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Research area: e.g. Product aims

End products made of paper, paperboard and board // Carton products

Key words:

Food packaging, folding boxes, organoleptic properties, odour, gas-chromatography

TITLE:**Development of strategies for controlling the organoleptic properties of folding boxes based on chemical and descriptive odour analysis****Background/Problem area**

To control the organoleptic properties of food stuffs more and more higher standards are established by the food industry. Already very small deviations in odour and taste can be detected with very effective organoleptic tests methods but only assigned in minor cases to a potential source. Often packaging materials are under a strong suspicion to cause changes in the organoleptic properties of food stuffs. Therefore they are often the reason of customer complaints.

Compared with other packaging materials carton boards but also papers have some disadvantages regarding their organoleptic properties. Paper and board are mainly composed of natural fibres and possess nearly in every case a small but not unpleasant odour by itself. The fibres of cellulose and mechanical wood pulps are a very good nutrient media for microorganisms which could generate odorous compounds during production and storage. Very rapidly fibres adsorb low molecular compounds like solvents or residual monomers. In return the emission of the volatile compounds is very slow.

To avoid customer complaints and losses in market shares the currently used quality assurance measures for monitoring the organoleptic properties of carton board products need to be optimised in the paper and board industry to create a better basis for future optimisation work.

Objectives/Research results

The objectives of the research project include the identification of the main odorous compounds, improvement of sensory analysis and quick allocation of odorous compounds to the main sources in packaging products made from carton board.

Based on laboratory samples the main raw materials and additives for carton board production were investigated in respect to their organoleptic properties. Beside different types of pulp the main focus of the investigations were defoaming agents, sizing and wet strength agents. In addition selected board samples were printed and varnished with different types of printing inks and lacquers on laboratory scale. Afterwards the samples were examined in respect to their organoleptic properties and by gas-chromatography / mass spectroscopy.

Relevant odorants were identified in carton board as (E)-Non-2-enal, (E,E)-Deca-2,4-dienal, tr-4,5-Epoxy-(E)-deca-2-enal, 2-Methoxyphenol, 3-n-Propylphenol, 4-Ethylphenol and 4-Methylphenol together with low molecular fatty acids and a lot of other aldehydes not explicitly mentioned. Recycled fiber pulp, mechanical wood pulp and unbleached chemical pulp can exhibit higher odour intensities than bleached chemical pulp. Different carton board samples from the same quality and odour intensity can show quite different odour characteristics. Basically the statements of printing ink producers were confirmed: Low odour and low migration inks showed a better organoleptic performance than conventional printing inks. UV printing inks and varnishes can generate rather high odour intensities up to critical levels.

During the project a flavour language for carton board was developed. The findings were discussed together with people from the paper industry at a sensory Workshop at IVV in Freising. Based on solid phase microextraction (SPME) a method for the quick analysis of volatile organic compounds was developed. Finally schedules for odor reduction, packaging optimisation and quality assurance were written down.

Application/Economic benefits

The research results can be used along the whole value chain from the carton board production up to the final packaged food product. Especially the following two economic advantages are generated:

1. Avoiding of customer complaints and product losses via control of odour and taste
2. Future use of carton board as packaging material for food stuffs especially in the case of recycling board qualities.

Period of time: e.g. 01.04.2012 – 31.06.2014

Remarks

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