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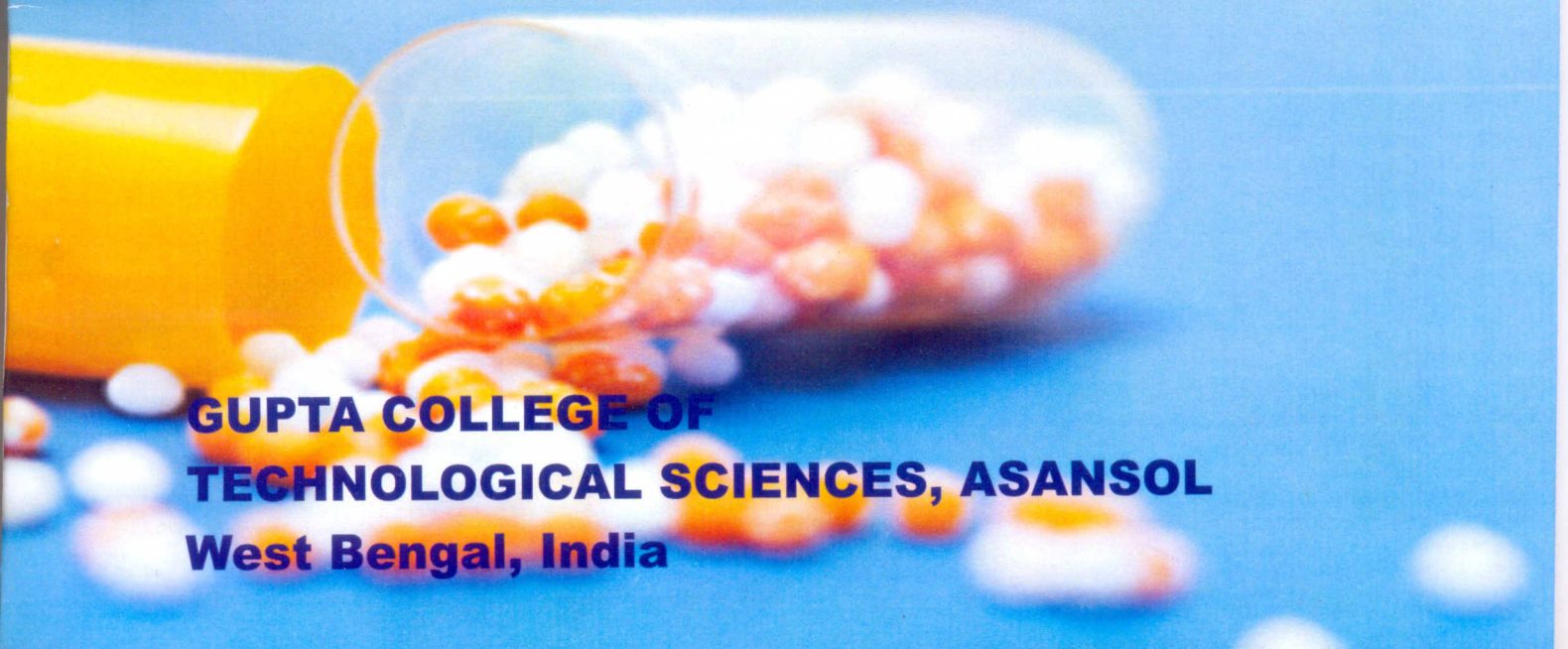

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Nanocrystals for Dermal Application of Bio-active Substances

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Abstract

Over the last ten years, the number of poorly soluble drugs has steadily increased and about 60% of all drugs are nowadays poorly soluble and therefore may exhibit poor dermal penetration. The drug nanocrystals are crystals with an average diameter typically in the range of 200–500 nm, which means they are nanoparticles with a crystalline character. Further, the drug nanocrystals are composed of 100% drug without any carrier material. Basically, "top-down" and "bottom-up" techniques are being extensively used for the production of nanocrystals from poorly soluble actives, although the top down techniques being industrially more relevant. After successful use in oral pharmaceutical products, nanocrystals are currently being studied to improve the dermal penetration of drugs and poorly soluble antioxidants rutin and hesperidin. The nanocrystals should act as fast dissolving depot, increase saturation solubility and especially accumulate in the hair follicles, to further increase skin penetration. The active substances in the form of nanocrystals can accumulate more in hair follicles than a solution, especially when having an optimal size of about 700 nm. Recent studies have demonstrated that nanocrystals can increase dermal drug bioavailability by enhancing its dissolution velocity and saturation solubility, thus, leading to an increased concentration gradient with a consequent improved skin penetration of drugs. This review encompasses nanocrystal production technology along with potential dermal application of anti-aging substances and small drug molecules.

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Preparation, Characterization and *In-Vitro In-Vivo* Evaluation of Pectino-Aceclofenac Mucoadhesive Microspheres

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Abstract

The purpose of this research was to design, develop and evaluate pectino-aceclofenac mucoadhesive microspheres by ionotropic gelation method. Pectino-aceclofenac mucoadhesive microspheres are a potential drug carrier for the oral delivery of this anti-inflammatory drug. The formulations were investigated for various evaluation parameters like particle size, entrapment efficiency, micromeritic study, mucoadhesion properties, *in-vitro* drug release etc. Surface texture was studied by SEM and possible interactions were studied by FTIR. The microspheres exhibited good mucoadhesive property and showed high drug entrapment efficiency. The drug release showed comparatively faster release from alginate microspheres as compared to pectino-aceclofenac microspheres. SEM study revealed that the spheres were almost spherical in shape with rough outer surface. FTIR study showed that the major peaks of pure drug were almost intact in the formulations. Dunnet's multiple comparison analysis suggested a significant difference in percent inhibition of paw edema when the optimized formulation was compared to pure drug. As a conclusion, the pectino-aceclofenac mucoadhesive formulations exhibit promising properties as a sustained release dosage form for aceclofenac and provide distinct and notable tissue protection in the stomach.