

POSTER PRESENTATION

Open Access

Evaluation of antifungal activity of glycoalkaloids from the *Solanum lycocarpum* St. Hil (lobeira) in the cell membrane of dermatophyte of *Trichophyton rubrum*

Bruna AM Cantelli^{1*}, Flavia R Barbosa¹, Tamires A Bitencourt¹, Mariza A Miranda², Jairo K Bastos², Mozart Marins¹, Ana Lucia Fachin¹, Mariana H De Abreu¹, Yasmin D Crivelenti¹, Thaís B Mesquita¹

From 5th Congress of the Brazilian Biotechnology Society (SBBIOTEC)
Florianópolis, Brazil. 10-14 November 2013

Background

The dermatophytes belong to one of the main groups of pathogenic fungus, characterized by the use of the host's keratin for its nutrition, which are the most common cause of fungal infection in the world, affecting millions of individuals annually, causing a huge economic impact [1]. Therefore, there was an increase in the search for new antifungal agents from natural sources, because the majority of the available drugs in the market presents a restricted number of cellular targets and there are reports of resistant fungal strain to these utilized drugs [2]. Glycoalkaloids from the *Solanum lycocarpum* plant (lobeira) presents several biological activities, such as cytotoxic and antimicrobial activities [3]. The goal of this work was determination the Minimum Inhibitory Concentration (MIC) of the solanine, solamargine and solasodine from the *S. lycocarpum* in addition to evaluate the effect of these alkaloids in the regeneration of the *Trichophyton rubrum* cell wall.

Methods

The minimum inhibitory concentration (MIC) of alkaloids toward the ATTC MYA-3108 *T.rubrum* strain was determined by microdilution assay in 96-well plates using RPMI medium according to the protocol NCCLS M-38 (2002) for 7 days at 37°C [4], using amphotericin B as control. The protoplast regeneration assay has been used to evaluate the level of plasma membrane damage caused

by antifungal compounds [5]. Protoplasts were obtained from of MYA-3108 *T. rubrum* strain grown for 7 days. Regenerated protoplasts were selected on solid minimal medium, supplemented with 1 M sucrose, 0.2% casein and 0.07 mM NaNO₃ by incubation with the MIC and 0.5 MIC concentrations of alkaloids for 7 days at 28°C.

Results and conclusion

The results indicated that the glycoalkaloids solamargine, solasodine and solanine presented a MIC of 3.12 µg/mL, 12.5 µg/mL and >25 µg/mL, respectively, the amphotericin B control presented a MIC of 0.39 µg/mL. The same concentrations of the three glycoalkaloids were tested and didn't inhibit the protoplasts regeneration and also didn't cause reduction on the size of the colonies compared with the aculeacin control that inhibited 100% of the regeneration. These data shows that the alkaloids solamargine and solanine presented pronounced antifungal activity, but didn't act in the membrane of *T.rubrum*.

Acknowledgements

This study was supported by grants from Fundação de Amparo à Pesquisa do Estado de São Paulo (2012/06889-7 and fellowship granted to TAB 2012/02920-7); CNPq (PIBIC fellowship granted to MHA), PET MEC (fellowship granted to TBM, BAMC, YDC) (and CAPES through fellowship granted to FRB and TTK. We thank the staff of the Biotechnology Unit, UNAERP, and to Professor Nilce M Martinez-Rossi for kindly provided the *T.rubrum* strains.

Authors' details

¹Unidade de Biotecnologia, Universidade de Ribeirão Preto (UNAERP), Av. Costábile Romano, 2.201 Ribeirania, Ribeirão Preto, CEP14096-900, Brazil.
²Laboratório de Farmacognosia, Faculdade de Ciências Farmacêuticas de Ribeirão Preto, University of São Paulo (USP-FCFRP), Av. do Café, s/nº, Campus Universitário, Ribeirão Preto, São Paulo,14040-903, Brazil.

¹Unidade de Biotecnologia, Universidade de Ribeirão Preto (UNAERP), Av. Costábile Romano, 2.201 Ribeirania, Ribeirão Preto, CEP14096-900, Brazil
Full list of author information is available at the end of the article

Published: 1 October 2014

References

1. Ameen M: **Epidemiology of superficial fungal infections.** *Clinics in dermatology* 2010, **28**(2):197-201.
2. Roemer T, Xu D, Singh SB, Parish CA, Harris G, Wang H, Davies JE, Bills GF: **415 Confronting the challenges of natural product-based antifungal discovery.** *Chemistry and Biology* 2011, **18**(2):148-164.
3. Abreu Miranda M, Tiossi RF, da Silva MR, Rodrigues KC, Kuehn CC, Rodrigues Oliveira LG, Albuquerque S, McChesney JD, Lezama-Davila CM, Isaac-Marquez AP, Kenupp Bastos J: **In vitro leishmanicidal and cytotoxic activities of the glycoalkaloids from *Solanum lycocarpum* (Solanaceae) fruits.** *Chemistry and Biodiversity* 2013, **10**(4):642-8, doi: 10.1002/cbdv.201200063.
4. Wayne Pa: **Reference method for broth dilution antifungal susceptibility testing of conidium-forming filamentous fungi.** *National Committee for Clinical Laboratory Standards* NCCLS (National Committee for Clinical Laboratory Standards); 2002, Proposed standard. NCCLS document M38-A..
5. Jung HJ, Park Y, Sung WS, Suh BK, Lee J, Hahn K-S, Lee DG: **Fungicidal effect of pleurocidin by membrane-active mechanism and design of enantiomeric analogue for proteolytic resistance.** *Biochimica et Biophysica Acta (BBA) - Biomembranes* 2007, **1768**(6):1400-1405.

doi:10.1186/1753-6561-8-S4-P11

Cite this article as: Cantelli *et al.*: Evaluation of antifungal activity of glycoalkaloids from the *Solanum lycocarpum* St. Hil (lobeira) in the cell membrane of dermatophyte of *Trichophyton rubrum*. *BMC Proceedings* 2014 **8**(Suppl 4):P11.

**Submit your next manuscript to BioMed Central
and take full advantage of:**

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at
www.biomedcentral.com/submit

