

Cyto-genotoxicity and quality of sediments in Dandugan Oya, Sri Lanka

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Sediments are very important in maintaining aquatic ecosystem health. Dandugan Oya is a stream located in the Western province of Sri Lanka. Dandugan oya receives industrial waste from multiple sources. It also serves as a raw water source for public water supply in some suburban areas in the Gampaha District. This study was conducted with the objective of assessing sediment quality and cyto-genotoxic effects of sediments in Dandugan oya. Shallow sediments (5 replicates) were collected from six sites (A: Urban site; B and D: Industrial sites; C: water intake for public water supply; E: Agricultural site; F: Reference site) at two month intervals from May to November 2017 and sediment quality was analysed using standard analytical methods. Cyto-genotoxicity of the sediment elutriates were assessed using *Allium cepa* bioassay. Spatial variation of sediment quality and toxicity indices were analysed by ANOVA followed by Tukey's pairwise comparison using MINITAB 14 software. Significant spatial variations of sediment quality parameters and nuclear abnormalities were observed. Site B recorded significantly lower sand (37%) and significantly higher silt contents (44%) while site D showed a significantly higher clay content (40.6%). Significantly lower sediment pH (4.71) and sediment conductivity (25.29 $\mu\text{S}/\text{cm}$) were recorded from reference site and highest total organic matter (2.32 %) content was recorded at urban site. Mean nuclear abnormalities ranged from 13‰ to 44‰ with significantly higher abnormalities in sites B (42‰) and D (44‰). Occurrence of nuclear buds and condensed nuclei in the interphase cells of the *Allium cepa* root tips exposed to sediment elutriates from industrial sites (15‰ and 18‰) were significantly higher (7 to 9 fold) compared to reference site. Further, Site B showed the highest condensed nuclei formation (61‰). However, occurrence of binuclei showed no significant spatial variations. The Mitotic index of the *Allium cepa* root tip cells ranged from 2.9% to 7.4% with significantly higher values in sites A and B. The results of the present study indicated the occurrence of potential cyto-genotoxic contaminants in the sediments of Dandugan Oya. Therefore, further investigations on the identification of the active forms of these contaminants are recommended in order to maintain the health of the ecosystem.