Facts on Paper Recycling

- Paper production with recycled paper helps to preserve a large number of trees. For every 1 tonne of recycled fibre used, it was estimated that on average 17 trees are saved. Landfilling issues are also minimised as disposal is avoided and air pollution through incineration can be avoided.
- Considerable savings arise in water and electricity whereas air pollution is decreased. According to a research on paper recycling (Bajpai, 2013) for every tonne of recycled paper used, savings in water usage reach 30000L, in electricity consumption savings on average are 3500kWh and a 95% decrease in polluting emissions is achieved.
- When virgin fibre is used in the papermaking procedure, the highest energy demand occurs during the pulp stage where wood needs to be converted to paper. The conversion to recycled fibres, results in the elimination of this energy-consuming process achieving considerably lower energy demand.

Introduction

Although the benefits of paper recycling are recognised and understood by a range of industries and people, several concerns regarding recycling are emphasized on the quality of paper and particularly on the usage and presence of critical and/or harmful substances that are persistent throughout the recycling process (Begley et al., 2008; Gartner et al., 2009). The main concerns of paper quality are primarily focused on the presence of some chemicals in paper that is to be used for food packaging where there is a chance of chemical migration into the food and whether some absorption could occur through handling such paper. Currently around 21% of recycled paper final usage, is to be used as packaging including for food (Allwood, 2012) posing a health risk through consumer exposure.

Aims and Objectives

The overall goal of this study is to investigate how the accumulation of mineral oil contamination builds up in the recycling process of paper. Information and concentration values based on existing literature and experiments carried out facilitate in achieving this.

- Development of a calculation tool in Excel, where the influencing factors of contamination can be varied.
- Determine impact on MOSH accumulation under varying recycling, removal and mixing parameters.

Methodology

Data of contamination concentration in recycled paper were collected from experimental procedures carried out (Biedermann, 2011) and used to estimate the consequent accumulation of the contaminant as the recycling loop is carried forward. The data were input into an Excel spreadsheet where the variance in concentration is displayed.

As the main objective is to display and investigate how the contamination varies at different configurations of the influencing factors, 5 different scenarios were identified and applied. The first scenario displays what the current situation is using the base-case scenario of 2014 recycling scheme, whereas 4 other scenarios were used with varying configurations.

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X_{n+1} = R X_n + x_0
\]

\[
C_{n+1} = (Y D_n + 1) + C_0
\]

\[
T_{X_n} = a X_n + b X_n + b X_n + g X_n
\]

Results

Scenario 1

Conclusions

- Low recycling rates prevent large MOSH accumulation.
- Currently used deinking methods do not remove sufficient amount of MOSH from newsprint, contaminating recycled fibres in the mixing process.
- Separate collection and recycling prevents contamination in other paper categories from newsprint.

References: