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Life-cycle environmental and economic assessment of medical waste treatment

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**Life-cycle environmental and economic assessment of medical waste treatment**Jingmin Hong<sup>a</sup>, Song Zhan<sup>a</sup>, Zhaohe Yu<sup>a</sup>, Jinglan Hong<sup>\*,b</sup>, Congcong Qi<sup>b</sup>

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**ABSTRACT**

The environmental and economic impacts of three medical waste disposal scenarios (i.e., pyrolysis, steam sterilization, and chemical disinfection) were quantified via a cost-coupled life cycle assessment to quantify the effective technique for medical waste disposal. Results show that steam sterilization and chemical disinfection scenarios exhibit the highest overall environmental and lowest economic impacts, respectively, because of the differences in energy consumption. The overall economic burden is attributed to the cost of investment, labor, electricity, and human health protection for each scenario, whereas the environmental burden comes from energy and chemical production processes. The contribution of hydrogen chloride emission to the overall environmental burden is relatively low, although the direct hydrogen chloride emission is significantly higher when generated from medical waste pyrolysis than from municipal solid waste and industrial hazardous waste incineration. However, opposite results are observed for direct mercury emission. Effective measures to reduce the environmental burden include improving electricity and diesel consumption efficiency, reducing the use of chemicals (e.g., sodium

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