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Seasonal variation of endotoxin in the ambient air of a sewage treatment plant (STP) in Delhi, India

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In the present study, particulate samplings were carried out for the assessment of endotoxin in different sites of a sewage treatment plant for two seasons, namely summer and winter. The study was focused on the detection of endotoxin levels associated with the coarse (PM_{2.5-10}) and fine particles (PM_{1.0-2.5}). Air sampling was carried out with the cascade impactor “Dekati PM10 sampler”. Filters of the samples were analyzed with the Limulus Amebocyte Lysate (LAL) assay. The amount of endotoxin detected was observed low, however, the concentration of endotoxin in the summer season (124 EU/m³) significantly ($P < 0.05$) exceeded the winter season (40 EU/m³). Among the sites under study, higher values were found at the grit chamber and aeration tank while, it was lower at final settlement tank. Two-way ANOVA result showed the statistically significant ($P < 0.05$) individual effect of sampling sites and sample types as well as the interactive effect of sampling sites and sample types on the endotoxin concentrations. The endotoxin concentrations were found higher in coarse particles (PM_{2.5-10}) than the corresponding fine particles (PM_{2.5}). Since, we are well aware that endotoxins have the toxic effects on respiratory system, immune system etc., thus our result will be useful to understand the causative effects imposed on the workers of the STP pertaining to different sizes in various seasons. Very few investigations have been carried out at international level about exposure of workers to endotoxin in different sampling sites of STP.

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Green tea extract: Its potential protective effect on Bleomycin induced lung injuries in rats

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Green tea is a beverage that is popular worldwide. Polyphenols in green tea have been receiving attention for the maintenance of human health. The contribution of antioxidant activity in preventing diseases caused by oxidative stress has been focused upon. Lung fibrosis is a common side effect of the chemotherapeutic agent, Bleomycin. Current evidence suggests that reactive oxygen species may play a key role in the development of lung fibrosis. The present work studied the effect of green tea extract on Bleomycin-induced lung fibrosis in rats. Animals were divided into three groups: (1) Saline control group; (2) Bleomycin group in which rats were injected with Bleomycin (15 mg/kg, i.p.) three times a week for four weeks; (3) Bleomycin and green tea group in which green tea extract was given to rats (100 mg/kg/day, p.o) a week prior to Bleomycin and daily during Bleomycin injections for 4 weeks until the end of the experiment. Bleomycin-induced pulmonary injury and lung fibrosis that was indicated by increased lung hydroxyproline content, elevated nitric oxide synthase, myeloperoxidase (MPO), platelet activating factor (PAF), tumor necrosis factor α (TNF- α), transforming growth factor 1 β (TGF1 β) and angiotensin converting enzyme (ACE) activity in lung tissues. On the other hand, Bleomycin induced a reduction in reduced glutathione concentration (GSH). Moreover, Bleomycin resulted in severe histological changes in lung tissues revealed as lymphocytes and neutrophils infiltration, increased collagen deposition and fibrosis. Co-administration of Bleomycin and green tea extract reduced Bleomycin-induced lung injury as evaluated by the significant reduction in hydroxyproline content, nitric oxide synthase activity, levels of MPO, PAF & TNF- α and ACE in lung tissues. Furthermore, green tea extracts ameliorated Bleomycin-induced reduction in GSH concentration. Finally, histological evidences supported the ability of green tea extract to attenuate Bleomycin-induced lung fibrosis and consolidation. Thus, the finding of the present study provides that green tea may serve as a novel target for potential therapeutic treatment of lung fibrosis.

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