Development of an oral feed additive against intestinal infections based on microparticles' systems loaded with Ctx(Ile^{21})-Ha peptide coated with HPMCAS/Chitosan

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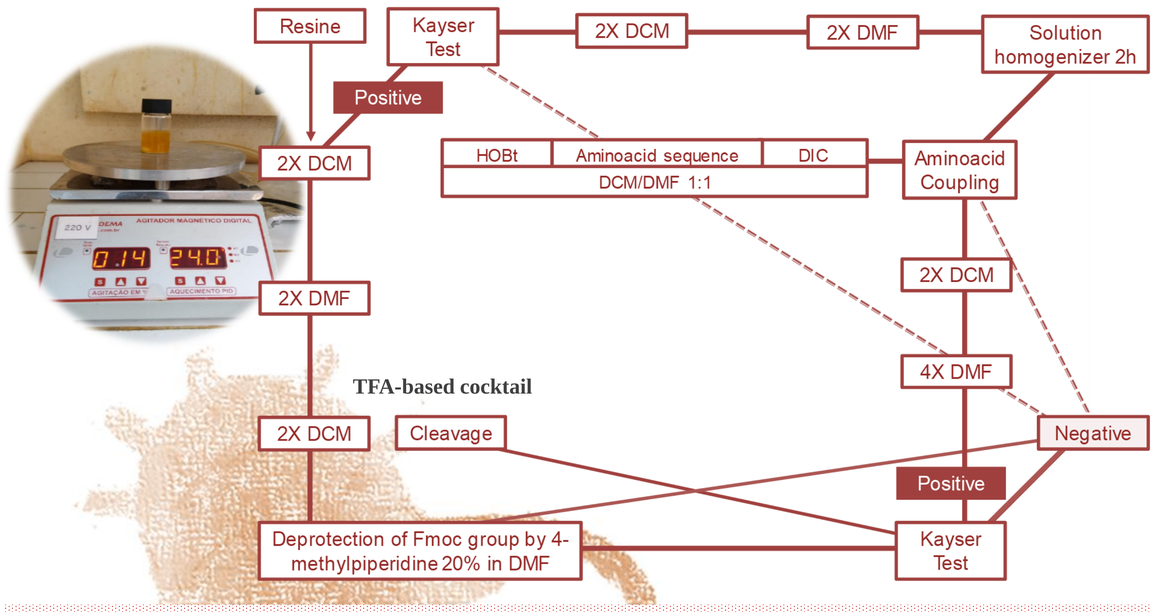
Introduction

