

**There is Still Something in the Air**  
***Consumer Reports Article Raises New Concerns About Ionizers***

**By Jim Rosenthal, CAFS and Stevan Brown, CAFS**

The May 2005 issue of *Consumer Reports* presented new concerns about ionizing air cleaners (ionizers). The magazine reported the results of tests they had conducted with 5 ionizers including the Ionic Breeze sold by Sharper Image, the market leader. Other units tested included the Brookstone Pure-Ion, the Ionic Pro, the IonizAir and the Surround Air. All 5 of these devices did a poor job of clearing the air of pollutants such as dust, smoke and pollen. In addition, all 5 of these ionizers produced potentially harmful levels of ozone. When tested in accordance with the UL 867 procedures for ozone emissions from air cleaners, all 5 failed by producing more than 50 parts per billion (ppb) of ozone. The magazine has placed a “Not Recommended” rating on all 5 of these devices.

Ionizers (sometimes called electrostatic precipitators) work by electrically charging airborne particles and trapping them on oppositely charged metal plates. Ozone is a byproduct of this process. Ionizers now account for about 25 percent of the roughly \$410 million spent per year on air cleaners.

The findings are particularly worrisome because about 80 percent of people who buy air cleaners have asthma or allergies, according to the magazine. People with asthma and allergies are especially sensitive to indoor ozone, an irritant that can worsen asthma, deaden the sense of smell, raise sensitivity to allergens such as pollens and mold, and may cause permanent lung damage. “Not only are these devices not effective at cleaning the air, they are being purchased by and for those who are the most susceptible to the negative effects of ozone,” said Mark Connelly, Director of Testing at Consumers Union, publisher of *Consumer Reports*. “Because

of the marketing of these devices unsuspecting consumers are using ionizers as if they were creating clean air. For example, if an ionizer were purchased by the parents of an asthmatic child, it is likely that they would place the ionizer close to the child's bed or crib where they would receive the maximum ozone exposure." Said Connelly.

Experts agree that an ozone concentration of more than 80 ppb for 8 hours or longer can cause health problems. However, there are studies that show lower levels of ozone may be dangerous. For example, a 14-year study of 95 urban areas in the US found a clear link between small increases in ozone and higher death rates. The study which appeared in the November 2004 *Journal of the American Medical Association*, predicts that a 10 ppb increase in ozone over 8 hours could lead to roughly 3,700 premature deaths per year in some cities.

The report marks *Consumer Reports* second criticism in two years of the Ionic Breeze. The first criticism was in October of 2003 where the magazine found the Ionic Breeze "to be quiet but ineffective." Sharper Image sued Consumers Union, the publisher of *Consumer Reports*, for libel. In November of 2004 U. S. District Judge Maxine Chesney dismissed the lawsuit stating that "Sharper Image had not demonstrated a reasonable probability that any of the challenged statements were false." Sharper Image was ordered to pay attorneys fees for Consumers Union of \$520,000.

Currently, air cleaners need not meet ozone limits – not for the Environmental Protection Agency, which regulates only outdoor air, nor for the Food and Drug Administration, since it does not consider them to be medical devices. No federal agency sets indoor ozone limits for homes. The Consumer Product Safety Commission (CPSC) is reviewing data on all air cleaners that create ozone and is evaluating whether the 50 ppb industry standard is adequate

protection for consumers. Dr. Richard Shaughnessy of the University of Tulsa is heading this study for the CPSC.

The *Consumer Reports* article also pointed out that while ozone dissipates indoors, it can create other pollutants in the process. As they report: “research suggests that ozone reacts with the terpenes in lemon and pine scented cleaning products and air fresheners, creating formaldehyde – a carcinogen – and other irritants.” The article goes on to state that “research has also found that ozone reacts with terpenes to create additional [ultra fine](#) particles, which are hard to filter and [penetrate](#) deep into the lungs.”

