

Polyhydroxybutyrate (PHB): Highly Porous Scaffold for Biomedicine

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Abstract : Polyhydroxyalkanoates (PHAs) are biocompatible and biodegradable polymers produced by a wide range of bacterial strains. These biopolymers are significantly studied for drug delivery and tissue engineering applications because of their fascinating physicochemical properties. Polyhydroxybutyrate (PHB) scaffold that has been extracted from a novel bacteria using oil wastewater was selected to study. Some physical parameters affecting scaffold properties such as PHB concentration, solvent evaporation speed, and ultrasonic time were investigated. Scanning electron microscopy was used to evaluate the porosity. Afterward, the biocompatibility of PHB scaffold was assessed. Initial results showed the highly porous PHB scaffold structure with a variety of pore sizes. Subsequent results indicated that more unique pore sizes can be obtained by optimizing physical factors. It would be noticed that the morphology of the pore structure was accordingly affected by ultrasonic time. Hence, In vitro cell viability tests on the PHB scaffold using human foreskin fibroblasts revealed strong cell attachment and proliferation supports. Therefore, it can be concluded that the cost-effective PHB scaffold has the potential using as a biomaterial cell adhesion substrate in therapeutic applications.

Keywords : Polyhydroxybutyrate, biocompatible, scaffold, porous, tissue engineering

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