

Antifungal activity of loaded Chitosan nanoparticles with S-nitrosomercaptosuccinic acid against *Candida sp.*

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Abstract:

Candida sp species are fungal pathogens that affect patients with risk pathologies. Due to the change in their conventional drug susceptibility patterns, it is necessary to investigate therapeutic alternatives. It is proposed to evaluate the antifungal potential of nitric oxide (NO), by administering it in the donor s-nitrosomercaptosuccinic acid (MSA-NO), encapsulated in chitosan nanoparticles (Np) to improve its bioavailability and inhibit the growth of *Candida albicans*, *glabrata*, *krusei* and *parapsilosis*.

Methods: Three batches of nanoparticles loaded with mercaptosuccinic acid (MSA-Np) were synthesized by ionic gelation. The effective particle diameter and polydispersity index were analyzed by dynamic light scattering and encapsulation efficiency by the Ellman reaction. After adding NaNO₂, MSA-NO Np. The minimum inhibitory concentration (MIC) against species of *Candida sp.* was determined by microdilution and the NO release profile was estimated by UV spectrophotometry.

Results: The MSA Np presented optimal values of effective particle diameter (241.69 ± 18.95 nm), polydispersity index (0.274 ± 0.015) and encapsulation efficiency ($97.52 \pm 0.07\%$). The MIC values of *C. glabrata* and *C. albicans* were 0.28 mg / mL and 2.25 mg / mL, respectively. The lowest CMI corresponded to *C. krusei* while *C. albicans* was the least susceptible to NO. The results did not vary significantly batch to batch.

Conclusions: A procedure of synthesis of MSA-NO Np with antifungal activity on *Candida sp* was validated. The antifungal potency varied according to the species. The chitosan of MSA-NO Np was useful as a polymer matrix for NO controlled release.



Biography:

Gabriela Morón is a Pharmaceutical Chemistry graduated from the Faculty of Science of the Cayetano Heredia Peruvian University. He has won the Prize for Innovation in Pharmaceutical Technology awarded by the Association of National Pharmaceutical Industries from 2015 to 2016. Currently, he works in the Cosmetic Industry as Technical Director and is pursuing a specialization in Lean Six Sigma Black Belt by the University of the Pacific.

Speaker Publications:

1. Development of pharmaceutical forms for topical and parenteral use to improve the biopharmaceutical properties of antimonial pentavalent compounds in the treatment of Leshmaniasis (Cutaneous and Visceral), Antimicrob Agents Chemother. 2016 May; 62(5): e02419-17.
2. Determination of the Antifungal Activity of Chitosan Nanoparticles Loaded with S-nitrosomercaptosuccinic Acid on *C. albicans* and *C. glabrata*. Journal of Nanomaterials & Molecular Nanotechnology, 2019

[23rd World Nanotechnology Congress](#); Istanbul, Turkey - June 9-10, 2020.

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