

# Magnetic Macroporous Particles as an Essential Tool of Multiparametric Degradation Approach for Production of Size-Defined Hyaluronan Fragments

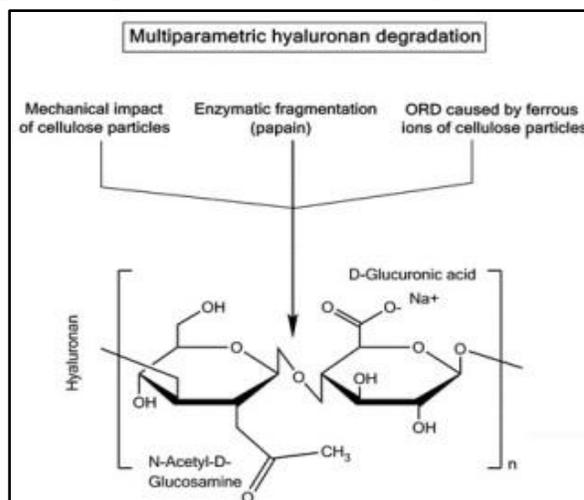
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Currently, the interest of hyaluronan (HA) and its fragments has been already increasing due to their beneficial physicochemical and biological characteristics. The impacts of this versatile biomolecule influenced by molecular weight of polymer chains are utilized in the large spectrum of biomedical and biotechnological areas<sup>1</sup>. The common degradation methods of HA fragments production have some limitations, particularly high size polydispersity of final fragments and/or present of reaction contaminants. And therefore, the aim of this study was to develop the new approach to efficiently and safely produce pure size-defined HA fragments.

Novelty of our multiparametric approach is based on the mutual cooperation of three factors: the mechanical effect of magnetic macroporous beads made from nontoxic and biocompatible cellulose, oxidative-reductive depolymerization caused by accessible iron ions incorporated in the structure of carriers and the ability of plant-derived enzyme to cleave the glycosidic bonds. The complementary impact of such magnetic macroporous carriers with covalently bound enzyme papain generates easily and safely size-defined HA fragments. Native polyacrylamide gel electrophoresis was used to evaluate the efficiency of HA fragmentation process and size exclusion chromatography/multi-angle light scattering was applied to precisely estimate and monitor the kinetics of degradation process.

Additionally, we assume that a magnetically stabilized fluidized bed with the continuous and dynamic contact of the carrier and viscous HA molecules could also contribute the fragmentation efficiency. In this case, such arrangement can be used even for large-scale production in the pharmaceutical or cosmetic industry.



## References:

1. Kogan, G., Soltes, L., Stern, R., Gemeiner, P. *Biotechnology Letters*, 29, 17–25, (2007).

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