Antifungal Activity of Benzophenones Against Oral Candida spp

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Introduction

*Candida* species are characterized as a naturally occurring, opportunistic pathogenic yeast.1 For healthy adults, *Candida* species can be found in the mouth, within the gastrointestinal tract, and in other parts of the body.2 Individuals with a weakened immune system or an uncontrolled medical condition may experience a Candida overgrowth due to microbiome dysbiosis. This condition, called candidiasis, can lead to discomfort, pain, or irritation in the affected mucosal areas.

Flucanazole is typically the first option for treating candidiasis; however, some individuals may develop resistance to this azole antifungal, making it less effective. The development of new antifungal drugs is imperative due to the limited availability of effective treatments. Natural small molecules are an important source of new antimicrobial pharmacophores. Our research group has isolated new polyphenylated benzophenones from the fruits and seeds of *Garcinia brasiliensis*, which have shown potential to express both antibacterial and antifungal properties.3

Objective

To evaluate the in vitro antifungal activity of various Benzophenones against *Candida* spp and determine the cytotoxicity of select drugs against oral cell line cultures.

References


Methods

**Obtaining Benzophenones from *Garcinia brasiliensis***

1. Isolate bioactive polyphenylated benzophenones using silica gel column chromatography
2. Crystallize the samples
3. Perform a microbiological analysis

**Preparation of *Candida* Species**

1. Inoculate an isolates colony to add into well with PBS
2. Measure absorbance of the well with PBS and Candida

**Preparation and Selection of Drugs with Initial 96-Well Application**

1. Prepare stock solution of all drugs
2. Prepare working solution of all drugs
3. Add working solution to designated wells with Candida and PBS

**Determination of Minimal Inhibitory Concentration (MIC) and Minimal Fungicidal Concentration (MFC)**

1. Inoculate preparation
2. MIC determination
3. MFC determination

**Determination of Cytotoxicity**

1. Transfer cells to 96-well plate
2. Add CellTiterBlue
3. Incubate for the recommended time

**Results**

<table>
<thead>
<tr>
<th>Drug</th>
<th>MIC (µg/mL)</th>
<th>MFC (µg/mL)</th>
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<tbody>
<tr>
<td><em>Candida albicans</em> ATCC 321182</td>
<td>10-1</td>
<td>10-1</td>
</tr>
<tr>
<td><em>C. dubliniensis</em> ATCC MYA 646</td>
<td>10-1</td>
<td>10-1</td>
</tr>
<tr>
<td><em>C. glabrata</em> ATCC MYA 275</td>
<td>10-1</td>
<td>10-1</td>
</tr>
<tr>
<td><em>C. tropicalis</em> ATCC MYA 2876</td>
<td>10-1</td>
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Conclusions

Polyphenylated benzophenones do express antifungal properties at certain concentrations. Guttiferona-a produced the most MIC/MFC results at 1-10 mM/mL. In addition, it also posed no cytotoxic effects between 0.001-10 mM/mL against oral cell line cultures (HGF).

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