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Evaluation of potential toxicity of wastewater from automobile service stations by using *Lemna minor* L

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Abstract

Automobile service industry is one of the leading producers of wastewater with different types of potential toxicants such as oil, grease, detergent and etc. Therefore, wastewater may affect negatively on different ecological receptors in receiving environments. Hence, it is important to characterize potential toxicity of wastewater before being discharged from automobile service stations in order to ensure environmental wellbeing. The study aimed to evaluate the potential toxicity of wastewater generated from automobile service centers by using *Lemna minor* which is widely used indicator plant in ecological risk assessments. Apparently, healthy *Lemna minor* plants were exposed to series of treatments containing 0%, 10%, 20%, 30%, 40%, 50% and 100% wastewater for 7 days. Sterilized distilled water was used as the control. The experiment was designed according to the randomized block (CRBD) by using three replicates for each treatment and control. The analyzed endpoints were relative growth rate (RGR), root number, root elongation and chlorophyll contents (chlorophyll a, chlorophyll b and total chlorophyll). The data were analyzed by employing one-way ANOVA followed by Tukey's post hoc test. All the end points measured from the treatments showed contamination level dependent significant ($P < 0.05$) decrease among the treatments and between each treatment and control. The recorded contamination level dependent significant ($P < 0.05$) negative RGR from the treatments with 30-100% wastewater (respectively $-0.0079 \pm 0.00079 \text{ gg}^{-1}\text{day}^{-1}$, $-0.0247 \pm 0.00247 \text{ gg}^{-1}\text{day}^{-1}$, $-0.0435 \pm 0.00529 \text{ gg}^{-1}\text{day}^{-1}$, $-0.1481 \pm 0.01938 \text{ gg}^{-1}\text{day}^{-1}$) inferred the growth inhibition. The calculated IC_{50} values based on the recorded inhibition in root number, root elongation, chlorophyll a, chlorophyll b and total chlorophyll contents from the treatments were 23.11%, 23.11%, 40.76%, 38.97%, and 38.977%, respectively. The recorded inhibitions in RGR and in the measured end points inferred the potential toxicity of wastewater generated in the service station highlighting the suitability of *Lemna minor* for the evaluation of toxicity.

Keywords: Automobile service centers, End points, *Lemna minor*, Toxicity, Wastewater

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