Quantification of chemical contaminants in the paper and board fractions of municipal solid waste

Chemicals are used in materials as additives in order to improve the performance of the material or the production process itself. The presence of these chemicals in recyclable waste materials may potentially affect the recyclability of the materials. The addition of chemicals may vary depending on the production technology or the potential end-use of the material. Paper has been previously shown to potentially contain a large variety of chemicals. Quantitative data on the presence of chemicals in paper are necessary for appropriate waste paper management, including the recycling and re-processing of paper. However, a lack of quantitative data on the presence of chemicals in paper is evident in the literature. The aim of the present work is to quantify the presence of selected chemicals in waste paper derived from households. Samples of paper and board were collected from Danish households, including both residual and source-segregated materials, which were disposed of (e.g., through incineration) and recycled, respectively. The concentration of selected chemicals was quantified for all of the samples. The quantified chemicals included mineral oil hydrocarbons, phthalates, phenols, polychlorinated biphenyls, and selected toxic metals (Cd, Co, Cr, Cu, Ni, and Pb). The results suggest large variations in the concentration of chemicals depending on the waste paper fraction analysed. Research on the fate of chemicals in waste recycling and potential problem mitigation measures should be focused on in further studies.

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