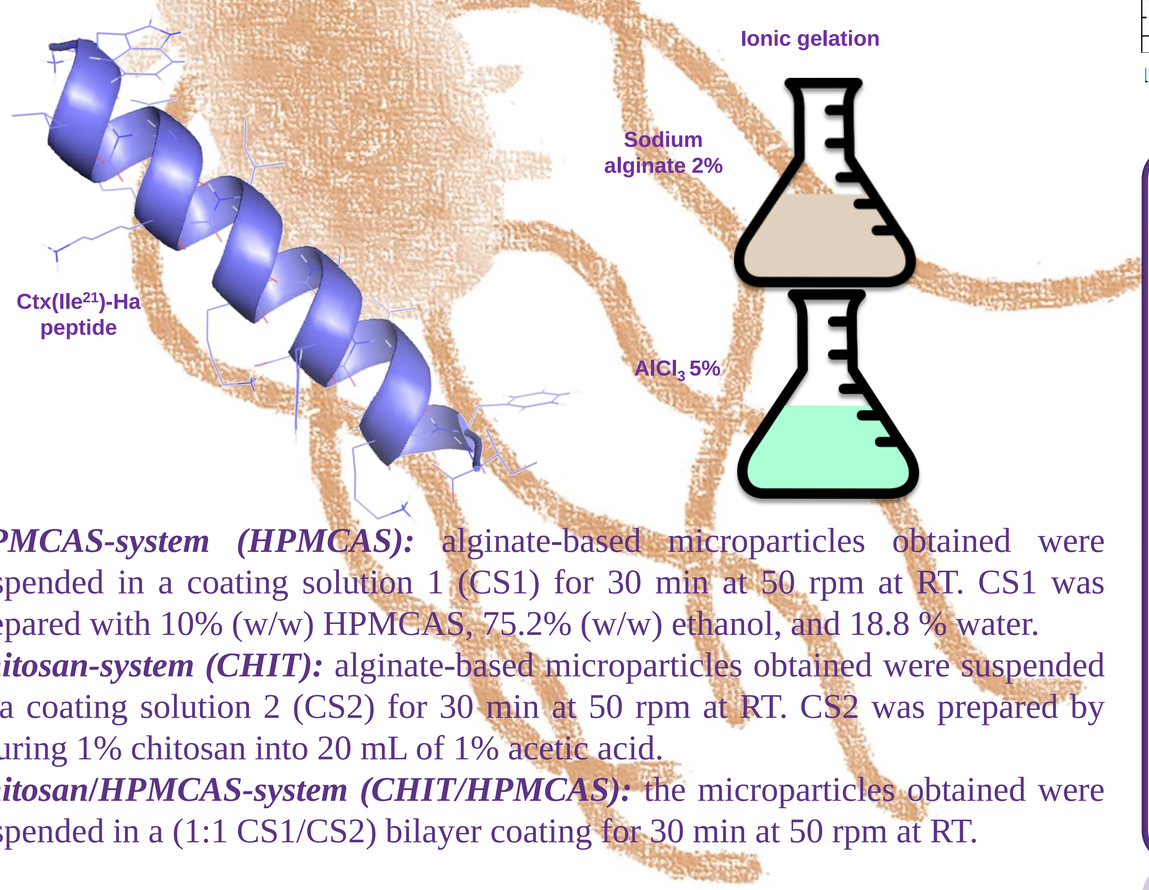
In recent decades, resistant bacteria have generated a worldwide concern, since prolonged exposure to different compounds produces or acquires these mutations. The Ctx(Ile^{21})-Ha antimicrobial peptide is widely studied by our research group, proved to be effective against multidrug resistant bacteria (1) and *Salmonella* Enteritidis, both in *in vitro* and *in vivo* studies (2). However, its oral administration is affected by external factors that induce degradation. In this study, Ctx(Ile^{21})-Ha peptide was synthesized in solid phase peptide synthesis and characterized by LC/MS.

Material and Methods

Solid Phase Peptide Synthesis (SPSS)

