

## Biosynthesis and accumulation of polyhydroxybutyrate by the marine bacterium *Roseovarius nubinhibens* ISM

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Cells of the climatically active marine bacterium *Roseovarius nubinhibens* ISM were found to accumulate polyhydroxybutyrate (PHB) under conditions of phosphorus or nitrogen limitation. PHB production varied between 26 and 30% of the cellular weight after 48 h of experimentation, with the polymer composed entirely of 3-hydroxybutyric acid monomeric units. qPCR results showed up-regulation of PhaP but not PhaC during stress induced PHB formation. PHB rich cells showed a greater resistance to H<sub>2</sub>O<sub>2</sub> and temperature than their PHB negative counterparts.

As PHB is known to be produced by bacteria as an intracellular carbon storage material when essential nutrients become limiting, we hypothesize that PHB accumulation may be an overlooked aspect of the marine carbon cycle. For the most part the major oceanic gyres are either nitrogen or phosphorus limited. PHB formation and hence carbon sequestration under such nutrient starvation conditions could provide a competitive advantage to those bacteria capable of PHB and other polyhydroxyalkanoates accumulation, providing a potentially new source of microorganisms capable of polyhydroxyalkanoates production for industrial purposes.

### Biography

Juan Francisco Villarreal-Chiu has completed his Ph.D. at the age of 30 from Queen's University Belfast (Belfast, United Kingdom) and joined the faculty of the School of Chemical Sciences of the University of Nuevo Leon (Universidad Autónoma de Nuevo León, San Nicolas de los Garza, Mexico). His research program centers on the investigation of the biosynthesis of bioproducts such as methane, polyphosphate and polyhydroxyalkanoates, and the biodegradation of contaminants such as BTEX and pesticides of organophosphorus origins.

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