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Evaluation of antifungal and cytotoxic activity of *trans*-Chalcone and α-Solanine

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Background

Dermatophytes are adapted to grow in keratinized tissues such as skin, nail and hair. *Trichophyton rubrum* is the most frequent cause of dermatophytosis in Brazil and in the world [1]. Despite its incidence there are only a limited number of antifungal drugs available for clinical use and some drugs are highly toxic to humans. In this regard, chalcones and alkaloids are phytochemical products which provide a rich source of chemical diversity for the development of new antifungals. Chalcones inhibit the biosynthesis of the cell wall and activity of fatty acid synthase in yeast [2,3]. The glycoalkaloid α-Solanine purified from potate sprout presents antifungal activity by altering cell membrane integrity and inhibition of sporulation [4]. The aim of the present study was to evaluate the minimum inhibitory concentration (MIC) and cytotoxicity (by MTT) of *trans*-Chalcone and α-Solanine toward strain MYA3108 of *T.rubrum* and the keratinocyte cell line HaCat, in order to evaluate the potential use of these phytochemicals against fungal skin infection.

Materials and methods

The antifungal activity of the compounds was determinated by using the M38-A microdilution technique according to the Clinical and Laboratory Standards Institute [5] toward strain *T.rubrum* for 7 days at 28°C. Keratinocytes were cultures in RPPMI supplemented with 10% fetal calf serum and incubated at 37°C and 5% CO_2. Cells were plated ($2.5x10^5$ cells/mL) in a 96-well tray 24 h prior to the beginning of the experiment. After addition of several concentrations of natural compounds or the vehicle, cells were analyzed after a period of 24 h using the MTT assay.

Results

The MICs of α-Solanine and *trans*-Chalcone were 7.8 μg/mL, showing effectiveness against *T. rubrum*, while the inhibition of the HaCat cell line by *trans*-Chalcone (7.8 μg/ml) and α-Solanine (50 μg/ml) were 45.78% and 68.86% respectively.

Conclusions

Finally, the α-Solanine is a potential candidate for the development of new antifungal drugs against *T. rubrum*, due to its significant antifungal activity and lower citotoxicity for human keratinocytes.

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