Blowing Smoke: Differential Effects on Oral Bacteria between Vaping and Cigarette Usage

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Electronic cigarettes, or “e-cigarettes” are touted by cardiologists as an alternative to help traditional smokers quit smoking. In particular, e-cigarettes are marketed toward a young audience for their new attractive flavors. However, little is known about their potential biological harm. We studied the effects of e-cigarette juice on oral flora, including both beneficial and harmful bacteria (Streptococcus salivarius and Streptococcus mutans). First, we determined the chemical composition of commercially popular e-juices using Gas Chromatography because e-cigarette companies do not release the components of their juice. Then, we examined the potential bactericidal effects of the identified compounds (nicotine, menthol, and camphor) by measuring zones of inhibition on bacterial plates with varying chemical concentrations and treatments. In all, 120 plates were tested in two trials and a one sample t-test was run. The present study showed that menthol and camphor, at the concentrations in the most common e-juice flavors, did not inhibit bacterial growth in culture medium. However, nicotine-dependent traditional smokers often choose the highest concentration of nicotine available in e-juice when they switch to vaping. Our results suggest that high doses of menthol and camphor in flavored e-juices containing nicotine can be harmful to oral flora necessary for digestion. These oral bacteria may act as indicator species for more serious health concerns. Based on the bactericidal findings, it is too early to claim that e-cigarettes are safe alternatives to traditional cigarettes. Future studies should examine specific effects of e-juice (such as an impact on cellular replication or synthesis of digestive enzymes) as well as their effect on respiratory tissues.

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