

Heated Tobacco Products: A new challenge for environmental impact assessment

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Dear Editor,

Heated tobacco products (HTPs) present a multifaceted environmental challenge, which is expected to increase in significance in light of the increasing use of HTPs across the globe¹ and especially in Europe². While they may differ from traditional cigarettes in some aspects, their impact spans production-waste management and post-consumer pollution. HTP devices utilize disposable tobacco sticks or pods, and the devices themselves eventually require disposal.

The environmental impact of tobacco products, including HTPs, covers their entire lifecycle³. Each stage, from tobacco farming and curing to product manufacture, distribution, consumption, and post-consumer waste generation, contributes to environmental degradation⁴.

Discarded HTP sticks, similar to cigarette butts, can be harmful to the environment due to the materials they contain, such as heated or unheated tobacco, filters, and polymers^{5,6}. According to a recent systematic review conducted by El-Kaassamani⁷, there are no independent research data available on the environmental impact of HTPs. However, two industry-funded studies were identified. One study examined the environmental impact of improper disposal of HTP sticks compared to cigarettes⁸, while the other explored a method to treat nicotine leachate in water⁹.

Heat-not-burn tobacco products (HTPs) emit harmful chemicals such as nicotine, particulate matter, benzene, acrolein, and other toxic elements. These emissions not only affect indoor air quality but also contribute to overall environmental pollution. Recent studies have shown that HTPs may generate environmental pollutants, particularly indoors, which raises concerns about air quality and potential health risks^{10,11}.

Limited research exists on addressing post-consumer

waste from tobacco products, including HTPs. This highlights the need for further studies to assess their environmental impact and develop proper disposal methods. Emerging products like e-cigarettes¹² and HTPs lack comprehensive information on their environmental footprint, indicating a critical gap in knowledge.

The tobacco industry has been known to promote take-back programs and the exploration of recyclable materials as part of their corporate social responsibility initiatives to reduce waste. However, some experts argue that these efforts can be another industry tactic within the form of 'greenwashing' which hides the true environmental impact of the tobacco industry¹³.

Mitigating the environmental impact of HTPs requires a multifaceted approach that includes implementing proper waste management strategies, increasing research efforts, and raising public awareness of the environmental consequences. The EU Single-use Plastics Directive (EU Directive 2019/904)¹⁴ is one strategy that recognizes the environmental burden caused by discarded tobacco products with plastic filters. This directive classifies them as single-use plastics and proposes actions such as phasing out unnecessary single-use plastics, promoting reusable alternatives, and implementing extended producer responsibility programs (EPR) to reduce their impact on the environment¹⁵.

The lack of information about the specific composition and toxicity levels of waste produced during HTP production makes it difficult to assess the associated risks. This highlights the urgent need for further research into the environmental impact of HTPs, especially since independent studies on HTPs are limited¹⁶. These studies should aim to shed light on the composition and toxicity levels of the waste

generated by HTP production and use, to enable a better assessment of environmental risks associated with HTPs.

