

**MINOR RESEARCH PROJECT SUMMARY**

**PREPARATION AND EVALUATION OF PROTEIN NANOPARTICLES FOR DRUG DELIVERY APPLICATIONS**

Advancement in nano biotechnology enhance our understanding of biological intricacies and help to solve biological and medical problems. Green synthesis of biocompatible nanoparticles is an area of intense scientific and technological interest. Comparable size of nano particles with biological materials facilitate their use for biomedical applications. Large surface area to volume and cell penetrating ability of nanoparticles can be exploited for drug delivery applications. Surfactant play an important role in stabilizing the nanoparticles during its formation and to prevent coagulation during storage. For biomedical application it is necessary that the coating agent should be nontoxic and well tolerated by living cells. Several coatings agents have been used to prevent agglomeration and keeping the particles in suspension including various polymers like polyethylene glycol (PEG), poly(vinylpyrrolidone) (PVP) etc. Instead of polymeric surfactants honey has the advantage that it is nontoxic in nature and is well known to enhance the potential of ayurvedic medicine. Honey being nontoxic and is traditionally used as a carrier for the delivery of Ayurvedic medicine, it is safe in vivo for oral applications. Efficacy of honey as a surfactant for the preparation of protein micro and nanoparticles has been investigated. Since honey is a nontoxic material used in the formulation of ayurvedic medicine and is well tolerated by human body, it seems to be a material worth investigation. Milk protein casein and human serum albumin nanoparticles were prepared by cross-linking with metal salts. Nanoparticle formation was observed with both casein and albumin by dynamic light scattering technique. Critical concentration of honey required to stabilize the nanoparticles were found to be 2%. 5- Fluro Uracil (5- FU) and curcumin loaded nanoparticles were also prepared by the same technique. A maximum of 26 % loading was obtained for 5-FU and 18 % for curcunmin. A sustained release was observed from both 5-FU and curcumin loaded nano particles. These results demonstrate that honey can be used as surfactant for the preparation of protein and polysaccharide nano and micro particles. These results are important to fabricate nano and microparticles that can be used for drug delivery applications.