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## Harnessing Glyco-Compounds: Effective Anti-Fungal Biofilm Agents Against *Candida sp.*

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### ABSTRACT

Fungi are one of the main causes of disease in humans and their way of life generally involves the formation of biofilm, which consists of a strong and dynamic structure that provides a range of advantages to its members, such as: low energy demand and low oxygen demand<sup>1</sup>. That said, we can look to metronidazole mechanism of action, that function as a prodrug that is activated by the bioreduction of its nitro group in low oxygen concentration environments. The metronidazole itself does not work as antifungal agent, but we can build derivative of that, such as glyco-compounds, to furnish new molecular structure exploring this mechanism of action as new antifungal agents<sup>2</sup>. In this study, we hereby present the synthesis and antibiofilm fungal study of the eight unprecedented glyco-compounds prepared by non-classical glycosylation, to explore the impact on the pharmacokinetics and pharmacodynamics offered by glycosides, additionally to the potential enhancement provided by the triazole ring. To study the chiral pool provided by carbohydrates, as well as their relationship with size and polarities, we explored four different glyco-compounds of D-glucose, D-galactose, N-acetylglucosamine and D-lactose, with interesting activities in in vitro assays, in addition to a satisfactory selectivity index. To study the chiral pool provided by carbohydrates, as well as their relationship with size and polarities, we explored four different glyco-compounds of D-glucose, D-galactose, N-acetylglucosamine and D-lactose,<sup>3</sup> All glyco-compounds showed both interesting antifungal and antibiofilm activities, with lacto-metronidazole standing out for its significantly higher activity compared to the reference drug fluconazole.

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### REFERENCES

1. JIANG, H. *et al.* Application of carbohydrates in approved small molecule drugs: A review. *European Journal of Medicinal Chemistry*, 2021, 223 (5), 1-22. DOI: 10.1016/j.ejmech.2021.113633

2. PEREIRA, R. *et al.* Biofilm of *Candida albicans*: formation, regulation and resistance. *Journal of Applied Microbiology*, 2021, 131(1):11-22. DOI: 10.1111/jam.14949

3 - SHARMA, A.; BERA, S.; MONDAL, D. Advances in the synthesis of antiviral agents from carbohydrate-derived chiral pools. *Journal of Carbohydrate Chemistry*, 2023, 41(1):1-87. DOI: 10.1080/07328303.2023.2189473