

Lorkiewicz, P., Keith, R., Lynch, J., Jin, L., Theis, W., Krivokhizhina, T., Riggs, D., Bhatnagar, A., Srivastava, S., & Conklin, D. J. (2022). Electronic cigarette solvents, JUUL e-liquids, and biomarkers of exposure: In vivo evidence for acrolein and glycidol in e-cig-derived aerosols. *Chemical Research in Toxicology*, 35(2), 283-292. <https://doi.org/10.1021/acs.chemrestox.1c00328>

Definitions

- **E-cigarettes (E-cigs):** Devices that vaporize liquid containing nicotine for inhalation.
- **Acrolein:** A toxic compound formed when vegetable glycerin in e-liquids is heated.
- **Glycidol:** Another harmful compound formed during the heating of vegetable glycerin.
- **Biomarkers:** Biological indicators, such as chemicals in the urine, that show exposure to certain substances.

Key Findings

- E-cigarette use results in the production of harmful compounds like acrolein and glycidol.
- These compounds are found in the urine of both mice and humans exposed to e-cigarette aerosols.
- 23HPMA is a potential specific biomarker for e-cigarette use in humans.

Introduction

The study investigates the health effects of e-cigarettes by examining the presence of harmful chemicals produced when e-liquids are heated. It looks at how these chemicals affect both animals and humans, focusing on acrolein and glycidol as toxic byproducts.

Main Content

Background

E-cigarettes are popular alternatives to traditional smoking, but their long-term health effects are still unknown. Previous research has linked e-cigarette use to cardiovascular problems due to harmful chemicals like acrolein formed during the vaporization process.

Methods

- **Animal Study:**
 - Mice were exposed to aerosols from e-liquids.
 - Urine samples were collected to measure levels of acrolein and glycidol metabolites.
- **Human Study:**

- Human participants used e-cigarettes, and urine samples were collected before and after use.
- The presence of biomarkers 3HPMA and 23HPMA was measured.

Results

- **Animal Study:**

- Mice exposed to e-cigarette aerosols showed increased levels of 3HPMA and 23HPMA in their urine.
- The use of a labeled version of glycerin confirmed that these metabolites were derived from the thermal breakdown of vegetable glycerin.

- **Human Study:**

- E-cigarette users had increased levels of 23HPMA in their urine, indicating exposure to glycidol.
- Levels of 3HPMA did not significantly change, suggesting it may not be a specific biomarker for e-cigarette use.

Conclusion

The study provides evidence that e-cigarette use leads to the production of harmful chemicals, which can be detected in the urine. The findings suggest that 23HPMA is a useful biomarker for e-cigarette exposure. The results highlight the potential health risks associated with e-cigarette use and the need for further research to fully understand these risks.

Word Count: 352

This summary was generated July 2024 by ChatGPT4.o and has not been reviewed for accuracy. This summary should not be relied on to guide health-related behavior and should not be reported in news media as established information. Please refer to the original journal publication listed in the hyperlink on the first page to validate representations made here. This summary will be updated once an expert review is complete.