RECOVERY PERAK DARI LIMBAH FOTOGRAFI MELALUI MEMBRAN CAIR BERPENDUKUNG DENGAN SENYAWA PEMBAWA ASAM DI-2-ETIL HEKSILFOSFAT (D2EHPA)

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RINGKASAN

Perak merupakan suatu logam berharga, yang digunakan dalam film foto karena sifat fotosensitif. Pengembangan film menyebabkan limbah fotografi dari larutan *fixer* dan air bilasan mengandung 1.000-10.000 dan 50-200 mg/L, dalam bentuk kompleks perak-tiosulfat. Perak juga dikelompokkan sebagai zat yang berbahaya sehingga penelitian ini dilakukan untuk memperoleh kembali kation Ag^+ dari limbah fotografi karena perak memiliki nilai komersial dan sebagai upaya mengurangi pencemaran lingkungan.

Recovery perak dari limbah cuci cetak dapat dilakukan dengan metode membran cair berpendukung (SLM), sebagai membran pendukung digunakan PTFE yang direndam selama 2 jam dalam senyawa pembawa D2EHPA 1 M dengan pelarut kerosen dan dilakukan pengadukan selama 6 jam. Untuk mengetahui kondisi optimum dalam *recovery* perak dilakukan variasi pH larutan umpan 1; 1,5; 2; 2,5; 3; 3,5; 4, larutan penerima HCl; HCl-EDTA; HNO_3; HNO_3-EDTA; H_3PO_4; H_3PO_4-EDTA serta konsentrasi larutan limbah pemekatan ½ kali; pengenceran 0 kali; pengenceran 10 kali.

Dari penelitian ini diperoleh % transpor perak dari limbah fotografi dengan variasi pH larutan umpan memberikan % transpor perak optimum pada pH 2,5 yaitu 96,44% dengan larutan penerima HCl, sedangkan untuk % transpor perak pada fasa penerima dengan variasi larutan penerima memberikan hasil optimum pada larutan penerima (HCl-EDTA) yaitu 63,85% dan untuk variasi konsentrasi larutan umpan memberikan hasil optimum pada pengenceran 10 kali.

Dapat disimpulkan bahwa kondisi optimum untuk proses *recovery* perak dari limbah fotografi yaitu pH larutan umpan 2,5 dengan larutan penerima HCl. Sedangkan pada variasi larutan penerima diperoleh hasil optimum pada larutan penerima EDTA-HCl dan pada variasi konsentrasi limbah fotografi, konsentrasi paling encer memberikan hasil optimum dalam proses *recovery* perak dari limbah fotografi.

SUMMARY

Silver, a precious metal, is used in photofilm because of its photosensitive properties. Film development causes photographic waste of spent fixer and rinse water containing 1000–10,000 and 50–200 mg/L, respectively, in the form of silver-thiosulphate complexes. Silver is also classified as a hazardous substance, therefore it should be recovered completely for both economic and environmental reasons.

Recovery of silver from photographic waste could be done with supported liquid membrane as supported membrane used PTFE which was immersed for 2 hours in carier D2EHPA 1 M with kerosene as solvent and agitated for 6 hours. To know optimum conditions in recovery of silver it was done with varying pH of feed solution 1; 1.5; 2; 2.5; 3; 3.5; 4, varying receiver solution HCl; HCl-EDTA; HNO_3; HNO_3-EDTA; H_3PO_4; H_3PO_4-EDTA and varying concentration of photographic waste solution with concentration factors of half time; 0 time; 10 times.

From this experiment was known % recovery of silver from photographic waste with varying pH solution which providing % optimum transport of silver with pH feed solution of 2.5 was 96.94% with HCl as stripping solution, whereas for % recovery of silver with varying strip solution which providing % optimum transport of silver with HCl-EDTA as stripping solution was 63.85% and for varying concentration feed solution which providing % optimum transport of silver with dilution 10 times.

It could be concluded that the optimum conditions for recovery process of silver from photographic waste are pH feed solution of 2.5 with HCl as stripping solution. Whereas with varying strip solution the optimum result is with HCl-EDTA as stripping solution and for varying concentration photographic waste, the smallest concentration of sample result in effective process.

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