

II. Symposium of Young Researchers on Pharmaceutical Technology, Biotechnology and Regulatory Science

January 23-24th 2020. Szeged, Hungary

OP-10

DOI: 10.14232/syrptbrs.2020.op10

Lactoferrin micro-encapsulation in Na-alginate hydrogel beads

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Whey, co-product of milk processing was considered for years as a waste material and thus represented environmental burden. However, due to its protein rich composition, different scientific areas are oriented to the exploitation of whey potential. Lactoferrin (Lf) is an iron-binding whey protein, which has antimicrobial, immunomodulatory, and antioxidant activities, thus expressing several beneficial effects on human health [1].

The objective of the study was to develop and optimize composition of microcapsules with alginate and Lf, along with selection of appropriate microencapsulation parameters, drying process and conditions.

Formulations with different alginate/ Lf ratios in water were prepared and subjected to microencapsulation by utilizing encapsulator Inotech IE-50 R in cross linking solution containing Ca²⁺ ions. Size distribution of dried microcapsules was evaluated through the image analysis and Lf content was determined by reverse phase HPLC.

Obtained results revealed that by increasing Lf/ alginate ratio in initial dispersion (i.e. from 1:1 to 2:1) size of microcapsules also increased, however by further increase of Lf/ alginate ratio to 4:1 no additional changes were observed. Moreover, due to the leakage of Lf from the core of the microcapsules, only a minor differences in Lf content were demonstrated.

Our results suggest that by incorporation Lf in alginate dispersion microcapsules can be prepared and formulated in final dosage form for oral administration. However, by appropriate formulation composition and inclusion of additional excipients leaking of Lf has to be further investigated.

References

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