

学位論文要旨  
Dissertation Abstract

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Antitermite and Antifungal Activities of Indonesian Wood  
Biomass Against a Subterranean Termite *Coptotermes*

学位論文題目 : *formosanus* and Wood Rotting Fungi  
Title of Dissertation

(インドネシアの木質バイオマスの地下シロアリ *Coptotermes formosanus* に対する抗蟻活性および木材腐朽菌に対する抗真菌活性)

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The antitermite and antifungal activities of several Indonesian wood biomass were investigated against the subterranean termite, *Coptotermes formosanus* and wood rotting fungi, a white rot fungus (*Trametes versicolor*) and a brown rot fungus (*Fomitopsis palustris*). The objective of this study was to isolate the chemical components that responsible as antitermite and antifungal properties of those wood biomass samples.

The heartwood mill was extracted with acetone and methanol to give their extracts, each of which were fractionated successively using *n*-hexane, ethyl acetate, and water to afford their fractions. No-choice and two-choice tests were employed to assess the antitermite activity of the wood biomass samples. To examined the antifungal activity, Potato Dextrose Agar medium that contain the obtained concentration of the extracts tested was used to inoculate the fungal mycelium.

Gofasa (*Vitex cofassus* Reinw.) is one of the wood species that potential to explore its bioactive compounds, since this wood species showed high resistance to wood deteriorating organisms without any chemical preservatives. The yield of the extracts and fractions suggested that the extractives of *V. cofassus* heartwood tend to be polar. It was demonstrated that the methanol extract itself, the ethyl acetate fraction and the *n*-hexane fraction from the methanol extract, and the ethyl acetate fraction from the acetone extract had high antifeedant activity against *C. formosanus*. Further investigation showed that there were four active sub-fractions that recently obtained from the ethyl acetate fractions of the acetone and the methanol extracts. Furthermore, all the extracts and fractions were shown to have strong-moderate activity against the wood rotting fungi, where the aqueous fraction of the acetone extract had the strongest antifungal activity against *T. versicolor*, while almost these extracts and fractions had moderate-weak activity against *F. palustris*.

*Sandoricum koetjape* Merr. (Meliaceae), also known as wild mangosteen, is one

kind of trees that produce fruits, and various parts of the tree have medicinal properties. The yield of the extract and fraction indicated that the extractives of *S. koetjape* tend to be non-polar. Antitermite test revealed that the acetone extract and its fractions had the strongest antifeedant activity classified into III-IV of the antifeedant class, and that the methanol extract and its fractions had lower antitermite activity mostly belonging to I-II of the antifeedant class. Furthermore, the antifungal test indicated that against *T. versicolor* the *n*-hexane fraction of the methanol extract had the strong antifungal ability belonging to the strong category according to the antifungal activity class, while against *F. palustris* almost these extracts and fractions had the weak activity.

*Albizzia falcataria* one of the member of Family Fabaceae, is most widely developed and utilized tree species for forestry development program in Indonesia. The extraction and fractionation indicated that the extracts of *A. falcataria* waste wood and *A. falcataria* bark tend to be polar. Antitermite test revealed that *Albizzia falcataria* bark classified into class II – III, while the *A. falcataria* waste wood had revealed the antitermite activity that classified into class I – II of the antifeedancy classification. From the antifungal test results confirmed that the extract of *A. falcataria* waste wood were classified into moderate-weak class of antifungal activity class against *T. versicolor*. On the contrary, all these extracts and fractions only classified into the weak-not active antifungal activity against *F. palustris*. Furthermore, the extracts and fractions of *A. falcataria* bark demonstrated the moderate-weak antifungal activity against *T. versicolor*. Conversely, all these extracts and fractions revealed classified into weak-not active antifungal classification against *F. palustris*.

As the conclusions were among those Indonesian wood biomass extracts, the *S. koetjape* heartwood extracts revealed the higher antitermite activities compared to *V. cofassus* and *A. falcataria* waste wood and *A. falcataria* bark. Moreover, the wood biomass extracts showed the strong-moderate antifungal activities against *T. versicolor*, while almost the extracts were indicated the weak-not active against *F. palustris* fungi.

**Key words:** *Coptotermes formosanus*, antifeedant activity, wood extractives, white rot fungus, brown rot fungus