Evaluation of the Potential of Planarians Dugesia tigrina as Bioindicators of the Toxicity of Waters and Sludges from Mining Tailing

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Copper mining is a crucial component of the overall Chilean economy. It generates high volumes of mining tails with signi? cant environmental risk and potential impacts on ecosystems. Most of them are associated with high concentrations of several heavy metals in the tails. Routine environmental risk assessment of mining tails includes measures of heavy metals levels in tailing, but donot include the biological impact and toxicity over the biotic component. Bioindicators are useful tools to establish biotic impact of contaminants over ecosystems. Planaria is a well-recognized model of regeneration that can be used as bioindicator of several toxic heavy metals. Consequently, this study aims to prove if Dugesia tigrina, the main planaria species in Chile, can serve as bioindicator for routine heavy metal toxicity assessment in copper mining tailing. Therefore, we exposed D. tigrina to both, soluble and insoluble fractions of copper tailing and established their impact over morphology, viability and regenerative turnover of the flatworm. Our results show that D. tigrina exposed to the whole mining tail, present a 22% reduced viability at 21 days and reduced to 0,43 and 0,93 its regeneration index in 14 days (planarian head and tail respectively). In same times, soluble fractions maintain a 100% of planarian viability, but reduced the regeneration index (0,47 and 0,64). Insoluble fractions present a 12% reduced viability and decrease the regeneration index (0,69 and 0,65). These results suggest that D. tigrina is a good bioindicator for mining tails toxicity that can be used in liquid and semi-solid mining waste.

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