
Studying the composition and photodegradation of wet wipes by thermoanalytical techniques

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Abstract

Wet wipes are spunlace nonwoven fabrics obtained through the binding of fibers with water jets (1), used to delivery and apply skin-touching personal care products. Wet wipes are commonly composed of cellulose fibers, synthetic fibers, or blends of the two (1). The intensive usage of wet wipes has increased the concern of the scientific community about microfiber pollution (2,3) and the release of additives in the environment (4).

We investigated different classes of wet wipes in commerce in UK: flushable according to UK certification, biodegradable but not flushable, and conventional. Evolved Gas Analysis-Mass Spectrometry (EGA-MS) allowed us to study the thermal profile of the materials constituting the wet wipes, while their composition and the presence of additives were assessed by multi-shot Pyrolysis-Gas Chromatography-Mass Spectrometry (Py-GC-MS). Moreover, the samples were immersed in distilled water and subjected to artificial photoageing to simulate their behaviour in the environment. The photoaged tissues and the microfibers released in the water were analyzed by Py-GC-MS. All the samples showed significant releases of microfibers and, in the case of the blend composed of cellulose and polypropylene, a tendency to release preferentially cellulose microfibers was observed.

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