

Tannic acid into chitosan microsystems toward wound infection

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Infection in complex wounds are characterized by having a reduced permeability to bioactive compounds when applied at the wound site (1). That is one of the reasons why delivery systems, aiming the controlled release of carried drugs, like polymeric dressings, are becoming more and more vital in new pharmaceutical products in order to achieve an adequate therapeutic effect in wounds (2).The aim of this study was to develop and characterize a new powdered wound dressing with antimicrobial and antioxidant properties to apply in complex wounds, composed by chitosan microparticles (CM) loaded with tannic acid (CMTA) and silk sericin (SS) to promote fast tissue regeneration. Tannic acid was encapsulated in CM by spray drying, showing great results for encapsulation efficiency (98.5%). Particles with diameters of 7.4 μm, exhibited a spherical morphology that collapsed on the outer surface after drying without being disrupted, while hydrated showed regular shape and smooth surface with some agglomeration tendency. The CMTA formulation showed optimal antioxidant activity performance, plus protecting TA from degradation and providing biological stability, and controlled released. The microparticles were also bactericide against *Staphylococcus aureus* ATCC as well as methicillin-resistant *Staphylococcus aureus.*
Herein, spray drying revealed to be an efficient microencapsulation process for CMTA. CM demonstrated a great potential for TA wound delivery, being possible to develop a potential antimicrobial and antioxidant system composed by natural compounds. The development of the present biomedical solutions focus on by-products valorisation, which will contribute to increase the economic potential of this technology.

Biography

Microbiologist with a PhD degree in Pharmaceutical Sciences (Specialty Pharmaceutical Technology) by Faculty of Pharmacy, University of Porto (FFUP).
So far, she participated in 11 scientific projects, more than 20 training courses/seminars, and received 5 awards/distinctions, including: a merit award in 2012 by the Portuguese-American Foundation (COHiTEC program by Hitec Centre, University of North Carolina, and New University of Lisbon). She is also inventor/co-inventor of 2 patent applications forms, and author/co-author of more than 20 publications.
Currently she is a CBQF - Biomedical post-doctoral researcher, expert in: clinical microbiology, micro/nanotechnology, and in advanced biomaterials for biomedical applications.

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References

1. Kurup R, Ansari AA. A study to identify bacteriological profile and other risk factors among diabetic and non-diabetic foot ulcer patients in a Guyanese hospital setting. Diabetes Metab Syndr. 2019;13(3):1871-6.
2. Silva PTd, Fries LLM, Menezes CRd, Holkem AT, Schwan CL, Wigmann ÉF, et al. Microencapsulation: concepts, mechanisms, methods and some applications in food technology. Ciência Rural. 2014;44(7):1304-11.