

A study on the food contact suitability of recycled paper and board

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Abstract

The suitability of recycled paper packaging materials for direct food contact applications is a major area of investigation. The evaluation of food contact suitability was conducted on two commercially produced recycled papers. The white top testliner and the fluting paper, commonly used as integral parts of corrugated container, were tested. Selected papers were also submitted to additional chemical cleaning, which was obtained by means of laboratory deinking flotation. The aim of this experiment was to evaluate a possible decrease in the amount of chemical contaminants in the deinked pulp after laboratory deinking flotation had been conducted. Two original paper samples as well as their corresponding deinked pulp handsheets were checked for the presence of potentially harmful substances that are usually found as residues of recycling procedures. Food contact analyses comprised determination of heavy metals (Cd, Pb, Hg), primary aromatic amines, diisopropyl-naphthalenes (DIPN), phthalates and polychlorinated biphenyls (PCB) from aqueous or organic solvent extracts of paper samples. It was found that all amounts of measured contaminants were below the maximum limit of concentration proposed for these compounds by the European legislation. Furthermore, deinking flotation applied on the white testliner and fluting samples had a positive effect on the reduction of chemical contaminants from the deinked pulp.

Keywords: Food packaging, health safety, recycled fibres, chemical deinking flotation, reduction of contaminants.

1. Introduction

Recycled fibres have become an indispensable raw material for the paper manufacturing industry because of the favourable price of recycled fibres in comparison to the corresponding grades of virgin pulp and due to the promotion of recovered paper recycling by many European countries [1]. In addition,

a growing tendency of using recycled paper fibres is also present in the production of food packaging materials. Paper and board, partly or fully produced from recycled fibres, are being used both as primary and secondary packaging for wide range of foods in many European countries. However, in the last couple of years recycled fibres have been proved to be a source of contamination of various foods [2, 3]. Potentially harmful substances present in the recycled paper comprise the residues of printing inks, varnishes, adhesives and other substances, which are applied to the material in printing and converting processes undertaken in the previous use of the paper. Once present in the packaging material, they could migrate into food content under certain conditions, posing health concerns for the consumers [4]. In the scientific paper [5] published in 2002, Binderup et al. cited a list of chemicals that can be found in recycled paper. The list contains phthalates, solvents, azocolorants, diisopropyl naphthalenes, primary aromatic amines, polycyclic aromatic hydrocarbons, benzophenone and others. Considering that recycled fibres may be contaminated by many potentially harmful compounds, recycled grades must be used with a special caution in the production of food packaging.

In order to be classified as suitable for food contact, packaging paper has to meet many specific requirements proposed by the European legislation [6, 7]. However, the EU still has no harmonized legislation regarding food contact paper and board applications and the use of recycled paper fibres in the contact with foods. In addition, there is a lack of specific directives for paper and board materials intended to come into contact with food. The main rule for paper and board food contact applications comes from the EU Framework Regulation (EC) No 1935/2004 [6] and the Regulation on Good Manufacturing Practice (EC) No 2023/2006 [7]. Framework Regulation covers all groups of materials intended to come into contact with food and sets some general requirements that

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