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Review of Nano-Chitosan Based Drug Delivery of Plant Extracts for the Treatment of Breast Cancer
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Abstract

Breast cancer is the most commonly diagnosed cancer and the leading cause of death in females, worldwide. Many therapeutic strategies though available does not effectually reduce the cancer burden. Alternative system of medicine and an effective mode of drug delivery is a major part of ongoing cancer research. Traditional Siddha literature refers to cancer as "Putru" and elucidates the use of extracts from various plant parts for the treatment of cancer. For example, extracts of *Mimosa pudica*, *Plumbago indica*, *Vitex trifolia*, *Glycyrrhiza glabra*, *Alstonia scholaris*, *Withania somnifera*, *Aegle marmelos* have been studied and shown to possess anticancer property. It is shown to decrease the adverse side effects of chemo and radiotherapy due to the presence of antioxidants. To heighten the bioavailability of the extract and controlled release, it can be delivered along with or encapsulated within a biomaterial. Chitosan and their derivatives are well-known polycationic polymers in the field of biomaterials. Chitosan can be prepared as a colloidal system for delivery in the form of microsphere, hydrogel, nanoparticles and can be modified to improve adhesion by crosslinking, chemical modification and conjugation with macromolecules. They have the advantage of being able to penetrate tight junctions of the cell membrane, biodegradable and mucoadhesive. Glycol-chitosan nanoparticles exhibited tumour-homing property which is an advantage for its use in targeted delivery of anti-Tumour agents. Drug loaded-glycol modified chitosan nanoparticles have tumour inhibitory property because of enhanced permeation and retention capacity. Chitosan as a delivery system enhances the controlled drug release and modulates sustained drug bioavailability thereby delivering effective therapy. The use of chitosan encapsulation of anticancer extracts of medicinal plants can be a promising avenue to explore for their potential in breast cancer therapy. © (2022) Society for Biomaterials & Artificial Organs #20058522.

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