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Design and characterization of chitosan/calcium alginate nanocapsules for oral delivery of Liraglutide in diabetic patients

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Increasing prevalence, variable pathogenesis and natural history of progressive type II diabetes result in compulsion of repeated insulin injection, consequently pancreas activity failing as well as patient inconvenience, highlight the need for immediate adoption of new therapeutic strategies. In this study, Liraglutide loaded nanocapsules were prepared by ionotropic gelation. The effect of coating combination including sodium alginate, calcium chloride and chitosan concentrations on the particle size and gastric conditions stability was studied based on RSM. The beads were characterized through DLS, SEM, TEM and FTIR. Beads stability over storage and gut simulation conditions, encapsulation content and efficiency and *in vitro* release behavior were investigated. The diameter of the beads formed was most dependent on the encapsulation technique and calcium concentration. The optimum combination for producing beads smaller than 600 nm was alginate concentration of less than 0.75% and chitosan concentration of up to 1% and calcium up to 1% at pH 6.0. The resulting bead formulation had a loading efficacy of 96.5% and scanning electron microscopy images showed spherical and smooth particles. Chitosan concentration significantly influenced stability over 2 month storage. Decreasing the alginate concentration resulted in smaller sizes but gastric condition stability reduction.

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Research on nano-particle film preparation having a flexible magnetothermal response and good biocompatibility

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Flexibility magnetic is a topic of rapidly growing interest in both the scientific and engineering research due to its numerous potential in a broad range of applications. Previous assembly approaches for 2-dimensional magnetic iron oxide at the nano scale are used by the layer by layer technology. Here, a strategy is introduced that exploits flexibility material for self-assembly of 2D thin film, and this material can be bent at different angles from 0 to 360. In alternating magnetic field with different elastic deformation of the film, there are obvious differences in magneto thermal effect. The vibrating sample magnetometer shows that the material has good anisotropy. Low frequency impedance analyzer test results further demonstrate that has a good the magnetic response. By deformation, the nanoparticle film changes its impedance due to its nanoparticles arrangement. And this film has a good hydrophilicity and can be used for skin adhesion. Scanning electron micrograph shows that, for different nanoparticle film deformation, the nanoparticles spaced from each other has changed. Analysts believe that such particles pitch density can have a very important effect on the magnetic coupling between the particles, resulting in different deformation having different magnetic response effect. In conclusion, we prepared a flexible nanoparticle film having a magnetic effect and good bio-compatibility. The future may be used for skin adhesion of administration and control magnetic stimulation.

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