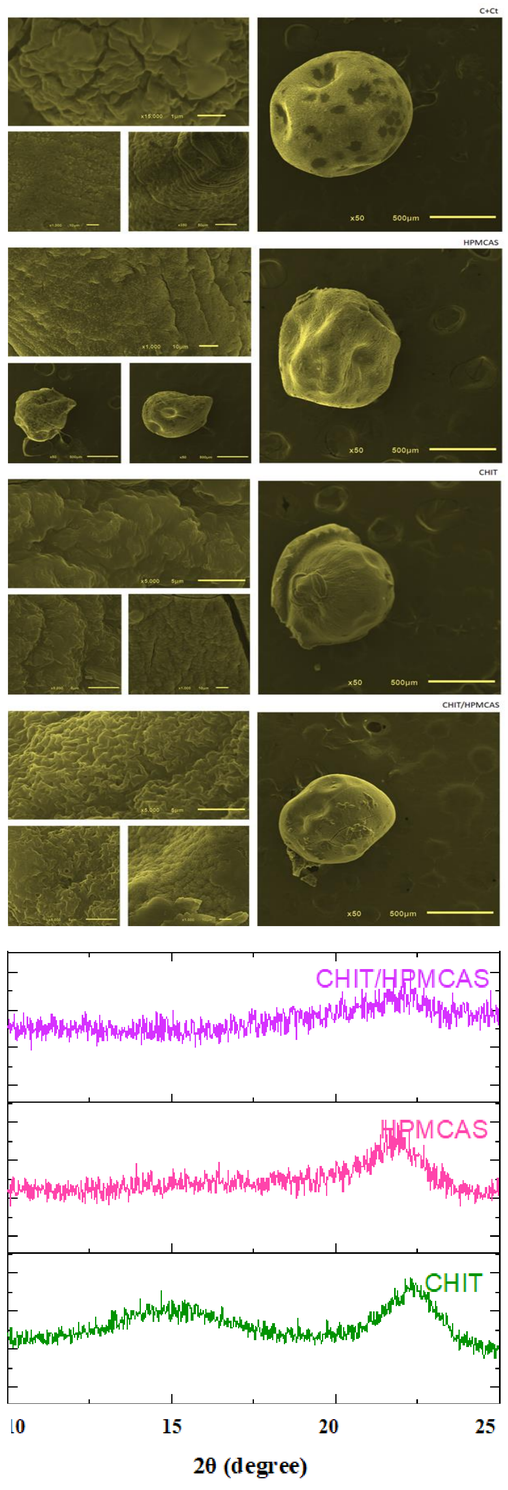


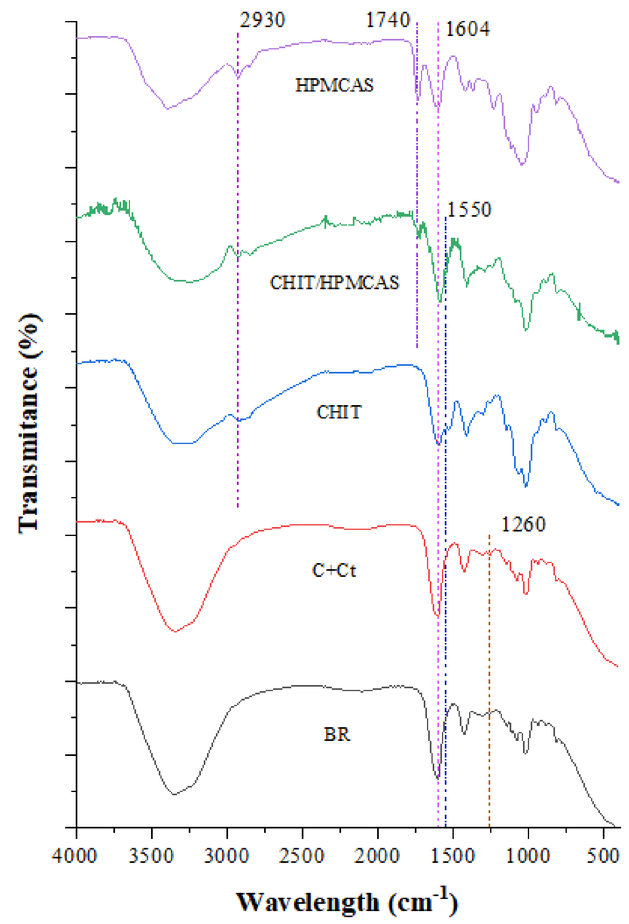
Microencapsulation and coating procedure

