**Introduction**

Mucormycosis is an opportunistic fungal infection that occurs in immunocompromised individuals, such as burn, cancer, and diabetic patients. A fungus called Absidia corymbifera is a major cause of Mucormycosis infections and is a common species isolated from confirmed Mucormycosis infections. Amphotericin B (Amp B) is the current line of treatment for the infection, but it is known to have many adverse side effects including liver and kidney toxicity. Origanum vulgare (oregano) oil has been shown to have broad antimicrobial properties in various studies. This study investigates the ability of oregano oil to inhibit biofilm formation by Absidia corymbifera. The synergistic activity of oregano oil and Amp B could potentially be used to decrease the concentration of the drug required to successfully inhibit Absidia corymbifera biofilm growth.

**Hypothesis**

Oregano oil can be used in synergism with Amphotericin B to lower the Minimum Inhibitory Concentration (MIC) of Amp B to treat Mucormycosis infections.

**Methodology**

1. **Setup:**
   - Set up plates with fungal strain Absidia corymbifera.
   - Prepare cultures of Amp B and oregano oil.

2. **Treatments:**
   - Single treatment: Use different concentrations of Amp B and oregano oil alone.
   - Synergism: Use combinations of Amp B and oregano oil.

3. **Inhibition Rates:**
   - Measure inhibition rates from single and synergistic treatments.

**Results**

**Oregano Oil and Amphotericin B Single Treatment**

- **Figure 1:** Oregano oil (top 3 rows) and Amp B (bottom 3 rows) showing the biofilm inhibition gradient based on the concentration of each treatment.

**Synergism of Oregano Oil and Amphotericin B**

- **Figure 2:** Synergism plate showing the greater concentration of Amp B and oregano oil results in a greater inhibition of fungal biofilm.

**Discussion**

- **Figure 3:** Inhibition of biofilm formation by Amp B or Oregano Oil concentrations. MIC50 determined from single treatment dilution on Absidia corymbifera biofilm will be compared to synergism to determine the effect of Oregano Oil on biofilm inhibition (figure 4).

- **Figure 4:** Synergistic activity of Amp B dilution and oregano oil. The inhibition rate doubles (26% to 69%) at 0.1 μg/ml oil concentration combined with Amp B.

**Conclusions**

- The 0.1 μg/ml concentration of oil doubled the effectiveness of 0.0625 μg/ml amp B. This concentration increased the biofilm inhibition from 26% to 69%.
- The 0.05 μg/ml concentration of oil and Amp B combination brought inhibition rate from 59% to 71%.
- Oregano oil exhibited antifungal properties, inhibiting 47% of Absidia corymbifera biofilm growth at a concentration as low as 0.05 μg/ml.
- Synergistic effects of Oregano Oil and amp B treatment showed greater inhibition of Absidia corymbifera biofilm formation than Amp B treatment alone.
- Oregano oil has substantial effect on the inhibition of Absidia corymbifera biofilm formation.
- The lowering of the MIC of Amp B indicates that oregano oil may be utilized in conjunction with Amp B to treat Mucormycosis infections.

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