

Evaluation of Antifungal Effects of Brunei Propolis Ethanol Extract 70% towards the Growth of *Candida albicans* in vitro = Evaluasi Efek Antifungal Propolis Brunei Ekstrak Ethanol 70% terhadap Pertumbuhan *Candida albicans* in vitro

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Abstrak

Pendahuluan: *Candida* sp. Menyumbang 40.9% dari seluruh kasus di seluruh dunia. Namun, resistensi obat terus meningkat akibat kemampuan jamur ini untuk beradaptasi. Oleh karena itu, obat antijamur alternatif untuk melawan kandidiasis invasif sangat dibutuhkan. Beberapa studi menunjukkan bahwa propolis, sebuah produk dari sarang lebah yang bertekstur seperti lilin, memiliki sifat antijamur. Walaupun demikian, studi yang menyelidiki efektivitas Propolis Brunei (PB) sebagai obat antijamur alternatif masih langka. Studi ini bertujuan untuk mengevaluasi efek PB terhadap pertumbuhan *Candida albicans* (CA). **Metode:** Studi ini menggunakan metode difusi agar dan mikrodilusi. Melalui difusi agar, peneliti mengevaluasi zona inhibisi. Sedangkan, melalui mikrodilusi, peneliti mengevaluasi optical density difference (ODD), minimum inhibitory concentration (MIC), dan percentage of inhibition (%I). CA ATCC 90028 dipaparkan dengan ekstrak etanol propolis dengan tiga konsentrasi berbeda: 50 mg/ml, 70 mg/ml, dan 100 mg/ml. Flukonazole digunakan sebagai kontrol positif. Hasil: Rerata zona inhibisi PB 50 mg/ml (10 mm), 70 mg/ml (9 mm), dan 100 mg/ml (11,5 mm) lebih rendah daripada flukonazol (15,5 mm). ODD PB 100 mg/ml lebih tinggi dari tes sampel yang lainnya (0.0703 nm). %I PB 50 mg/ml (79.15%), 70 mg/ml (91.18%), dan 100 mg/ml (92.76%) lebih tinggi daripada flukonazol (21.82%). MIC adalah 50 mg/ml. **Kesimpulan:** PB memiliki efek antifungal terhadap pertumbuhan CA. Terdapat hubungan yang signifikan antara zona inhibisi dan ODD PB jika dibandingkan dengan flukonazol. Terdapat korelasi negatif antara zona inhibisi dan ODD ketika membandingkan ketiga konsentrasi PB. Terdapat korelasi positif antara konsentrasi PB dan %I.

.....**Introduction:** Among all cases, candida species accounts for 40.9% cases worldwide. However, drug-resistance is rising due to its adaptive nature. Thus, an alternative anti-fungal drug to combat invasive candidiasis is needed. Studies have shown that propolis, a wax-like beehive product, possess anti-fungal properties. Still, studies investigating the effectiveness of Brunei propolis (BP) as an alternative anti-fungal drug are still scarce. This study aims to evaluate the effects of BP against the growth of *Candida albicans* (CA). **Methods:** Researcher conducted agar diffusion and micro-dilution method. Through agar diffusion, inhibition zone was evaluated. Meanwhile, through micro-dilution, the author evaluated the optical density difference (ODD), minimum inhibitory concentration (MIC), and percentage of inhibition (%I). CA ATCC 90028 was tested against Propolis extract in three different concentrations: 50 mg/ml, 70 mg/ml, and 100 mg/ml. Fluconazole was the positive control. **Results:** The mean inhibition zone of BP 50 mg/ml (10 mm), 70 mg/ml (9 mm), and 100 mg/ml (11.5 mm) are lower than fluconazole (15.5 mm). ODD of BP 100 mg/ml is higher than other test samples (0.0703). %I of BP 50 mg/ml (79.15%), 70 mg/ml (91.18%), and 100 mg/ml (92.76%) are higher than fluconazole (21.82%). MIC value is 50 mg/ml. **Conclusion:** BP possess anti-fungal effects towards CA. There is a significant association between inhibition zone and ODD of BP with respect to fluconazole. There is a negative association between all BP concentrations. There is a

positive association between BP concentration and %I.