

Production, characterization and application of nanocarriers made of polysaccharides, proteins, bio-polyesters and other biopolymers: a review

ABSTRACT

Chitosan, collagen, gelatin, polylactic acid and polyhydroxyalkanoates are notable examples of biopolymers, which are essentially bio-derived polymers produced by living cells. With the right techniques, these biological macromolecules can be exploited for nanotechnological advents, including for the fabrication of nanocarriers. In the world of nanotechnology, it is highly essential (and optimal) for nanocarriers to be biocompatible, biodegradable and non-toxic for safe in vivo applications, including for drug delivery, cancer immunotherapy, tissue engineering, gene delivery, photodynamic therapy and many more. The recent advancements in understanding nanotechnology and the physicochemical properties of biopolymers allows us to modify biological macromolecules and use them in a multitude of fields, most notably for clinical and therapeutic applications. By utilizing chitosan, collagen, gelatin, polylactic acid, polyhydroxyalkanoates and various other biopolymers as synthesis ingredients, the 'optimal' properties of a nanocarrier can easily be attained. With emphasis on the aforementioned biological macromolecules, this review presents the various biopolymers utilized for nanocarrier synthesis along with their specific synthetization methods. We further discussed on the characterization techniques and related applications for the synthesized nanocarriers.

Keyword: Polysaccharides; Protein; Polyhydroxyalkanoate