

**RECOVERY LOGAM BERAT Cd(II), Cu(II), DAN Cr(III) MENGGUNAKAN
TEKNIK MEMBRAN CAIR RUAH (BLM) DENGAN SENYAWA PEMBAWA
TURUNAN EUGENOL BERGUGUS AKTIF N**

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J2C003132**

RINGKASAN

Senyawa pembawa sangat menentukan efektifitas dan selektifitas pada berbagai teknik ekstraksi. Melihat fungsinya, maka akan menjadi suatu kajian yang menarik untuk mensintesis senyawa pembawa yang memiliki efektifitas dan selektifitas yang tinggi sebagai suatu ekstraktan logam berat. Eugenol merupakan salah satu sumber kekayaan hayati Indonesia. Eugenol beserta turunannya dapat dimanfaatkan sebagai ekstraktan logam berat. Pada penelitian ini bertujuan untuk mempelajari efektifitas dan selektifitas senyawa pembawa turunan eugenol (piridin metil eugenoksi asetat dan polimernya) untuk *recovery* logam berat Cd(II), Cu(II), dan Cr(III). Digunakan logam Cd(II), Cu(II), dan Cr(III) karena mewakili logam golongan asam lunak, *borderline*, dan keras, sehingga dapat diketahui selektifitasnya terhadap golongan tertentu.

Senyawa piridin metil eugenoksi asetat (PMEOA) dan polimernya (poliPMEOA), hasil sintesis dari eugenol digunakan sebagai senyawa pembawa logam berat dengan metode transport membran cair ruah (BLM). Analisis senyawa yang terbentuk dilakukan dengan GC-MS, FTIR, dan ¹H NMR. Penentuan berat molekul rata-rata polimer ditentukan dengan viskosimeter Ubbelohde. Transport logam dilakukan dengan menggunakan pipa U selama 24 jam. Membran merupakan senyawa pembawa dalam pelarut kloroform. Fase umpan adalah campuran ion logam Cd(II), Cu(II), dan Cr(III) masing-masing 30 ppm dengan pH 3,31, sedangkan fase penerima adalah larutan HCl pH = 1. Hasil transport ion logam dianalisis dengan AAS.

Hasil sintesis PMEOA berupa cairan berwarna hitam berbau harum. Sedangkan poliPMEOA berbentuk gel berwarna hitam dengan berat molekul 4924 g/mol. Dari hasil transport diperoleh bahwa PMEOA selektif terhadap Cu(II) diikuti Cd(II) dan Cr(III) dengan % transport berturut-turut adalah 87,54%; 43,53%; dan 0,60% menggunakan 0,7 g PMEOA, serta 73,03%; 25,70%; dan 2,01% menggunakan 0,3 g PMEOA. Pengujian menggunakan 0,7 g poliPMEOA tidak menunjukkan selektifitas namun lebih efektif dengan % transport masing-masing sekitar 50%.

SUMMARY

Carrier compounds determine the effectivity and selectivity on various techniques of extraction. Considering their characteristics, synthesis of highly effective and selective carrier compounds as heavy metal extractants could be a major of interesting study. Eugenol is one of Indonesian biological resources. Eugenol and its derivatives can be utilized as heavy metal extractant. This research was carried out to study the effectivity and selectivity of eugenol derivatives (pyridine-2-ylmethyl 2-(eugenoxo) acetate) as carrier compounds for the recovery of Cd (II), Cu(II) and Cr(III). Those heavy metal ions were selected because they represented metals of soft, borderline and hard acid. The selectivity of the carrier compounds toward certain group of acid, therefore, could be analyzed.

Pyridine-2-ylmethyl eugenoxo acetate (PMEOA) and its polymer (polyPMEOA), which were synthesized from eugenol, were utilized as heavy metal carrier compounds by transport method of Bulk Liquid Membrane (BLM). Compounds formed were analyzed by GC-MS, infra-red spectrometer, and ^1H NMR. The determination of average molecular weight of the polymer was carried out by Ubbelohde viscosimeter, whereas the metal transport was done by using U-pipe for 24 hours. Membrane was carrier compound in chloroform. The feed phase was the mixture of 30 ppm of heavy metal ions, Cd (II), Cu(II) and Cr(III) with pH = 3,31 whereas the receiving phase was HCl solution with pH = 1. The transport result of metal ions was analyzed by AAS.

The synthesis produced an aromatic black liquid of PMEOA and a dark gel of poliPMEOA with molecular weight of 4924 g/mol. The transport data showed that the selectivity of 0,7 g of PMEOA followed the order of Cu(II), Cd(II) and Cr(III) with transport percentage of 87,54%; 43,53%; 0,60% respectively, while 0,3 g of PMEOA resulted the transport percentage of 73,03%; 25,70% and 2,01%. From the data on the analysis of 0,7 g of poliPMEOA, it could be concluded that this polymer did not indicate any selectivity. However, it was more effective with transport percentage for about 50% for all heavy metal ions.

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