Thermal Decomposition Characteristics of Disposable Straw Materials

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Abstract

This study investigates the thermal decomposition behavior and volatile organic compound (VOC) emissions from six types of disposable straws composed of plastic, paper, and bamboo. Samples were collected from seven Korean manufacturers and analyzed using gas chromatography (GC) under a heating condition of 310 °C. A total of 16 VOCs were quantified, including ethyl acetate, n-hexane, acetone, methyl isobutyl ketone, and xylene isomers. Plastic straws exhibited the highest VOC emissions, followed by paper straws, while bamboo straws showed minimal emissions. The results indicate that material composition and manufacturing additives significantly influence VOC release. Bamboo straws may offer a safer alternative with lower environmental impact during thermal disposal.

Keywords: Disposable straws, VOCs, Gas chromatography, Thermal decomposition, Bamboo