

**Fitoremediasi Lahan Tercemar Limbah Cair Industri Perak dengan Tanaman Tahi Kotok (*Tagetes erecta* L.): Laju Penyerapan, Laju Eliminasi, dan Bioakumulasi Subselular**

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**INTISARI**

Polusi tanah oleh logam berat merupakan permasalahan kesehatan dan lingkungan yang perlu dituntaskan. Fitoremediasi merupakan salah satu metode remediasi lahan tercemar logam berat. Pada penelitian ini, digunakan *Tagetes erecta* L. untuk menguji kemampuannya dalam meremediasi lahan tercemar limbah cair industri perak Kotagede, Daerah Istimewa Yogyakarta dengan fokus pada laju penyerapan, laju eliminasi, dan distribusi tingkat subseluler. Tanaman berusia 2 bulan ditanam dalam tanah dan disiram limbah industri perak lalu diamati selama 28 hari untuk mengamati laju penyerapan logam berat, kemudian dipindahkan ke media tidak terkontaminasi untuk mengamati laju eliminasi logam berat. Logam berat dominan pada limbah yang teramati melalui *Atomic Absorption Spectrophotometer* yaitu nikel. Laju penyerapan nikel mencapai 41,3% dengan laju tertinggi sebesar 2,172 mg.kg<sup>-1</sup>.d<sup>-1</sup> yang lebih tinggi daripada laju eliminasinya. Distribusi Ni dalam tingkat subseluler diamati dengan ultrasentrifugasi bertingkat dengan hasil di kondisi perlakuan yaitu Fraksi Terlarut > Dinding Sel > Organel > Membran pada kondisi penyerapan dan Dinding Sel > Organel > Fraksi Terlarut > Membran pada kondisi eliminasi. Tanaman *T. erecta* L. berpotensi sebagai agen fitoremediasi terutama sebagai fitofiltrasi lahan tercemar logam berat yang terkandung dalam limbah cair industri perak Kotagede.

Kata Kunci : Nikel, penyerapan, eliminasi, distribusi subseluler

**Phytoremediation of Soil Contaminated Silver Industry Wastewater by Marigold (*Tagetes erecta* L.): Uptake and Elimination Rates, and Subcellular Accumulation**

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**ABSTRACT**

Soil pollution by heavy metals is a health and environmental problem that needs to be solved. Phytoremediation is one of the methods to remediate the contaminated land by heavy metals. In this study, *Tagetes erecta* L. was used to test its ability to remediate the contaminated land by Kotagede silver industry wastewater. It focuses on the uptake and elimination rates, and sub-cellular level distribution. The 2-month-old plants were planted and doused with silver industry wastewater. Then, it was observed for 28 days to observe the rate of heavy metal absorption and transferred to uncontaminated media to measure the rate of heavy metal elimination. The dominant metal in the wastewater observed through the Atomic Absorption Spectrophotometer is nickel. The nickel absorption rate reached 41.3% with the highest rate of  $2.172 \text{ mg.kg}^{-1}\text{d}^{-1}$  which is higher than the elimination rate. The distribution of Ni in the subcellular level is observed with multilevel ultracentrifugation. The result of the treatment conditions are the Soluble Fraction > Cell Wall > Organelle > Membrane on absorption condition and Cell Wall > Organelle > Soluble Fraction > Membrane in elimination condition. Plant has potential as phytoremediation agent primarily as a phytofiltration of contaminated heavy metals contained in Kotagede silver waste industry.

Keywords: Nickel, uptake, elimination, subcellular distribution