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Novel bio-based active release materials for biomedical applications

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With the increasing scarcity of oil resources and in a period of energy transition due to global warming and the impacts on the biosphere, researches are conducted to find an alternative to petrochemical products. Among these resources, plants have a growing interest since they are an enormous source of complex chemical molecules exploited in different fields such as fragrance, food, cosmetic and pharmaceutical industries. Essential oils, present in plant resources, constitute a non-food valorization of the biomass. The powerful and green process of thiol-ene addition was used to elaborate bio-based networks from eugenol loaded with two phenolic compounds as active release materials. Carvacrol, a phenolic monoterpene present in thyme or oregano, and tannic acid, a polyphenol family tannins (glucose polyester) known for their antibacterial and antioxidant activities have been embedded in the cross-linked eugenol based network to increase its antibacterial properties. Their antibacterial and antioxidant activities have been evaluated and promising properties have been demonstrated since derived materials led to a tremendous inhibition of the adhesion of *Staphylococcus aureus* and *Escherichia coli*. Systems proceeding by diffusion (carvacrol) or by diffusion and immobilization (tannic acid) of antibacterial and antioxidant moieties have been obtained. Moreover, in the case of tannic acid, the materials present the advantage of having a sustainable antibacterial and antioxidant activities over time since an oxidative coupling reaction between phenol groups leads to the trapping of tannic acid in the network.

Biography

Tina Modjinou has done her graduate studies (PhD) from East Paris Institute of Chemistry and Materials Science, France (Université Paris Est, CNRS) under the supervision of Professor Estelle Renard. Her PhD work focused on the chemical modification strategies for biodegradable/biocompatible co-polyester mainly PHAs for medical applications. The main goal of her studies is devoted to the design of new bio-based materials with antioxidant and antibacterial activities and the improvement of their properties. She has published 3 papers in these research fields.

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