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Water Soluble Chitosan Derivatives and their Biological Activities: A Review

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ABSTRACT

Chitosan is the second most basic natural polysaccharide obtained from chitin after cellulose, by acetylation process of 2-amino-2-deoxy-D-glucose unit of chitin in alkali media. Chitosan is composed of 2-acetamido-2-deoxy-D-glucose units and β-(1-4)-linked 2-amino-2-deoxy-D-glucose units and it is a linear polysaccharide Chitosan is soluble in acidic media. The most commonly used acidic media for dissolving chitosan are lactic acid, acetic acid, hydrochloric acid and formic acid.

Recently, numerous medical articles associated with water soluble chitosan (WSC) have been launched. since the solubility of chitosan is limited to acidic media, and there's an increasing call for towards to the by-product of the chitosan polymer, which is specially to attain a fabric each having solubility in aqueous media and additionally being chitosan assets. Due to cationic property, the usage of this polymer is limited in some aspects in aqueous media. Water soluble chitosan is obtained generally by replacing hydrophilic groups onto chitosan. One of the advantages of synthesis of water soluble chitosan is to acquire a water soluble polymer which is easily miscible with different kinds of compounds in aqueous solutions.

Addition of water soluble functional groups on chitosan's back bone results in conversion of polymer into an expedient shape for many biological applications such as anticancer agent, antioxidant and antimicrobial. In this review, water soluble chitosan derivatives are mainly tested in terms of their biological and other applications. Water soluble chitosan derivatives are obtained by the addition of different kinds of functional groups, which helps in making the chitosan soluble in aqueous media, onto chitosan backbone. Biological activities of Water Soluble Chitosan derivatives are analyzed in the sense of anticancer activity, antioxidant and antimicrobial respectively. Thereby, the accrued statistics may be beneficial to compare novel synthesized water soluble chitosan derivatives with alternative systems. In this research, water soluble chitosan either alone or in combination with different compounds are investigated with subject to their biological abilities, synthesis ways and possible usability in miscellaneous fields of science.

Keywords: Water soluble chitosan; Antioxidant; Antimicrobial; Anticancer; Activity