Microscopic Evidence of the Behavior of pH-sensitive Food-grade Polymeric Delivery Systems

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Background

Colon delivery systems are designed for the oral delivery of active compounds in the large intestine. Food-grade copolymers Eudraguard® Biotic (EUGB) and control (EUGC) have been investigated to develop colloidal systems loading natural active ingredients.

Methods

In this study, we evaluated the degradation process of these matrices in simulated gastric, intestinal and colonic conditions. Microparticles made of EUGB and EUGC, alone or in combination, were loaded with the model compound resveratrol (RSV). A parallel study was performed on *in vitro* RSV release and SEM analysis of microparticles kept at different pH values.

Results

All systems ensured a limited gastric release of RSV (below 20%), presenting only small pores on the surface of microparticles treated with simulated gastric fluid. EUGB microparticles showed the maximum release in simulated colon fluid (SCF), showing a complete dissolution of the microparticle matrix. The EUGC-based system allowed a prolonged release of RSV over time, and in SCF, it showed only partial degradation. Using mixed EUGB/EUGC matrices, a prolonged RSV release was observed along the intestinal tract.

Conclusion

Overall, EUGB and EUGC copolymers were able to modulate and localize the release of entrapped cargo in the small intestine and colon. They could have interesting applications in treating bowel diseases synergistically with other therapeutic strategies.

Keywords: Colon-targeted delivery, release kinetics, Eudraguard®, microparticles, nutraceuticals, pH-sensitive polymers, scanning electron microscopy.