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Use of Biotechnological Products of Baku In Drug Dosage Forms

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It is well-known fact that biotechnological products (products of plants and animals) have been used as pharmacologically active substances and excipients in drug dosage forms since ancient times. Most of these biotechnological products are originated from plants and are used in phytotherapy. The flora of Azerbaijan is rich with wide variety of medicinal plants. The 64% of the Caucasian flora belong to Azerbaijan Republic. Currently, 40% of all pharmacologically active substances in Azerbaijan are medicinal plants. The reason behind the wide use of medicinal plants in therapy is the advantage of them being less toxic and posses no serious side effect.

In this study, the biotechnological products of medicinal plants were investigated with respect to their functionality in drug dosage forms. Most of them are used as pharmacologically active substances in formulations.

Formulation of High Molecular Weight Peptidoglycans With Chitosan Nanoparticles

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Complex high molecular weight peptidoglycans were isolated from Mycobacterium vaccae, a fast growing mycobacteria which is being clinically tested as an immunostimulants. Considered to be the cell wall components, these peptidoglycans have marked antineoplastic and immunostimulatory activities. Chitosan is a biocompatible, biodegradable and mucoadhesive biopolymer consisting of β-1→4 linked 2-amino-2-deoxy-glucopyranose. In this study, we tried to formulate the isolated high molecular peptidoglycans into chitosan nanoparticles, with the aims to increase the biological activity and facilitate clinical applications. Chitosan nanoparticles were prepared by a novel precipitation method using sodium sulfate as the precipitant . The nanoparticles were further stabilized by a brief cross-linking with 0.25% glutaraldehyde. Particle size was determined by photon correlation spectroscopy (PCS) and confirmed with scanning electron microscopy (SEM). The prepared nanoparticles were highly homogenous in size with an average particle diameter around 600 nm and were positively charged (10 ± mV in PBS, pH 7.4). By ionic interaction, negatively charged protein molecules (bovine serum albumin) were found to be readily adsorbed by these nanoparticles. In this study, high molecular weight peptidoglycns were entrapped into chitosan nanoparticles by direct lyophilization of the two components with 2% (w/v) D-mannitol in water. The formulation could be readily redispersed into aqueous media and the incorporated peptidoglycans were found to be rapidly released in vitro. The formulated peptidoglycans showed more consistent antineoplastic activity in vivo when tested against S-180 murine solid sarcoma than unformulated solutions. The chitosan nanoparticles were safe and were complete degraded within 14 days in vivo. The results demonstrated that chitosan nanoparticles, prepared without using organic solvents, are useful vehicles for the protein and peptide drug delivery.

Suppositories With Dry Extract of Ruscus Aculeatus L.

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A suppository dosage form containing dry extract of Ruscus aculeatus has been formulated. It has antihemorroid action. The main characteristics of the extract evaluated were: organoleptic indices, moisture content and assay of ruscogenins (ruscogenin and neoruscogenin).

The main parameters of the suppository models such as: melting point, mechanical hardness, disintegration time, release rate of the extract, were also determined. A HPLC method for assay of ruscogenins in suppositories was developed.