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Preparation of PHBV Foams and Investigation of Their Potential For Drug Release

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Abstract: Polymeric foams seem to have potential for use in many research areas such as cell seeding and macromolecule or drug loading. Three factors were studied to evaluate the efficiency of foams as drug carrier and releasing agents. Effect of polymeric properties was examined by using two types of polymers (PHBV 7 and PHBV 22) differing only in their valerate (copolymer) content. The other factor studied was the effect of loading extent on release kinetics and rate. The results showed an unexpected inverse proportionality between drug loading and release rate. They, however, were in accordance with foam physical properties such as porosity, which dominate the control of release from the foam. When the concentration of the polymer solution increased the density of the resulting foam increased leading to a less porous structure and to a slower release rate. In all cases, complete drug release took place within a very short time period most probably due to the high water solubility and low molecular weight of the drug molecule. It is expected that it will be possible to achieve a longer term release with larger bioactive agents like enzymes, plasmids or antibodies.

Key Words: Controlled Release, Poly(hydroxybutyrate-co-hydroxyvalerate)-PHBV, Polymer foams, Tetracycline.

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