

ABSTRAK

AKTIVITAS ANTI FUNGI EKSTRAK KULIT HUJAN EMAS (*Senna multijuga*) TERHADAP JAMUR *Ganoderma boninense* PADA SAWIT SECARA *IN VITRO* DAN *IN SILICO*

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Penelitian ini bertujuan mengevaluasi aktivitas antifungi ekstrak kulit tanaman hujan emas (*Senna multijuga*) terhadap jamur *Ganoderma boninense* secara *in vitro* dan *in silico*. Ekstraksi dilakukan melalui maserasi menggunakan alkohol 96%, dilanjutkan fraksinasi etil asetat kemudian pemurnian dengan kolom kromatografi menggunakan eluen 100% CHCl₃, 3% MeOH/CHCl₃, 20% MeOH/CHCl₃ dan 100% MeOH. Uji *in vitro* dilakukan dengan metode difusi senyawa aktif terhadap isolat murni *G. boninense* dalam media PDA. Hasil uji *in vitro* menunjukkan hasil kolom kromatograf fraksi 100% CHCl₃ menghasilkan laju pertumbuhan terendah (0,39 cm/hari). Fraksi eluat 100% CHCl₃ di kolom kromatografi untuk mendapat senyawa yang lebih murni (Fraksi 1-5) dan dilakukan uji *in vitro* terhadap *G. boninense*. Fraksi 1 menunjukkan daya hambat tertinggi dibandingkan fraksi lainnya dengan laju pertumbuhan *G. boninense* sebesar 0,52 cm/hari dan persentase daya hambat 37% sehingga diuji lebih lanjut pada berbagai konsentrasi (0; 0,25; 0,5; 0,75; 1; 1,25; dan 1,5 ppm) terhadap *G. boninense*. Konsentrasi 1,5 ppm fraksi 1 menghasilkan daya hambat tertinggi (54 %) dan laju pertumbuhan 0,40 cm/hari. Uji *in silico* terhadap senyawa hasil LC-MS menggunakan *molecular docking* senyawa trans-1,1'-Dimethyl-5,5'-azotetrazole dari kulit hujan emas (*Senna multijuga*) menghambat ATP-dependent RNA helicase *G. boninense* dengan *binding affinity* -6,4 kcal/mol dengan ikatan hidrogen dengan situs aktif protein, yaitu Ser310A dan Thr360A. Berdasarkan hasil tersebut, ekstrak kulit *S. multijuga* memiliki potensi sebagai sumber antifungi alami terhadap *G. boninense*.

Kata kunci: *Senna multijuga*, *Ganoderma boninense*, antifungi, *in vitro*, *in silico*, *docking molekuler*

ABSTRACT

ANTIFUNGAL ACTIVITY OF HUJAN EMAS TREE (*Senna Multijuga*) BARK EXTRACT AGAINST *Ganoderma Boninense* ON OIL PALM THROUGH *IN VITRO* AND *IN SILICO* APPROACHES

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This study aims to evaluate the antifungal activity of bark extract from the golden shower tree (*Senna multijuga*) against *Ganoderma boninense* through *in vitro* and *in silico* approaches. Extraction was carried out via maceration using 96% ethanol, followed by ethyl acetate fractionation and purification using column chromatography with eluents of 100% chloroform (CHCl₃), 3% methanol in chloroform, 20% methanol in chloroform, and 100% methanol. The *in vitro* assay was conducted using the diffusion method against pure isolates of *G. boninense* on PDA medium. Results showed that the 100% CHCl₃ chromatographic fraction had the lowest fungal growth rate (0.39 cm/day). This fraction was further separated into sub-fractions (Fr.1 to Fr.5), which were then tested against *G. boninense*. Among them, Fraction 1 exhibited the highest inhibitory effect with a fungal growth rate of 0.52 cm/day and an inhibition percentage of 37%. Fraction 1 was further tested at various concentrations (0, 0.25, 0.5, 0.75, 1, 1.25, and 1.5 ppm), where the 1.5 ppm concentration resulted in the highest inhibition (54%) and a fungal growth rate of 0.40 cm/day. The *in silico* analysis using molecular docking revealed that the compound *trans*-1,1'-Dimethyl-5,5'-azotetrazole, identified from the LC-MS profile of *S. multijuga* bark, inhibited ATP-dependent RNA helicase of *G. boninense* with a binding affinity of -6.4 kcal/mol. The compound formed hydrogen bonds with the protein's active site residues, Ser310A and Thr360A. These findings suggest that *S. multijuga* bark extract has promising potential as a natural antifungal agent against *G. boninense*.

Keywords: *Senna multijuga*, *Ganoderma boninense*, antifungal, *in vitro*, *in silico*, molecular docking