



## **Transport and fate of live/dead plant growth-promoting bacteria (PGPB) in soil**

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The transport and fate of PGPB in soil is affected by soil and water properties (e.g., soil particle size distribution and surface properties, water content, organic matter content etc.) and bacteria's surface characteristics (e.g., surface charge, hydrophobicity, cell size and shape etc.). When implemented to the root zone via subsurface or surface water source, some PGPB may die naturally or non-naturally (e.g., toxicity of low water quality). We hypothesized that live and dead PGPB have different surface properties, thereby their transport and retardation in soil will exhibit different characteristics. *Azospirillum brasilense* is commonly employed as a PGPB that can produce phytohormones and fix nitrogen. In this study, two *A. brasilense* strains (Cd and Sp7) were used in a flow through soil column transport experiment under saturated conditions. The strains were applied with different ratios of live and dead bacteria. The established breakthrough curves (BTC) of live, dead bacteria and their mixture were different. The live bacteria moved faster than dead bacteria. For example, after a pulse input (10 pore volumes) of bacteria suspension (100% live or 100% dead bacteria), the recovery of live bacteria in the leachates was 12~38% higher than dead bacteria. Competitive adsorption isotherms, contact angle, zeta potential and fluorescence microscopy observation were used to explain the measured BTCs. The results of this study will be presented and their implications for PGPB inoculation in the root-zone will be discussed.