and 5.00 g of PEG 8000 and 0.00, 1.25, 2.50, 3.75, 7.50, and 10.0 g sodium chloride per 50 mL of agar solution. Shaking cultures and agar plates (two plates per concentration) were inoculated with 1 X 10^8 PcO6 cells and incubated for 48 hours in a growth room. PcO6 growth was observed in all of the PEG conditions. PcO6 growth was observed in 1.25, 2.50, and 3.75 g of sodium chloride. These data suggest that PcO6 can grow in soil conditions generally considered highly saline. This indicates there is potential for crops inoculated with PcO6 to have increased viability in arid and high saline conditions.

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