

Degradation of millimolar concentration of the herbicide dalapon (2,2-Dichloropropionic Acid) by rhizobium Sp isolated from soil

Abstract

The herbicide Dalapon is widely used in agricultural areas and is persistent in ground water. A Rhizobium sp. was able to grow at 0.2 mM 2,2-dichloropropionic acid (2,2DCP), which was 100-fold lower than the concentration of the substrate routinely used. Apparently, no new dehalogenases are required to allow growth on this low concentration of 2,2DCP as judged by electrophoretic mobility of dehalogenase proteins in native-PAGE analysis and protein separation by anion-exchange column chromatography. The kinetic analysis suggested that the known dehalogenases were able to act efficiently on low concentrations of haloalkanoic acids. The amount of each dehalogenase, from cells grown on low substrate concentration was different compared to that seen at 20 mM 2,2DCP due to complex regulatory controls, which respond to the growth environment.