New Ethylene Absorbents: No Miracle Cure

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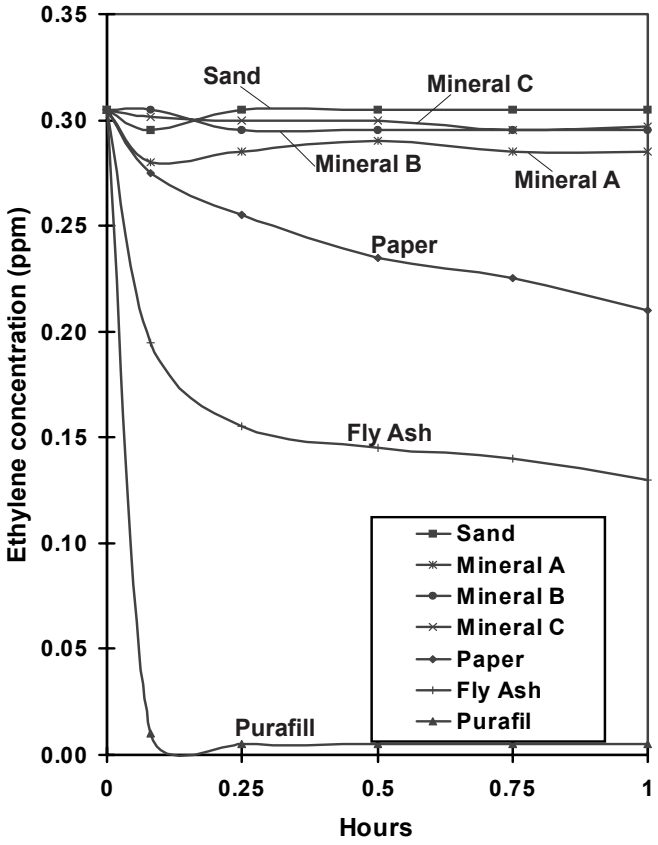
We've heard it now four times from four different and obviously sincere company Presidents. Through chance encounters, they have formed small companies with the owner of the rights to a new postharvest elixir. This mineral material, mined in Arizona, has the remarkable ability to absorb ethylene, control humidity, reduce weight loss in harvested perishable products, and prevent cross contamination. The material is said to reduce and stabilize the relative humidity in coolrooms, and, by a process that does not appear to relate to any engineering or physical principles of which we're aware, simultaneously reduce coolroom temperature *and* power demand. These materials are advertised throughout the perishables industry on the basis of testimonials from satisfied users, but there has been little independent testing of their value.

Despite the ardent claims of their proponents, we are doubtful of the value of these materials for any of the purposes for which they are advertised. We are conducting some studies on the ability of these materials to absorb water and regulate humidity, and have completed a series of experiments to determine their ability to remove ethylene. Ethylene, as those in the floral industry should know, is a common air pollutant, is used as an agent for ripening bananas and other fruit, and causes rapid wilting, shattering, or failure to open, of many cut flowers and potted flowering plants. Theoretically, an efficient ethylene absorbent could be used in floral display areas or coolrooms to remove ethylene and reduce such effects.

We tested a range of materials that have been sent to us as potential ethylene absorbents, including three similar mineral materials, an activated carbon-impregnated paper, and a reprocessed fly ash material. As controls, we used sand, which is effectively inert, and Purafil, a purple granular material containing potassium permanganate which we know to be a very effective ethylene absorbent. We placed samples of the different materials in small sealed jars, then injected enough ethylene to give a concentration of about 0.3 ppm. At intervals, we withdrew a sample of the air in each jar, and measured the concentration of ethylene. A good ethylene absorbent would cause a rapid decline in the amount of ethylene in the jar. The figure shows the results of our test.



As expected, the Purafil absorbed the ethylene in the jar almost immediately, reducing the ethylene concentration to near zero. THE THREE MINERAL MATERIALS ABSORBED NO ETHYLENE AT ALL and were no different from sand. Ethylene levels in the jars containing any of these four materials remained near 0.3 ppm for the hour shown in the graph and, when tested 24 hours later, were still near 0.3 ppm. The paper material and the fly ash absorbed ethylene slowly, resulting in a reduction in ethylene concentration in the jars of one-third and one-half, respectively, over the one-hour test period.