Is Plant Chlorophyll a Good Biomarker for Monitoring Automobile Exhaust Pollution?

Vig, Simmy

As we become more industrialized, the concern about environmental contamination keeps increasing, so we need natural and cost effective ways to address this issue. Plants utilize photosynthesis to produce chlorophyll, which is an energy source. This study is a continuation of my last year's project where I showed that exposing plants to automobile exhaust reduced their photosynthesizing abilities, resulting in decreased chlorophyll production in their leaves. This year, instead of using living plants, I used chlorophyll from the leaf extracts and measured the level of chlorophyll degradation after exposure to automobile exhaust. Fresh spinach leaves were crushed, made into a paste, and compressed through a cheese cloth. The green liquid containing chlorophyll was spread onto round discs of Watman paper that were fixed into a special home-made apparatus, which was exposed to automobile exhaust for different time periods ranging from 0 to 2 hours. The chlorophyll content was quantified using an Atleaf chlorophyll monitor. Chlorophyll values decreased with increasing time of exposure to gasoline exhaust. After 30 minutes and 1 hour of exposure, significant differences ($P<0.05$) in the chlorophyll values between the unexposed and exposed groups were observed. In conclusion, this strongly suggests that chlorophyll could be used as a biological marker for monitoring environmental pollution and a simple commercial product, which people can use in their everyday lives, could be developed. This way, people can become more aware of the contamination that surrounds them.

Awards Won: