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**Research area: Product aims**

Paper, paperboard and board // packaging papers and paperboard

**Key words:**

Packaging paper, nano particles, health, environment

**Title:****Impacts of nano particles from paper and packaging products on health and environment****Background/Problem area**

"Nanotechnology" (NT) - as in other industries - is an important factor for further technological advancement in the paper industry. Among other planned innovations, NT products have been in use for many years, e.g. nanoscale pigments for enhancing the printability or NT-based systems to improve retention.

Despite the clear benefit offered by NT, the discussion about the risks of NT is going to capture the attention of the public to an ever greater extent, particularly non-governmental-organisations (NGOs) like environmental or consumer protection associations expressing their concerns about possible NT risks in public discussions.

Driven by the NGO concerns and the increasing public discussion, consumer questions about the application of nanoparticles in paper & board and related packaging products are rising as well. As a result, if nanoparticles are in use, there are follow-up questions to be answered: Are there adverse health or environmental effects which can be caused by the use of nanoparticles in paper products? Are there possible negative impacts if nanoparticles enter the environment or the recycling loop?

In addition to these questions, a regulatory framework of the NT in the European Union (EU) is still non-existent. In April 2009 the EU Parliament decided that there is a need for action in view of the fact that the existing acts to regulate NT are insufficient.

It is necessary to point out that obtaining information about NT and especially in combination with corporate data is a challenging task. This is due to the fact that there are numerous literary/internet sources and the problem about the legal grey area, which brings additional problems to find or identify nanotechnological paper industry products.

**Objectives/Research results**

The most important objectives within this project are to describe and observe the current development of NT in paper products and to identify the nanoparticles which might be used in German paper mills. In this context, it is necessary to consider the use of nanoparticles during paper production as well as the impact of nanoparticles on human health and their environmental effects.

It can be said first of all that nanoparticles are used mostly as part of retention systems or as nano-scale products in paper coatings. Graphic paper and photographic paper are currently providing the greatest input of nanomaterials. So far it has not been possible to find examples of tissue paper or packaging paper in which nanoparticles are being used, although there are nanoparticle-based coating products for packaging products on the market, e.g. an anti-slip coating for paper bags.

A standard statement concerning the risks of NT is not possible. Several hundred research projects are currently in progress to gather more information about the toxicology and ecotoxicology of nanoparticles. Up to now, NT research has been concerned primarily with commercial performance goals rather than risk matters. Therefore, the actual state of nanoparticle risk knowledge can only be summarized and combined with paper industry interests.

Furthermore, it is necessary to obtain more information about nanoparticle emissions during the life cycle of paper products. In particular, this has to include emissions at the workplace, to the consumer and during paper recycling. Referring to the recycling loop, a special focus will be to identify which particles might get returned to the production process, still with nanoscale properties.

Another goal is the identification and evaluation of existing and potential future acts which can affect the German paper industry. In this context, several European and German acts have been considered, e.g. the European Cosmetic Regulation 1223/2009 which includes a first NT definition but only for cosmetics, and European Regulation No 10/2011 for plastic packaging materials intended to come into contact with food which also regulates NT products in several points.

So far, the literature study has not yet reached completion and the recommended follow-up action has to be further elaborated and ultimately will be added in the completed project report.

**Application/Economic benefits**

The expected results of this study can be used directly by all paper mills. Referring the superior topic of this study "impacts of nanoparticles" a broad knowledge base will be provided. This knowledge base can be used to assess on-going or scheduled nanoparticle based paper and packaging products. The recommended follow-up actions include research proposals designed to close knowledge gaps and to avoid possible negative impacts on human health or environmental media due to the use of nanoparticle in paper and paper-based packaging products.

**Project period: 01.01.2011 – 31.12.2011**

**Remarks**

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