Introduction

Candida albicans is a fungus which is often found colonized on the skin and in the mouth of many adults. It is the most frequently isolated human fungal pathogen. Dentures are an ideal location for growth of C. albicans. A possible method of cleaning dentures to prevent infections is through the killing of C. albicans with microwave irradiation. Microwaves are believed to damage the cell wall of C. albicans eventually leading to lysis and cell death. This study measured the effects of different strengths of microwaves at different concentrations of C. albicans.

Materials and Methods

- Inoculated 30mls YPD broth with C. albicans SC5314 and incubated at 30C overnight
- Cells were diluted to a concentration of 10⁷ in five flasks, each containing 100mls YPD broth
- Flasks were microwaved at high power for durations of 0, 10, 20, 30 and 40 seconds
- A series of five, 100 fold dilutions were made in 1000µls of water to create dilutions of 10⁻¹⁷⁻¹⁰⁻⁵
- 100µls of each dilution was plated on YPD agar and grown at 30C overnight
- Plates with 30-300 colonies were counted and cell densities recorded for these plates
- This procedure was then repeated with the microwave at medium power
- Microwave treatments at both high and medium powers were each repeated 3 times

Results

- High power had no growth for T₃₀ or T₄₀
- Medium power had no growth for T₄₀
- High power had >300 colonies on concentrations of 10⁻¹ or larger and <30 colonies for concentrations of 10⁻⁴ or less
- Medium power has >300 colonies for concentrations of 10⁻² or greater and <30 colonies for concentrations of 10⁻⁴ or less
- T-tests returned significant results for all other concentrations

<table>
<thead>
<tr>
<th></th>
<th>10⁻¹</th>
<th>10⁻⁴</th>
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<tbody>
<tr>
<td>High Power</td>
<td></td>
<td></td>
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<tr>
<td>T₀ vs T₁₀</td>
<td>p=0.99 df=3.99</td>
<td>p=0.55 df=3.98</td>
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<tr>
<td>T₀ vs T₂₀</td>
<td>p=0.98 df=3.99</td>
<td>p=0.17 df=2.09</td>
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<tr>
<td>Medium power</td>
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<tr>
<td>T₀ vs T₁₀</td>
<td>x</td>
<td>p=0.59 df=3.99</td>
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<tr>
<td>T₀ vs T₃₀</td>
<td>x</td>
<td>p=0.93 df=3.99</td>
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<tr>
<td>T₀ vs T₄₀</td>
<td>x</td>
<td>p=0.49 df=2.34</td>
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</tbody>
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Table 1: T-tests for significance of growth of microwaved C. albicans. Level of significance is 0.05.

Conclusions

- On high power cells remain viable for shorter microwave times than on medium power
- On medium power cells are able to remain viable in lower concentrations than those subject to high power
- Both high and medium power microwaves were effective at killing C. albicans

Acknowledgements

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