



Development of chitosan coated calcium-alginate nanocapsules for oral delivery of liraglutide to diabetic patients

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Abstract: Increasing prevalence, variable pathogenesis and natural history of progressive type II diabetes, highlight the necessity of immediate development of new therapeutic strategies. Glucagon-like peptide-1 receptor agonists are a new class of injectable antidiabetic drugs. Chitosan coated calcium-alginate nanocapsules were developed for oral sustained delivery of liraglutide, a long-acting analog of glucagon like peptid-1. The aim of such drug delivery system is to recover diabetic patient compliance which otherwise demands prolonged repeatedly injections. The effect of coating components including sodium alginate, calcium chloride and chitosan concentrations on the particle size was studied based on response surface methodology. The beads were characterized through dynamic light scattering (DLS), scanning and transmission electron microscopy (SEM and TEM) as well as fourier transform infrared spectroscopy (FTIR). It was shown that the diameter of the formed beads was most dependent on the encapsulation technique and alginate concentration. SEM revealed spherical and smooth particles of up to 100 nm diameter for optimum composition of alginate 0.5%, chitosan 0.5% and calcium chloride 0.5% in the ratio of 3:1:1. The resulting bead formulation had a loading efficiency of 92.5% and loading capacity of 54.16 %. In-vitro release studies in simulated gastrointestinal conditions were carried out in a sequential technique and the amount of drug release was found to be 39.1% after 8 hours. The MTT results of developed nanocarrier revealed up to 52.05% viability enhancement compared to free drug in 0.3 mg concentration.



Biography – Dr. Fatemeh Shamekhi has her expertise in encapsulation methods and optimization techniques of coating components for oral drug delivery. She has extensive experience in the academic field which extends to more than 10 years. She is currently a Lecturer at Azad University. She earned her Ph.D. degree in Nano-biotechnology from Tarbiat Modares University in 2018.

Publication of speakers:

1. Effect of Binary Blending of Mineral Admixtures on the Fresh Hardened Properties of Normal Grade Concrete
2. Comparative study of the properties of cement pastes modified with nano-silica and nano-alumina
3. Optimization of a cryoprotective medium and survival of freeze-dried *Bifidobacterium infantis* 20088 throughout storage, rehydration and gastrointestinal tract transit for infant formula probiotic applications.
4. Nano Technology in Concrete-A Brief Review
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7. [21st International Pharmaceutical Conference and Expo, May 10-11, 2020, Perth, Australia.](#)

8. Abstract Citation : [Fateme Shamekhi: Development of chitosan coated calcium-alginate nanocapsules for oral delivery of liraglutide to diabetic patients, MEDICINE-PHARMA-2020, Perth, Australia, May 10-11, 2020 pp:1](#)