

Chemical profiling of E-liquids and emissions from E-cigarettes marketed in Malaysia

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Track: Health

Theme: Lung Health

ABSTRACT

Introduction: E-cigarettes (E-cigs) are gaining popularity among youth and young adults in Malaysia. While the chemical composition of e-liquid is usually disclosed, there is limited information on how these compounds change when aerosolised and the potential toxic substances inhaled during use. **Objective:** This study aimed to analyse and compare the chemical constituents of e-liquids and their emissions from e-cigs in Malaysia. Twelve disposable and refillable e-liquid samples were selected based on their nicotine content and availability. **Materials and Methods:** Chemical profiling was conducted using a Shimadzu GCMS-QP2010 Ultra System coupled with a Teledyne Tekmar HT3™ headspace autosampler. E-liquid (250–300 mg) and corresponding emission samples produced by a smoking machine collected on Cambridge filter pads (CFPs) were incubated at 160°C for 30 min prior to analysis. Separation was performed on a Shimadzu Rxi-5Sil MS capillary column. **Results:** Eighty-five percent of the emission samples had fewer chemical compounds than their liquid counterparts, indicating possible compound loss or transformation during aerosolisation. Nicotine and 3-Piperidinol, 1-ethyl- were consistently found in both forms. Major volatile compounds included benzyl acetate, benzaldehyde, cinnamaldehyde, terpineol, and pyrazine derivatives. The mango and lychee flavoured samples showed the highest diversity, with 37 compounds in liquid and 33 in emissions. Some flavouring agents, like limonene, citronellol, and carene, were present in the liquid but absent in the emissions, suggesting thermal degradation or evaporation during vaping. **Conclusion:** This study highlights the compositional differences between e-liquids and aerosol emissions, stressing the need for regulations that consider both e-liquid ingredients and inhaled chemical transformations. Ongoing monitoring and public awareness are vital to reduce health risks linked to flavoured e-cigs.

Keywords: E-cigarettes, Flavoured e-liquids, Aerosol Emissions, Chemical Profiling, GC-MS Analysis