

ABSTRAK

EFEKTIVITAS ASAP CAIR LIMBAH BAMBUR TERHADAP PATOGEN LAYU TANAMAN (*Ralstonia solanacearum* Yabuuchi (Smith)) SECARA *IN VITRO*

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Pengendalian patogen layu tanaman (*R. solanacearum*) masih mengandalkan pestisida sintetik terbukti belum efektif dan bisa merugikan lingkungan. Asap cair adalah larutan campuran dispersi asap hasil pirolisa bahan organik yang berpotensi sebagai antibakteri yang ramah lingkungan. Penelitian ini bertujuan untuk mengetahui efektifitas asap cair limbah bambu sebagai antibakteri *R. solanacearum* secara *in vitro*. Pembuatan dan pemurnian asap cair dilakukan 4 tahapan yaitu pirolisis, sedimentasi, destilasi, redestilasi. Penelitian ini diawali dengan menghitung bobot jenis, pengecekan warna, pH, kandungan fenol, dan kadar asam. Uji antibakteri dilakukan menggunakan media kertas cakram dengan melihat diameter zona bening. Bakteri yang digunakan biakan bakteri *R. solanacearum*. Konsentrasi asap cair untuk uji antibakteri yaitu 1%, 2%, 3%, 4% dan 5%. Hasil penelitian menunjukkan bahwa pemberian asap cair limbah bambu terbukti dapat menghambat pertumbuhan bakteri *R. solanacearum* dimana semakin tinggi konsentrasi asap cair maka semakin besar daya hambatnya. Terdapat kandungan fenol dalam asap cair limbah bambu dengan kadar asam total sebesar 14,2%, pH asap cair sebesar 2 dan massa jenis 1,0228 dengan warna kuning jernih. Diameter zona hambat asap cair limbah bambu terhadap pertumbuhan bakteri *R. solanacearum* diperoleh nilai rata-rata 2,59 sampai 1,37 mm dengan kategori lemah. Konsentrasi Hambat Minimum (KHM) asap cair limbah bambu terhadap pertumbuhan bakteri *R. solanacearum* diperoleh pada konsentrasi 1% dengan diameter zona bening 1,88 mm. Hasil analisis menggunakan One Way ANOVA diperoleh F hitung (0.028099) > F tabel (2,77) sehingga tidak terdapat perbedaan yang signifikan terhadap zona bening yang dihasilkan.

Kata kunci : Asap Cair, *In Vitro*, Limbah Bambu, *R. solanacearum*.

ABSTACT
THE EFFECTIVENESS OF LIQUID SMOKE FROM BAMBOO WASTE
AGAINST PATHOGENS OF PLANT WILT (*Ralstonia solanacearum*
Yabuuchi (Smith)) *IN VITRO*

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Control of plant wilt pathogens (*R. solanacearum*) still relies on synthetic pesticides, which have proven to be ineffective and environmentally harmful. Liquid smoke is a solution composed of a dispersion of smoke produced from the pyrolysis of organic material, which has the potential as an environmentally friendly antibacterial agent. This study aims to determine the effectiveness of bamboo waste liquid smoke as an antibacterial agent against *R. solanacearum in vitro*. The production and purification of liquid smoke are carried out in four stages: pyrolysis, sedimentation, distillation, and re-distillation. The study begins with measuring density, checking color, pH, phenol content, and acid content. The antibacterial test is conducted using disc paper media by observing the diameter of the clear zone. The bacteria used are cultures of *R. solanacearum*. The concentrations of liquid smoke tested for antibacterial activity are 1%, 2%, 3%, 4%, and 5%. The research results indicate that the application of bamboo waste liquid smoke effectively inhibits the growth of *R. solanacearum* bacteria, with a higher concentration of liquid smoke resulting in a greater inhibitory effect. The liquid smoke from bamboo waste contains phenol with a total acid content of 14.2%, a pH of 2, and a specific gravity of 1.0228 g/ml, appearing as clear yellow. The inhibitory zone diameter of bamboo waste liquid smoke against *R. solanacearum* bacteria ranges from an average of 2,59 to 1,37 mm, categorized as weak inhibition. The Minimum Inhibitory Concentration (MIC) of bamboo waste liquid smoke against *R. solanacearum* bacteria is obtained at a concentration of 1%, with a clear zone diameter of 1.88 mm. The analysis using One Way ANOVA yields a calculated F-hit (0,028099) > F-tab (2,77), indicating no significant difference in the resulting clear zones.

Keywords: bamboo waste, *in vitro*, Liquid smoke, *Ralstonia solanacearum*.