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Effect of Cd^{+2} on phosphate solubilizing abilities of soil-borne micromycetes isolated from Phragmites australis-rhizosphere

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The aims of this work were to evaluate the P-solubilization and Hydrogen Peroxide (H_2O_2) production by the soil-borne micromycetes, *Aspergillus japonicus* and *Penicillium italicum* isolated from Phragmites australis-rhizosphere and to study the effect of several concentrations of Cadmium (Cd^{2+}) on both variables. Our results showed that *P. italicum* achieved a higher P-solubilization and H_2O_2 production than *Aspergillus japonicus* and *Penicillium* sp., only *P. italicum* showed a positive correlation (R^2=0.71) between P-solubilization and H_2O_2 production. In dose–response assays, P. italicum were also more tolerant to Cd^{2+} (0.31mM) compared to *A. japonicus* (0.26 mM). Analysis of the 24 factorial experimental design showed that P-solubilization by P. italicum was negatively affected by increase in Cd^{2+} (p=0.04) and yeast extract (p=0.02) in the culture medium. However, H_2O_2 production was positively affected only by glucose (p=0.002). Fungal biomass production was reduced significantly (p=0.0009) by Cd^{2+} and increased (p=0.0003) by high glucose concentration in the culture medium. The tolerance and correlation between P-solubilization and H2O2 production in the presence of Cd^{2+}, was strain and species dependent. P. italicum is promising for P-solubilization in soils contaminated with Cd^{2+}, and may be an alternative for manufacture of bio-fertilizers to replace chemical fertilizers.

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Comparison of the effects of e-cigarette vapor and cigarette smoke on indoor air quality

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Context: Electronic cigarettes (e-cigarettes) have earned considerable attention recently as an alternative to smoking tobacco, but uncertainties about their impact on health and indoor air quality have resulted in proposals for bans on indoor e-cigarette use.

Methods & Materials: Four different high nicotine e-liquids were vaporized in two sets of experiments by generic 2-piece e-cigarettes to collect emissions and assess indoor air concentrations of common tobacco smoke byproducts. Tobacco cigarette smoke tests were conducted for comparison.

Results: Comparisons of pollutant concentrations were made between e-cigarette vapor and tobacco smoke samples. Pollutants included VOCs, carbonyls, PAHs, nicotine, TSNAs, and glycols. From these results, risk analyses were conducted based on dilution into a 40 m3 room and standard toxicological data. Non-cancer risk analysis revealed "No significant risk" of harm to human health for vapor samples from e-liquids (AD). In contrast, for tobacco smoke most findings markedly exceeded risk limits indicating a condition of "Significant Risk" of harm to human health. With regard to cancer risk analysis, no vapor sample from e-liquids A-D exceeded the risk limit for either children or adults. The tobacco smoke sample approached the risk limits for adult exposure.

Conclusion: For all byproducts measured, electronic cigarettes produce very small exposures relative to tobacco cigarettes. The study indicates no apparent risk to human health from e-cigarette emissions based on the compounds analyzed.

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