

Research Institute:

PTS Heidenau
Pirnaer Str. 37
01809 Heidenau

Head of the research institute:

Dr. Frank Miletzky

Project leader:

Sabine Hottmann
Tel: 03529 / 551-663
Fax: 03529 / 551-899
E-Mail: sabine.hottmann@ptspaper.de

Internet: www.ptspaper.de

Research area: Product aims

Paper, paperboard and board // Packaging papers and paperboard

Key words:

Printing inks, migration, food contamination, coating colour formulation, sorption layers

TITLE:**Preventing the migration of mineral oil originating from printing inks and recovered papers by using sorption materials in a product side coating****Background/Problem area**

According to EFSA (European Food Safety Authority, Italy), the BfR (Federal Institute of Risk Assessment, Germany) and investigations of the Official Food Control Authority of the Canton Zurich packaging materials for food packaging can contain up to 1000 mg/kg mineral oil. The mineral oils found are characterised by a chain length of less than n-C28 and a fraction of up to 25% aromatic compounds. Due to the short chain length of the mineral oils they are able to migrate into food by evaporation; in the worst case even the ADI (acceptable daily intake) - value can be exceeded.

At the beginning of 2010 the BfR came to the conclusion that the migration of mineral oils originating from printing inks and recovered papers has to be reduced considerably. To achieve this the BfR provided recommendations for action. One recommendation was the ban of recovered paper for the use in food packaging as the mineral oils can be traced back i.a. to the use of recovered paper and the ink contained therein. Especially in Germany the recovered paper rates for packaging materials are very high (97%), a substitution of recovered paper with virgin paper would neither be economical nor ecological sensible. Therefore other suggestions have to be made to reduce the mineral oil in food due to packaging material. One possibility lies in the use of sorption materials integrated in a product side coating.

Objectives/Research results

The objective of the project is the development of concepts to incorporate sorption materials in the coating formulation to selectively sorb mineral oils due to inks and recovered paper. A porous coating on the product side should prevent the contamination of food by migration of mineral oil so that the critical values (migration value / ADI value) are not exceeded. Recommendations for sustainable, environmentally compatible and health preserving packaging materials shall be formulated.

In an extensive test program variations of sorption materials (type, quantity etc.) as well as variation of typical coating pigments, binder and additives plus variation of the coating thickness, coating weight and coating application shall be made. The prepared coating formulations will be applied on to a reference substrate and the functionality of the coating will be examined i.a. with migration tests. Due to the results of the migration tests the coating formulations will be optimised, applied onto commercial paper and packaging and examined. The examination will include migration tests as well as test regarding their recyclability. At the end of the examinations a profitability analysis will be made.

Over 15 pigments have been part of the screening process. The best pigments have been selected and incorporated into coating colour formulations (on their own and in combination with other sorption materials and typical coating colour pigments) and coated onto a reference substrate (virgin fibre board). In selected sorption layers more than 95% of the mineral oil was trapped in the coated board. The most promising sorption layers contained zeolites, silica and organoclays as well as calcium carbonate.

Application/Economic benefits

The intended results can be used by the entire value chain. The value chain is composed of: manufacturer of packaging paper, manufacturer of chemical raw materials and additives, paper converters and packaging manufacturers, distributors and end-users. The technical and economic benefits are obtained by:

- Savings compared to virgin fibre paper and board (paper industry)
- Savings of the development effort of optimised recovered paper containing packaging (paper industry)
- Increased profit due to a better marketing and new markets (suppliers)
- Avoidance of higher costs due to virgin fibre packaging (entire value chain)
- Increased market share by improved consumer protection (distributors)

Due to the increased consumer and health protection all companies involved will benefit from an increased public image. This increased public image can lead to a better marketing and therefore an increased market share.

Period of time: 01.02.2011 – 31.01.2013

Remarks

The research project IK-MF 100094 is being funded by the German Federal Ministry for Economics and Technology (BMWi).