

PENGARUH SUHU PIROLISIS DAN PROSES REDISTILASI TERHADAP SIFAT FISIKO-KIMIA ASAP CAIR TONGKOL JAGUNG

Oleh :

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INTISARI

Tongkol jagung merupakan limbah tanaman dari buah jagung yang telah diambil bijinya, tongkol jagung tersebut umumnya dibuang begitu saja menjadi sampah. Salah satu penanganan limbah tongkol jagung menjadi produk yang lebih bernilai adalah dengan memanfaatkannya menjadi bahan baku asap cair. Penelitian ini bertujuan untuk mengetahui faktor suhu pirolisis dan proses redistilasi terhadap sifat fisiko-kimia asap cair tongkol jagung yang dihasilkan.

Penelitian ini menggunakan model rancangan acak lengkap dengan dua faktor, yaitu suhu pirolisis (300°C, 400°C, dan 500°C) dan proses redistilasi (tanpa redistilasi dan dengan redistilasi). Asap cair selanjutnya dilakukan penghitungan rendemen hasil pirolisis, rendemen hasil redistilasi, pengujian sifat fisiko-kimia meliputi berat jenis, pH, kadar asam, kadar fenol serta analisis komposisi kimia dengan menggunakan GC – MS (*Gas Chromatography – Mass Spectrometry*). Uji aktivitas asap cair anti rayap dilakukan karena senyawa fenol dan asam diduga berperan aktif sebagai anti rayap.

Hasil penelitian asap cair tongkol jagung memberikan rendemen hasil pirolisis dan rendemen hasil redistilasi berturut-turut antara 27,21% – 30,74% dan 71% – 97,5% dengan rendemen hasil pirolisis dan rendemen hasil redistilasi terbesar diperoleh dari asap cair dengan suhu pirolisis 300°C. Fisiko-kimia asap cair yang dihasilkan memiliki nilai berat jenis berkisar antara 0,824 – 0,86; pH antara 4,1 – 5,22; kadar asam antara 7,06% – 9,91%; dan kadar fenol antara 2,7% – 7,11%. Mortalitas rayap yang dihasilkan antara 20% – 40%. Faktor suhu pirolisis berpengaruh sangat nyata terhadap rendemen hasil pirolisis, pH, kadar asam, dan kadar fenol. Proses redistilasi berpengaruh sangat nyata terhadap berat jenis, pH, kadar asam, dan kadar fenol. Interaksi suhu pirolisis dan proses redistilasi berpengaruh sangat nyata terhadap pH, kadar fenol, dan mortalitas rayap. Secara umum asap cair suhu pirolisis 300°C tanpa redistilasi memberikan nilai sifat fisiko-kimia dan mortalitas rayap paling baik.

Kata kunci : suhu pirolisis, redistilasi, asap cair, fisiko-kimia, dan tongkol jagung.

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EFFECT OF PYROLISIS TEMPERATURE AND REDISTILATION PROCESS ON THE PHYSICO-CHEMICAL PROPERTIES OF CORNCOB PYROLIGNEOUS ACID

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ABSTRACT

Corn cob is a plant waste from the fruit of corn that has been taken the corn kernels, the corn cobs are generally thrown away into a garbage. One of handling corn cob waste into a more valuable product is to use it as raw material of pyrolygneous acid. The objective of this study aimed to give an overview the effect of pyrolysis temperature and redistillation process on the physico-chemical properties of corn cobs pyrolygneous acid.

The research use completely randomized design with two factors, namely pyrolysis temperature (300°C, 400°C, and 500°C) and redistillation process (without redistillation and with redistillation). The experiment was done to analyze the yield of pyrolysis output, yield of redistillation output, physico-chemical properties including the specific gravity, pH, acid content, phenol content, and chemical composition analysis by GC – MS (Gas Chromatography – Mass Spectrometry). Termiticidal activity of pyrolygneous acid was done for phenol and acid compound were expected an active role as antitermite.

The results of the study provide corn cobs pyrolygneous acid yield of pyrolysis output and yield of redistillation output, respectively of between 27,21% – 30,74% and 71% – 97,5% with the highest yield of pyrolysis output and yield of redistillation output obtained pyrolygneous acid with 300°C pyrolysis temperature. Based on the physico-chemical examination results the value of specific gravity between 0,824 – 0,86; pH between 4,1 – 5,22; acid content between 7,06% – 9,91%; and phenol content between 2,7% – 7,11%. The result of termite mortality between 20% - 40%. Pyrolysis temperature factor significantly affected yield of pyrolysis output, pH, acid content, and phenol content. Redistillation process factor significantly affected specific gravity, pH, acid content, and phenol content. Interaction of pyrolysis temperature factor and redistillation process factor significantly affected pH, phenol content, and termite mortality. Generally liquid smoke with 300°C pyrolysis temperature without redistillation provide optimum value of physico-chemical properties and termite mortality.

Keywords : pyrolysis temperature, redistillation, pyrolygneous acid, physico-chemical, and corn cob.

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