In the Spring 2004 Issue of *Air Media* the authors reported the results of demonstrations we had conducted exposing a popular ionizer to various types of terpenes. We found that large quantities of sub-micrometer sized particles were produced when an ionizer was placed in a room with such common household products as pine scented cleaner, lemon scented furniture polish and lemon scented baby wipes. In many cases the particle counts in the rooms where these demonstrations were conducted exceeded 10,000,000 particles over 0.3 micrometers per cu. ft.. To put this in some perspective the highest particle count we have recorded OUTSIDE is 6,800,000 particles over 0.3 micrometers [per cu. ft.](#) and that was on a Red Alert Ozone Day just 300 feet away from a major superhighway.

Confirmation of the reactions of the ozone from ionizers creating formaldehyde actually comes from one of the leading ionizer retailers. Columbia Analytical Services of Simi Valley, California conducted tests on behalf of Sharper Image of an Ionic Breeze exposed to Environmental Tobacco Smoke (ETS). Their tests were entitled “Evaluation of the Sharper Image Quadra Air Cleaner Environmental Tobacco Smoke Trial.” In their experiments they “smoked cigarettes” in two chambers. In one they placed an ionizer. The other was used as the

control. Formaldehyde increased substantially (over 50%) in the chamber where the ionizer was operating. In the control chamber the airborne concentration of formaldehyde was essentially unchanged (64 ppb to 66 ppb). Formaldehyde in the chamber with the ionizer went from 82 ppb to 123 ppb at the end of the 8 hour test. Much of the increase (25 ppb) occurred in the last 4 hours of the test. NIOSH has set an occupational exposure limit for formaldehyde of 100 ppb.

Jeff Asher, vice president and technical director at CU, said ionizers give off a deceptively “fresh air” smell, similar to the scent just after a thunderstorm. Buyers, he said, “think that this is a good smell . . . that in fact, without that smell, the ionizer isn’t cleaning the air.” But what they smell, Asher said, is actually ozone and not clean air.

Odor is NOT a very good indicator of air quality. The classic example is natural gas. It is odorless. Yet, not recognizing its presence can lead to fatal consequences. A scent is added to it so that it can be detected if it leaks into the air.

In the above mentioned tests, in addition to formaldehyde, several other chemical compounds that are in **Environmental Tobacco Smoke (ETS)** were also evaluated. These included nicotine, 3-ethenylpyridine, Solanesol, carbon monoxide, acrolein, benzene and styrene. While Solanesol decreased at a faster rate in the chamber with the ionizer, all of the other chemicals decreased at the same rate with and without the ionizer operating.

The test also measured the odor levels in both chambers by using a panel of trained lab technicians to rate odor levels. The initial intensity of the odor was greater in the chamber with the ionizer running. This finding is consistent with other research which has shown that ozone can react with **Volatile Organic Compounds** (VOC's) to create aldehydes and ketones with very low odor thresholds. It is very possible that such reactions could be the cause of this strong odor perception. After one hour the intensity of the odor in the chamber with the ionizer on was less

than the control. After 8 hours the odor in the chamber with the ionizer on was 50% less than the control.

Although the odor decreased, the underlying chemicals did not decrease proportionately. They generally either remained the same as the control or increased over time. Odor reduction does not correlate well with chemical reduction.

The Consumer Reports article concluded by calling on the CPSC to set indoor ozone limits for all air cleaners and mandate performance tests and labels disclosing the results. They also urged the Federal Trade Commission to take a close look at air cleaner ads to determine whether they include unsubstantiated or deceptive claims.

In the meantime they recommended avoiding ionizers that performed poorly in their tests. “We cannot guarantee safety at any ozone level, so it makes sense not to contaminate your living space,” said Jonathan Samet, M.D., chairman of the epidemiology department of the Johns Hopkins Bloomberg School of Health. The magazine suggested that owners of any of the poor performing ionizers try returning them for a refund.

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