

3<sup>rd</sup> International Conference and Exhibition on

# Biopolymers & Bioplastics

September 12-14, 2016 San Antonio, USA

## Application of polyhydroxyalkanoates and exopolysaccharides produced by Haloarchaea in biopolymer and bioplastic industry

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**H**aloarchaea are a distinct evolutionary branch of the domain Archaea, which generally comprise the leading prokaryotic population of hypersaline environments. Haloarchaea mainly produces two major groups of macromolecules that are called exopolysaccharide (EPS) and polyhydroxyalkanoate (PHA). EPSs have several industrial applications, for instance their biosurfactant activity in bioremediation of oil-spilled sites, and its role in pharmaceutical and food-processing fields. PHAs are a group of polyesters. In the presence of excess carbon substrates, certain Haloarchaea synthesize PHAs and deposit them as energy storage intracellular granules. PHAs have thermoplastic features and are biocompatible and biodegradable “green plastics” that are considered as potential substitutes for petrochemical-derived plastics. Therefore they can be employed for daily supplies (plastic bags), biomedical materials (artificial blood vessels) and as biodegradable carriers for slow delivery of drugs. PHAs can be produced from reproducible resources such as carbohydrates, which makes their manufacturing independent of the availability of finite fossil feed stocks and also their biodegradation process resulting merely in CO<sub>2</sub> and H<sub>2</sub>O, the basic materials for the photosynthesis by green plants. The PHAs that are produced by Haloarchaea have several benefits in comparison with those from members of the domain Bacteria; First, they are produced from unrelated cheap carbon sources; second, there is no need for strict sterilization, and third, their isolation is much easier. The archaeon *Haloferax mediterranei* is the best PHA producer of the family *Halobacteriaceae* until now. PHAs currently are industrially produced under the commercial name “Mirel” by the company Metabolix in USA using a recombinant *Escherichia coli* strain.

### Biography

Masoud Hamidi has completed his PhD from Tabriz University of Medical Sciences. He is Assistant Professor of Pharmaceutical Biotechnology in Guilan University of Medical Sciences. He has published more than 15 papers in reputed journals.

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