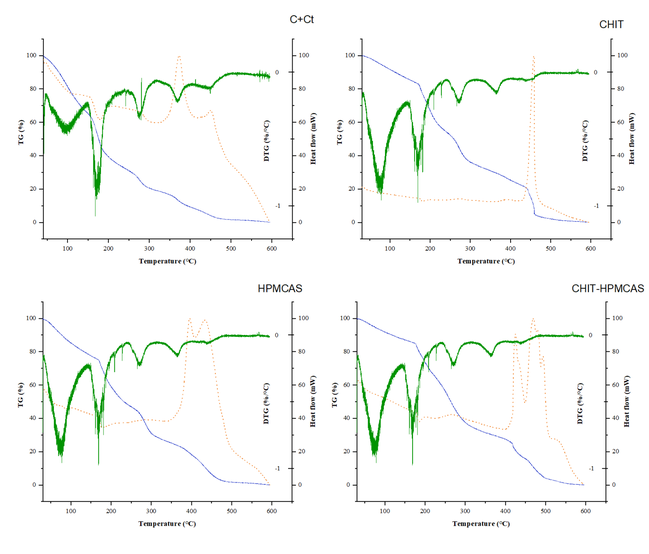


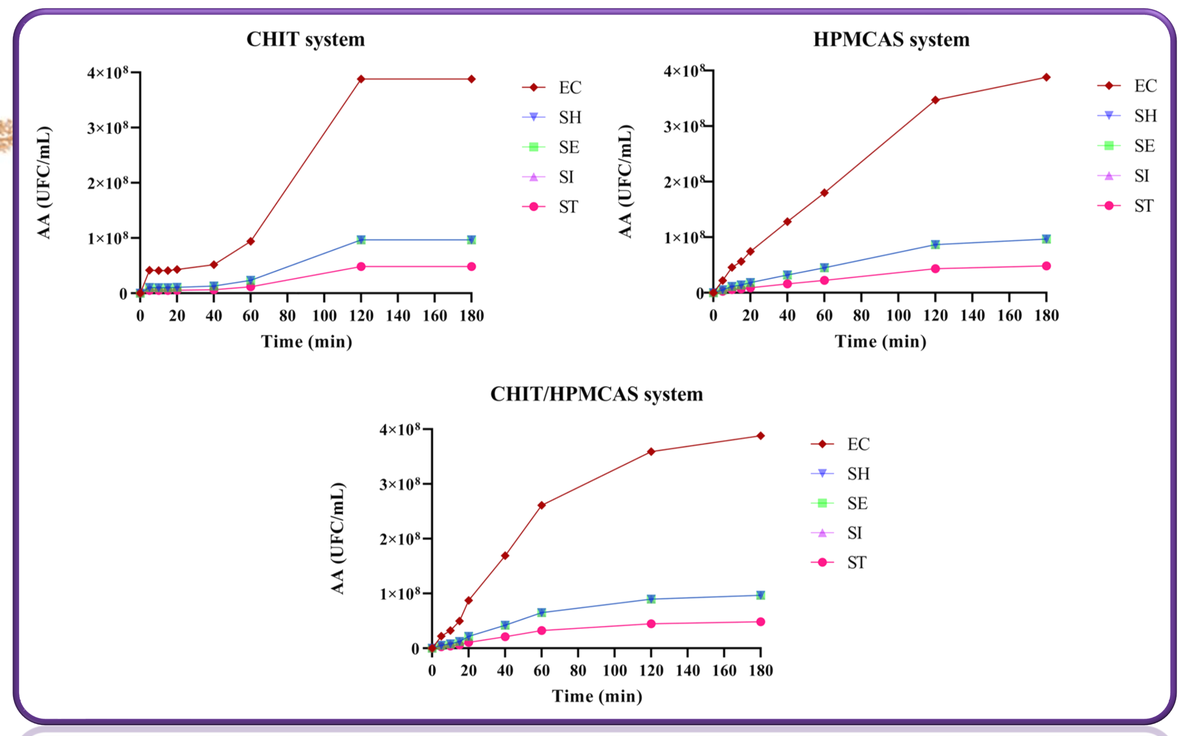
- ***HPMCAS-system (HPMCAS):*** alginate-based microparticles obtained were suspended in a coating solution 1 (CS1) for 30 min at 50 rpm at RT. CS1 was prepared with 10% (w/w) HPMCAS, 75.2% (w/w) ethanol, and 18.8 % water.
- ***Chitosan-system (CHIT):*** alginate-based microparticles obtained were suspended in a coating solution 2 (CS2) for 30 min at 50 rpm at RT. CS2 was prepared by pouring 1% chitosan into 20 mL of 1% acetic acid.
- ***Chitosan/HPMCAS-system (CHIT/HPMCAS):*** the microparticles obtained were suspended in a (1:1 CS1/CS2) bilayer coating for 30 min at 50 rpm at RT.

Results









* STM = *Salmonella* Typhimurium; SE = *Salmonella* Enteritidis; SI = *Salmonella* Infantis; SH = *Salmonella* Heidelberg; EC = *Escherichia coli*.

Conclusion

The peptide controlled release was achieved, and the hydrolysis and degradation produced by gastric pH could be prevented. In conclusion, the administration of encapsulated/coated antimicrobial peptides would be a new option for the treatment of intestinal diseases, including resistant pathogens.

Acknowledgments

This work was developed with the support of São Paulo Research Foundation/FAPESP (Proc. number 2016/00446-7) and PhD scholarship (Proc. number 2018/25707-3, 2020/16573-3). We also thank the technical assistants of chemistry laboratory of the FCE-UNESP Tupã, Institute of Chemistry - Araraquara (IQ-UNESP) for the use of LC/MS equipment and Shin-Etsu for kindly provide the coating (HPMCAS) to the experiments. Finally, the research group "Peptides: Synthesis, Optimization and Applied Studies - PeSEAp". We thank the Ultrastructure Laboratory Celular Carlos Alberto Redins (LUCCAR), CCS/UFES, MCT/FINEP/CT-INFRA – PROINFRA 01/2006 for the SEM images. Special thanks to the researchers Daniel F. Monte and Valdinete Pereira Benevides from FCAV/UNESP for their support and collaboration.

The 7th International Electronic Conference on Medicinal Chemistry
01–30 NOVEMBER 2021 | ONLINE