Sahoo et al. (2017) Can J Biotech, Volume 1, Special Issue, Page 50
https://doi.org/10.24870/cjb.2017-a37

Canadian Journal of Biotechnology

ISSN 2560-8304

Poster Presentation **OPEN ACCESS**

Category: Bioinformatics

In silico design of PHA synthase and its validation by PHAs producing bacterial isolates

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Abstract

Biopolymers are important alternatives to the petroleum-based plastics due to environment friendly manufacturing processes, biodegradability and biocompatibility. Therefore use of novel biopolymers such as polylactide, polysaccharides, aliphatic polyesters and polyhydroxyalkonoates (PHAs) is of interest. PHAs are biodegradable polyesters of hydroxyalkanoates (HA) produced from renewable resources by using microorganisms as intracellular carbon and energy storage compounds. Even though PHAs are promising candidate for biodegradable polymers, however, the production cost limits their application on an industrial scale. Therefore an attempt was made to model different PHAs synthases which are the key enzyme in the biosynthesis of Polyhydroxyalkanoates as the structural information of this enzyme is in dark veil.Then molecular docking of class I PHA Synthase from *Ralstonia Eutrophia* was done to study the PHA synthase activity. As there are lots of strain which needs to explore for the production of PHA. This investigation leads to find out the most industrial applicable microbes. Few bacterial isolates from soil sample were screened for production of PHA followed by the validation of the enzymatic activity and its product characterization to understand its structural properties.

Citation: Sahoo, S., Mohapatra, S., Rath, S.N., Balabantray, S. and Hazra, S. *In silico* design of PHA synthase and its validation by PHAs producing bacterial isolates [Abstract]. In: Abstracts of the NGBT conference; Oct 02-04, 2017; Bhubaneswar, Odisha, India: Can J biotech, Volume 1, Special Issue, Page 50. https://doi.org/10.24870/cjb.2017-a37