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Published in:
Book of Abstracts, Sustain 2017

Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

Link back to DTU Orbit

Citation (APA):
Recycled paper for food packaging: burden of disease methodology to link sustainability and safety

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Background: Semi-quantitative analytical experimental studies1 applied to recycled paper used as food contact materials have shown presence of endocrine-disrupting chemicals in pizza boxes made from recycled paper, and provided evidence that some of these chemicals will likely migrate from the packaging into the food. Therefore, the sustainability of recycling should be associated to safety because of the probable source of exposure to endocrine-disrupting chemicals from recycled food contact material which could lead to adverse health effects.

Purpose: The aim of this study is to estimate the burden of disease due to exposure to endocrine-disrupting chemicals present in food packaging and discuss the possible link between this study and a life cycle assessment of pizza boxes made from recycled paper. We consider, as example of endocrine-disrupting chemical, the high molecular weight phthalate DEHP (1,2-bis(2-ethylhexyl) benzene-1,2-dicarboxylate) from the consumption of commercially prepared (take-away) pizza in Denmark and estimate disease burden in terms of disability adjusted life years, DALYs1-2.

Methodology: We applied a burden of disease model consisting of three submodules (Fig1).

Expected outcomes: Our estimates will:

- Develop an approach to estimate the disease burden of endocrine-disrupting chemicals, filling in a knowledge gap at national and international levels.
- Allow for the integration of health impact assessment of a food contact material with the environmental impact and sustainability approach.
- Facilitate the evaluation and comparisons of different packaging alternatives by taking into account both human health and environmental impact of the material.

1 Pieke EN, Granby K, Trier X, Smedsgaard J. A framework to estimate concentrations of potentially unknown substances by semi-quantification in liquid chromatography electrospray ionization mass spectrometry, In Analytica Chimica Acta, Volume 975, 2017, Pages 30-41, ISSN 0003-2670,