

Macroporous alginate microbeads for on-demand delivery system

신봄이, 김재윤†
성균관대학교
(kimjaeyun@skku.edu†)

Alginate micromeads have been intensively studied in drug delivery, cell encapsulation, and tissue engineering. Usually alginate microbeads prepared via ionic crosslinking have nanoporous structure, which have limitation in loading and delivery of large-sized molecules. The synthesis of macroporous alginate microbeads can contribute to overcome this limitation of nanoporous alginate microbeads and to facilitate controlled delivery. Up to now there has been no report on the fabrication of macroporous alginate microbeads. In this work, we demonstrate the fabrication of macroporous alginate microbeads and their application as on-demand delivery system. In our previous report, uniform alginate microbeads with ultrahigh density and enhanced mechanical property were prepared through a simple remodeling of polymeric matrix and secondary crosslinking process (RsC process). Based on dense alginate microbeads prepared by RsC process, macroporous alginate microbeads with interconnected porous structure were synthesized using templated method. Lastly, the incorporation of functional nanoparticles resulted in macroporous alginate microbeads that respond to the external stimuli, which allow a controlled delivery of molecules on demand.