

EuPIA Statement

on the EUON “Literature study on the uses and risks of nanomaterials as pigments in the European Union”

A recent study commissioned by the *European Union Observatory for Nanomaterials (EUON)*¹ has identified gaps in the current knowledge on the hazard and risk assessment of nano-sized pigments. Several exposure scenarios are discussed, among them the production and use of printing inks.

Concerning the available toxicological data for pigments in general and in nanoscale, we would like to refer to the information provided by Eurocolour.² In this position paper the potential exposure of nanoscale materials due to printing inks is highlighted.

Pigments in inks

Printing inks consist of four major components: solvents, polymeric binders, additives, and colouring components, typically pigments. Usually the ink manufacturers use finely dispersed pigments, which are thoroughly wetted out by and completely incorporated into the other ink components during the production process. In order to achieve a high gloss and high transparency of the printed ink films it is necessary to finely disperse the pigments. A dried printing ink film is usually 1–1.5 µm thick, therefore, all of the embedded particles are normally considerably smaller than 1 µm. Hence, printing inks often contain nanoobjects, even if these materials have not been manufactured specifically for this purpose.

Exposure of workers during the production of inks

Printing inks are produced according to modern standards of occupational safety and hygiene procedure. Hence, as long as these procedures are followed the workers are not exposed to concentrations above the occupational exposure limit values. Consequently, the study also concludes: “*This ES is not of high concern based on the comparison between the measured particles concentration and the recommended reference value. The measured concentrations are 2.5 times and 4 times lower than proposed OEL. Therefore it can be generally concluded that risks can be controlled for this use, provided that standard occupational hygiene rules are observed.*”³

Exposure of consumers in applications - food packaging

Since printing inks are only supplied to industrial users, the consumer does not come into contact with the printing ink itself. However, consumers come into contact with printed materials. An especially sensitive application is food packaging. A potential migration of nanoparticles from the ink film into the foodstuff would lead to an oral exposure. In the dried ink film the pigments are, however, incorporated in the polymeric matrix and are thus not able to migrate. A study commissioned by the German Paint and Printing Ink Association, VdL, was able to confirm this and concluded: “*Following the wide range*

¹ *Literature study on the uses and risks of nanomaterials as pigments in the European Union*, September 2018, doi: 10.2823/260688

² [Statement](#) on the publication „Literature study on the uses and risks of nanomaterials as pigments in the European Union“, Eurocolour, October 2018

³ *Literature study on the uses and risks of nanomaterials as pigments in the European Union*, page 122 - 123

of analytical methods used in this study, no migration of nanoscale pigment particles could be detected from ink layers of printed food packaging into the food. Therefore exposure of the consumer to nanoparticles from the dried and cured ink layers may be excluded.”⁴

This is also in line with the EUON study, which states “The end uses of all pigments necessitates that they are bound in a matrix, for example when used to colour paints, coatings and polymers. These end-uses generally do not present a significant exposure potential.”⁵

Conclusion

It can be concluded that the presence of nanoscale particles in the printing ink supply chain does not lead to a significant exposure of workers or consumers and therefore poses no risk.

EuPIA, 8 November 2018

⁴ [„Nanoscale pigment particles - Analysis of the migration behaviour from printing ink layers of printed food packaging into the food”](#), Deutsche Lebensmittelrundschau, April 2013

⁵ *Literature study on the uses and risks of nanomaterials as pigments in the European Union*, page 138