Smoke Particulates: An Analysis of Reduction Methods Using GC-MS and Laser Particle Counting

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Wildfires are increasingly becoming an issue around the world and are correlating with the rising number of smoke inhalation injuries. Assorted prevention methods are available to decrease the number of injuries. The system that I am studying is the Ionizer. Beeswax is a natural ionizer. The combination of the ionization properties of beeswax and the filtration components of 100% pure cellulose fiber should create a naturally effective filter. Procedure: (1) Prepare to test by downloading Dylos software and collecting various samples to burn (Wood: Pine, Treated Pine, Ash, Oak & Maple). (2) Prepare 100% Cellulose Filters (Compressed & Expanded) by coating them in various natural components (Beeswax, Carnauba Wax & Candelilla Wax). A. (3) Construct a testing apparatus by adhering a funnel-like structure to the input area of the Dylos Particle Counter (4) Place three filters inside of a 150mL syringe in the order of compressed, expanded, compressed. Also, conduct singular filter testing with each filter in the syringe individually. (5) Burn the selected sample and pull smoke through the syringe. (6) Analyze the smoke sample with Dylos Particle Counter and analyze values. B. (3) Construct an apparatus that will trap smoke particulates in Hexane. (4) Analyze smoke-infused hexane samples using Gas Chromatography-Mass Spectrometry at a local university. Conclusion: Within the laser particle testing, the Beeswax filters resulted in the greatest decrease in particle quantity. The results from the GC-MS testing show that the beeswax filters had a partial positive effect on the quantity of VOCs in the smoke samples.

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