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Toxic study of ambient particulate matter in model organism escherichia coli**Aman Deep Gupta***Indian Institute of Technology Kanpur, India*

Epidemiological and toxicological studies on ambient Particulate Matter (PM) have shown an adverse effect on pulmonary and cardiovascular systems in humans. Various cellular studies on health risks due to PM reported ROS generation, DNA damage, cell inflammation, mutagenicity, etc., upon PM exposure. The study by WHO 2021 reported approximately seven million deaths occurring worldwide each year due to air pollution. Thus, thorough studies are needed to investigate related health risks. In this study, we used *Escherichia coli* as a model organism to examine the toxicity of ambient PM. The PM samples collected from ambient air in Kanpur, India were mixed in Luria Broth at different concentrations to study the effect on bacterial growth kinetics. The results exhibited bacteriostatic effect at low PM₂ concentrations (<80 µg/ml). From the kinetics curve, we found a stationary phase in middle of the exponential growth of bacteria. Thus, two growth phases, abbreviated as GP1 and GP2 of time intervals 1h and 8h were found with a stationary (acclimatization) period of 3h in between. The doubling time of *E. coli* varied from 0.8 to 2.1h during GP1 and 12.3 to 18.5h during GP2 and depended on PM concentrations. Thus, external stress was induced by PM_{2.5} in a concentration-dependent manner affecting the doubling time of *E. coli*. Lethal concentration (LC₅₀) was not obtained up to 80 µg/ml of PM₂ in growth media, but bactericidal effect may be achieved at higher concentrations. Overall this study showed that even lower PM exposure levels could be significantly toxic. These findings are significant for future studies on human subjects as the results are from a cohabitating microorganism, which can directly affect human health.

Biography

Aman Deep Gupta is PhD student in Civil Engg. department, IIT Kanpur. His areas of interest are PM toxicity analysis and bioaerosols.