

RINGKASAN

Perak adalah logam yang penggunaannya sangat luas meliputi fotografi, perhiasan, dan sebagainya sampai ke skala laboratorium. Mengingat toksisitasnya maka limbah yang mengandung perak sebelum dibuang perlu diolah untuk mengambil kembali kandungan peraknya. Teknik membran cair emulsi (*emulsion liquid membrane*, ELM) dapat digunakan untuk tujuan tersebut.

Penelitian ini bertujuan untuk mengetahui keefektifan serta selektivitas ELM bagi pengambilan dan pemisahan perak dari limbah cuci/cetak foto (*acifix*) dan laboratorium. Dalam penelitian dikaji pengaruh variasi komponen pembawa (D2EHPA, D2EHPA-TBP, dan TBP) dan konsentrasi pembawa (0,25 M dan 1 M) terhadap % pengambilan perak dari limbah buatan (dalam bentuk Ag^+ dan $\text{Ag}(\text{S}_2\text{O}_3)_2^{3-}$) maupun dari limbah *acifix*, dan pengaruh dari keberadaan logam (Cu(II) dan Cr(VI)) dalam fasa umpan terhadap % pengambilan.

Dari penelitian diperoleh % pengambilan perak dari limbah buatan Ag^+ dengan pembawa D2EHPA 1 M; D2EHPA-TBP 1 M; D2EHPA-TBP 0,25 M berturut-turut 64,48 %; 65,65 %; 96,49 %. % pengambilan perak dari limbah buatan $\text{Ag}(\text{S}_2\text{O}_3)_2^{3-}$ dengan variasi pembawa yang sama berturut-turut 25,57 %; 88,19 %; 82,76 %. % pengambilan perak dari limbah buatan Ag^+ dengan pembawa D2EHPA-TBP 1 M dengan adanya logam Cu(II) dan Cr(VI) 10 ppm sebesar 56,17 % dan dengan adanya logam Cu(II) dan Cr(VI) 25 ppm sebesar 39,82 %. % pengambilan perak dari limbah buatan $\text{Ag}(\text{S}_2\text{O}_3)_2^{3-}$ dengan pembawa D2EHPA-TBP 1 M dengan adanya logam Cu(II) dan Cr(VI) 10 ppm sebesar 87,42 % dan dengan adanya logam Cu(II) dan Cr(VI) 25 ppm sebesar 94,93%. % pengambilan perak dari limbah *acifix* dengan pembawa D2EHPA 1 M; D2EHPA-TBP 0,25 M; D2EHPA-TBP 1 M (SPAN-80 20 %); D2EHPA-TBP 1 M (SPAN-80 30 %) berturut-turut 88,14 %; 87,87 %; 89,26 %; 89,27 %. % pengambilan perak dari limbah laboratorium dengan pembawa D2EHPA-TBP 1 M sebesar 94,52 %. Pengambilan dengan pembawa TBP gagal karena tidak terbentuk emulsi.

Dapat disimpulkan bahwa pembawa D2EHPA-TBP lebih efektif untuk pengambilan perak yang berada dalam bentuk peraktiosulfat. Penggunaan pembawa D2EHPA-TBP untuk limbah buatan $\text{Ag}(\text{S}_2\text{O}_3)_2^{3-}$ menghasilkan efek sinergi. Pembawa D2EHPA-TBP (sinergi) relatif selektif terhadap perak daripada Cu(II) dan Cr(VI).

SUMMARY

Silver is a metal that widely used in many fields such as photography, electrical devices, jewelry, and in laboratory. Considering its toxicity, silver containing waste should be treated to obtain the silver back. Emulsion liquid membrane (ELM) technique can be used for the purpose of silver recovery.

The research is aimed to find out the effectiveness and selectivity of ELM method in the recovery and separation of silver from photography (acifix) and laboratory waste. The research studied about the influence of; carrier component variation (D2EHPA, D2EHPA-TBP, and TBP), carrier concentration (0.25 M and 1M) on % silver recovery of artificial waste (in the form of Ag^+ and $\text{Ag}(\text{S}_2\text{O}_3)_2^{3-}$) and acific waste. Also the influence of the presence other metal (Cu(II) and Cr(VI)) in feed phase on % recovery. The result analized by measuring silver concentration in feed phase (before and after recovery process) using AAS. pH of the feed phase and receiver phase also measured (before and after recovery).

The % recovery of silver from artificial Ag^+ waste with D2EHPA 1 M, D2EHPA-TBP 1 M, and D2EHPA-TBP 0.25 M as the carrier were 64.48%, 65.65%, and 96.49% respectively. The % recovery of silver from artificial $\text{Ag}(\text{S}_2\text{O}_3)_2^{3-}$ with D2EHPA 1 M, D2EHPA-TBP 1 M, and D2EHPA-TBP 0.25 M as the carrier were 25.57%, 88.19%, and 82.76% respectively. The % recovery of silver from artificial Ag^+ waste containing 10 ppm Cu(II) and Cr(VI) with D2EHPA-TBP 1 M carrier was 56.17%, while with 25 ppm Cu(II) and Cr(VI) was 39.82%. The % recovery of silver from artificial $\text{Ag}(\text{S}_2\text{O}_3)_2^{3-}$ waste containing 10 ppm Cu(II) and Cr(VI) with D2EHPA-TBP 1 M carrier was 87.42%, while with 25 ppm Cu(II) and Cr(VI) was 94.93%. The % recovery of silver from acifix waste with D2EHPA 1 M, D2EHPA-TBP 0.25 M, D2EHPA-TBP 1 M (SPAN-80 20%), D2EHPA-TBP 1 M (SPAN-80 305) were 88.14%, 87.87%, 89.26%, and 89.27% respectively. The % recovery of silver from laboratory waste with D2EHPATBP 1 M was 94.52%. Recovery with TBP carrier was failed because emulsion was not formed.

It is concluded that D2EHPA-TBP carrier is more effective for silver extraction in the form of $\text{Ag}(\text{S}_2\text{O}_3)_2^{3-}$. The use of D2EHPA-TBP carrier for artificial $\text{Ag}(\text{S}_2\text{O}_3)_2^{3-}$ waste resulting sinergic effect. D2EHPA-TBP (sinergic carrier) is relatively more selective for silver than for Cu(II) and Cr(VI).