REFERENCES

1. Goulette MR, Gravely S, Xu SS, et al. Perceptions of harmfulness of heated tobacco and nicotine vaping products compared to cigarettes, and the association of advertising exposure on harm perceptions among adults who smoke in South Korea: cross-sectional findings from the 2020 ITC Korea Survey. *Tob Induc Dis.* 2023;21:121. doi:[10.18332/tid/170252](https://doi.org/10.18332/tid/170252)
2. Laverty AA, Vardavas CI, Filippidis FT. Prevalence and reasons for use of Heated Tobacco Products (HTP) in Europe: an analysis of Eurobarometer data in 28 countries. *Lancet Reg Health Eur.* 2021;8:100159. doi:[10.1016/j.lanepe.2021.100159](https://doi.org/10.1016/j.lanepe.2021.100159)
3. WHO. HTP Factsheet, WHO/HEP/HPR/2020. 22nd Ed. WHO; 2020. Accessed December 14, 2023. <https://www.who.int/publications/i/item/WHO-HEP-HPR-2020.2>
4. WHO. Tobacco: poisoning our planet. WHO; 2022. Accessed December 14, 2023. <https://www.who.int/publications/i/item/9789240051287>
5. Schaller JP, Keller D, Poget L, et al. Evaluation of the Tobacco Heating System 2.2. Part 2: Chemical composition, genotoxicity, cytotoxicity, and physical properties of the aerosol. *Regul Toxicol Pharmacol.* 2016;81 Suppl 2:S27-S47. doi:[10.1016/j.yrtph.2016.10.001](https://doi.org/10.1016/j.yrtph.2016.10.001)
6. Smith MR, Clark B, Lüdicke F, et al. Evaluation of the Tobacco Heating System 2.2. Part 1: Description of the system and the scientific assessment program. *Regul Toxicol Pharmacol.* 2016;81(Suppl 2):S17-S26. doi:[10.1016/j.yrtph.2016.07.006](https://doi.org/10.1016/j.yrtph.2016.07.006)
7. El-Kaassamani M, Yen M, Talih S, El-Hellani A. Analysis of mainstream emissions, secondhand emissions and the environmental impact of IQOS waste: a systematic review on IQOS that accounts for data source. *Tob Control.* 2022;33:93-102. doi:[10.1136/tobaccocontrol-2021-056986](https://doi.org/10.1136/tobaccocontrol-2021-056986)
8. Koutela N, Fernández E, Saru ML, Psillakis E. A comprehensive study on the leaching of metals from heated tobacco sticks and cigarettes in water and natural waters. *Sci Total Environ.* 2020;714:136700. doi:[10.1016/j.scitotenv.2020.136700](https://doi.org/10.1016/j.scitotenv.2020.136700)
9. Alberti S, Sotiropoulou M, Fernández E, et al. UV-254 degradation of nicotine in natural waters and leachates produced from cigarette butts and heat-not-burn tobacco products. *Environ Res* 2021;194:110695. doi:[10.1016/j.envres.2020.110695](https://doi.org/10.1016/j.envres.2020.110695)
10. Sussman RA, Sipala F, Emma R, Ronsisvalle S. Aerosol emissions from heated tobacco products: a review focusing on carbonyls, analytical methods, and experimental quality. *Toxics.* 2023;11(12):947. doi:[10.3390/toxics11120947](https://doi.org/10.3390/toxics11120947)
11. Cancelada L, Sleiman M, Tang X, et al. Heated tobacco products: volatile emissions and their predicted impact on indoor air quality. *Environ Sci Technol.* 2019;53(13):7866-7876. doi:[10.1021/acs.est.9b02544](https://doi.org/10.1021/acs.est.9b02544)
12. Ngambo G, Hanna EG, Gannon J, Marcus H, Lomazzi M, Azari R. A scoping review on e-cigarette environmental impacts. *Tobacco Prevention & Cessation.* 2023;9(October):30. doi:[10.18332/tpc/172079](https://doi.org/10.18332/tpc/172079)
13. Gannon J, Bach K, Cattaruzza MS, et al. Big tobacco's dirty tricks: seven key tactics of the tobacco industry. *Tobacco Prevention & Cessation.* 2023;9(December):39. doi:[10.18332/tpc/176336](https://doi.org/10.18332/tpc/176336)
14. EUR-Lex. Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment (Text with EEA relevance) European Commission; 2019. Accessed December 14, 2023. <https://eur-lex.europa.eu/eli/dir/2019/904/oj>
15. Nikitara K, Lagou I, Plyta Z, Mocanu K, Vardavas C. The EU Single-Use Plastics Directive and its impact on tobacco products: a policy analysis. *Public Health and Toxicology.* 2022;2(3):16. doi:[10.18332/pht/153936](https://doi.org/10.18332/pht/153936)
16. Gallus S, Stival C, Scala M, Jarach CM, Lugo A. Conflict of interest in research on heated tobacco products: a systematic review. *Tobacco Prevention & Cessation.* 2023;9(Supplement):A20. doi:[10.18332/tpc/162457](https://doi.org/10.18332/tpc/162457)

CONFLICTS OF INTEREST

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