International Scholars Journals

Antioxidant network based on sulfonated polyhydroxyalkanoate and tannic acid derivative

Laura Brelle, Estelle Renard and Valerie Langlois

University of Paris-Est Creteil, France

Abstract

Poly (3-hydroxyalkanoates)(PHAs) are natural polymers produced by microorganisms. These microorganisms under stress accumulate PHAs within their cytoplasm as an energy reserve using carbon as a substrate. Due to their biodegradability and biocompatibility, they are used as very promising natural biomaterials for various biomedical applications. In order to increase their potential in biomedical applications, chemical modifications of medium-chain PHAs have been performed. In this context, a new generation of gels has been developed using ionic interactions. Firstly, water-soluble PHAs containing sulfonate groups were obtained in the presence of sodium-3-mercapto-1-ethanesulphonate. The anionic PHAs were physically cross-linked by divalent inorganic cations Ca2+, Ba2+, Mg2+ or by ammonium derivatives of gallic acid GA-N(CH3)3+ or tannic acid TA-N(CH3)3+. The formation of the networks depends on the nature of the cations. A weakly viscoelastic network with elasticity around 40 Pa is formed in the presence of Ca2+. The rheological properties increase in the presence of TA-N(CH3)3+ with an elastic modulus G' around 4200 Pa. PHOSO3-/TA-N(CH3)3+ gels with antioxidant activity, due to the presence of tannic acid, remained stable for at least 5 months. Thus, the stability of these new PHA-based networks encourages their use in the development of active biomaterials.

Biography

Laura Brelle is a 3rd year PhD student in materials chemistry from University of Paris-Est Creteil, France. She works in a team whose work focuses on bio-based polymers. These bio-based polymers will be used to develop biomaterials that can be used in various applications such as biomedical or environmental. The chemistry practiced within his team is essentially green to answer the environmental needs of tomorrow.

7th World Congress on Bio-Polymers and Polymer Chemistry
December 07, 2021

Citation: Laura Brelle, Antioxidant network based on sulfonated polyhydroxyalkanoate and tannic acid derivative, Polymer Chemistry 2021, 7th World Congress on Bio-Polymers and Polymer Chemistry, December 07, 2021, 05