

Ingredients found in e-Liquid/Juice

Nicotine: The addictive ingredient in e-cigarettes and regular cigarettes, nicotine stimulates the central nervous system and raises blood pressure, respiration, and heart rate. "People smoke because of the nicotine," says researcher Maciej Goniewicz, PhD, PharmD. He's a tobacco and e-cigarette expert at the Roswell Park Cancer Institute in Buffalo, N.Y.

While it's addictive, nicotine doesn't cause cancer, says Goniewicz: "What causes concern are the other chemicals (in the e-liquid)."

Flavorings: Goniewicz says hundreds of flavors exist, including cherry, cheesecake, cinnamon, and tobacco. Many of those flavoring chemicals, he says, are also used to flavor food.

"These are the big unknowns," he says. "When we eat them, they are safe, but we don't know what's going on when we inhale them."

It would be impossible to list all the various flavoring chemicals here, but one such chemical, diacetyl, is commonly used to add buttery flavor to popcorn. It's been linked to obstructive lung disease when inhaled. Other chemicals that add buttery flavor might be harmful as well, says Neal Benowitz, MD. He's a former member of the FDA's Tobacco Products Scientific Advisory Committee.

Propylene glycol (PG): PG is a lab-made liquid that the FDA generally views as safe in food, drugs, and cosmetics. It's also used to make artificial smoke or fog for rock concerts and other performances. It can irritate the lungs and eyes and may be more harmful for people with chronic lung diseases like asthma and emphysema.

Glycerin: Odorless and colorless, liquid glycerin has a slightly sweet taste. Like PG, the FDA generally views it as safe. It's found in many products, including food and drugs, both prescription and over the counter.

While both PG and glycerin are safe in food and drugs, Goniewicz says, "we don't know what happens if someone inhales large amounts of these chemicals over the long term. This is really unknown."

Heating Up

Toxic chemicals are formed as the e-liquid heats up to make the aerosol that e-cig users inhale. Some of these chemicals can cause inflammation and blood vessel damage responses, says Benowitz, who's also a professor at the University of California, San Francisco's School of Medicine. "In most preparations, they are much lower than you find in cigarette smoking, but they are of concern, no question about it," he says.

Those chemicals include:

Formaldehyde: A probable carcinogen.

Acetaldehyde: Another probable carcinogen.

Acrolein: Formed from heated glycerin, acrolein can damage the lungs and contribute to heart disease in smokers.

All three are released in increasing amounts as the temperature of the e-liquid rises. And, says Benowitz, users may be tempted to go for those higher temperatures.

"Unfortunately, the higher you heat the liquid, the more nicotine you get from it," he says. "People who want to get a big dose of nicotine may use really high voltage batteries or an adjustable voltage battery."

Goniewicz says flavors might mask the unpleasant taste that results when users heat their e-cigarettes to the point at which formaldehyde is made.

Particulates and Metals

The tiny particles in e-cigarette aerosol also may be harmful. This is certainly the case for cigarette smoke and other air pollution, which can cause blood vessel damage, inflammation, and nervous system effects, Benowitz says.

E-cigarette aerosol has similar levels of particulates as regular cigarettes. But not enough research has been done on e-cigarettes to draw any conclusions about the safety of breathing in the particles they produce.

Toxic metals such as tin, nickel, cadmium, lead, and mercury have been found in e-cigarette aerosol, too. A 2013 study notes that some metals, such as nickel, occur in concentrations 2 to 100 times that of cigarettes.

Copied from a February 2015 article *What's in your E-Cigarette*

<http://www.webmd.com/smoking-cessation/news/20150218/e-cigarette-ingredients#2>