

ECO-FRIENDLY POLYMER BIONANOCOMPOSITES FOR GREEN PACKAGING APPLICATIONS

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Currently, renewable and biodegradable bionanocomposites materials have drawn much attention as promising green materials in different domains of application such as intelligent food packaging, biomedical and drug delivery, bio-membranes as well as in industrial composting applications for the final end product use. The present review deals with the advances in the preparation methods and technical applications of these biocomposites. Different biomass materials obtained from renewable resources such as nanocellulose, and date stones in nanoform developed to be used as smart reinforcing agent in biodegradable biopolymers for improving their overall properties. However, some drawbacks are associated with the use of lignocellulosic materials as reinforcing agent, especially their high humidity absorption, poor wettability, and incompatible with most biopolymers. Thus, novel processing techniques and different aspects have been proposed for producing high performance lignocellulosic reinforced materials with better properties. On the other hand, facial and green modification of organoclay by antibacterial natural rosin and stearic acid to obtain toxicity-free expanded organoclay that can be used as compatibilizing and reinforcing material for different incompatible biopolymers such as chitosan, carboxy methyl cellulose (CMC) and polylactic acid (PLA) polycabrolactone are deeply investigated. Therefore, many chemical and physical properties for these materials are discussed in detail. Ultimately, the future vision on the challenges and the environmental issues towards CO₂ emission which associated to the risk assessment of these bionanomaterials are also discussed.

Biography

Prof. Youssef has completed his PhD at the age of 29 years from Ain Shams University and postdoctoral studies from Arkansas University, USA and Grenoble INP-France. He so far won the Ford Foundation Scholarship (2004) for PhD, the AU-TWAS Young Scientist National Awards in field of Basic Sciences, Technology and Innovation (2013), Unilever award for the best applied article (2015), and the NRC Award of Encouragement in Applied Chemistry (2015). Moreover, He awarded the State Award for Advanced Technological Sciences, which serves the basic sciences (2016) and NRC award for Pioneer Award in applied chemistry (2016). He has obtained the Privileges of the First Class of the Presidency (2017). He has published more than 80 papers in reputed journals with 21 H-Index and 995 citations on Scopus site. He serves as a reviewer for several key journals. He has coupled research experience with industrial work with National and International Counterparts.

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