ID 595

Acetylated Starch Nanoparticles for Encapsulation of *Flueggea leucopyrus* Leaves Extract for Anticancer Targeted Drug Delivery

ESM Silva[1], NB Jayaratna[1] and SA Senevirathne[1#]

[1] *Department of Chemical Sciences, Faculty of Applied Sciences, Rajarata University of Sri Lanka*

[#] suchithra@as.rjt.ac.lk

In cancer treatments, the major problem is the target release of drugs to cancer cells. Due to leaky vasculature and poor lymphatic drainage, molecules in the nanometer range can accumulate near cancerous tissues rather than normal tissues, known as the enhanced permeability and retention effect (EPR). In this study starch obtained from *Manihot esculenta* (cassava) was used to synthesize drug-loaded acetylated cassava starch nanoparticles (ACSNP). Acetylated starch was synthesized by an esterification reaction using acetic anhydride and acetic acid as reactants. The nanoprecipitation method was applied for the preparation of ACSNP by using acetone as the solvent and water as the anti-solvent. The *Flueggea leucopyrus* (FL) has been used in the treatments of cancers in Ayurvedic medicine in Sri Lanka. The major active ingredient found in the FL leaves is bergenin. The leaf extract of FL was encapsulated into ACSNP due to hydrogen bonding interactions between active ingredients and the ACSNP. The mean particle diameter of drug loaded ACSNP was 183.8 nm, determined by dynamic light scattering. Loading efficiency (LE%) and loading capacity (LC%) were determined by UV-Vis spectrum, showing clear absorption peaks at 217 nm and 273 nm specific for bergenin in the leaves extract. The LE% and LC% were 54.09% and 27.76% respectively. The drug release studies showed that ACSNP allowed the immediate release of bergenin at pH 5.6 (acidic pH). These results indicate that ACSNP is a promising vehicle for the loading of natural anticancer drugs and a potential candidate for targeted anticancer drug delivery.

Keywords: *Flueggea leucopyrus, acetylated starch, nanoprecipitation, targeted drug*