

## USE OF NANOPARTICLES IN SWISS INDUSTRY: A TARGETED SURVEY

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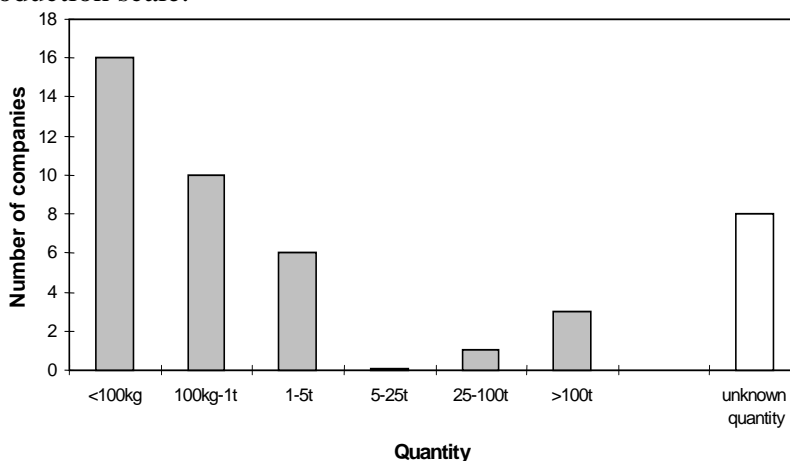
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**Keywords:** *exposure, nanoparticles, occupational, Switzerland*

A large number of applications with manufactured nanoparticles <100nm are currently being introduced into industrial processes and consumer products<sup>1</sup>. Manufactured nanoparticles might cause similar negative health effects as micro- and nanosized ambient particulate matter<sup>2,3</sup>. There is an urgent need to evaluate the risks of these particles to ensure their safe production, handling, use, and disposal. However, we currently lack information about types and quantity of industrially used manufactured nanoparticles and the exposure to them in Switzerland.

The pilot study of the Swiss Nanoinventory was an evaluation of the knowledge of production and safety managers in most types of industries about nanoparticles and safety measures. A telephone survey was conducted among 200 Swiss companies to evaluate the nanoparticle applications with regard to types and quantities of nanoparticles, protective measures and numbers of potentially exposed workers.

The following nanoparticles were found to be used in considerable quantities (>1000kg/a per company): Ag, Al-Ox, Fe-Ox, SiO<sub>2</sub>, TiO<sub>2</sub> and ZnO, but the majority of nanoparticle applications were on a small production scale.



*Fig. 1.* Number of companies in the different quantity classes of nanoparticles used per year (n=44)

The applications were identified in the following fields: coating, cosmetics, food, paintings, powder-production, and surface-treatment. The survey showed that nanoparticles are used in many Swiss industrial sectors, outside typical nanotechnology industries.

Safety managers as well as top management put strong emphasis on safety measures. They used their own experience to develop a protection strategy. However, they had many open questions about best practices. Guidelines and protection strategies should be developed soon.

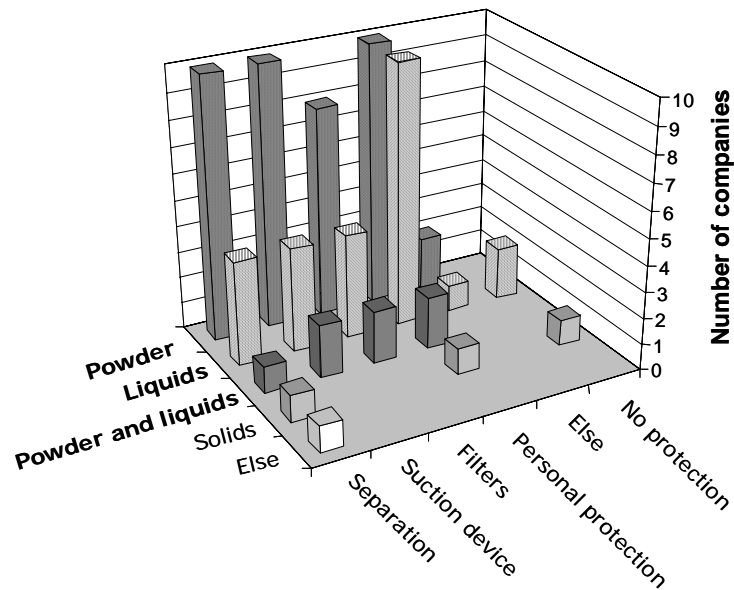


Fig. 2. Type of protection measures used for the different application types, (n=44)

The study showed that the use of nanoparticles is not fiction but already reality in the Swiss industry and it allowed an identification of industrial sectors with an established nanoparticle-use.

It gave us valuable information about the knowledge of production and safety managers about handling of nanoparticles, and is presently used as the basis for a detailed representative inventory, which eventually will be an important element for risk evaluation and prevention strategies regarding nanoparticles and health in Swiss industries.

#### Acknowledgements

This work was supported by the Swiss Federal Offices for Health (OFSP), Environment (OFEV) and Economy (SECO), the Swiss National Accident Insurance (SUVA) and the French Agency for Environmental and Occupational Health Safety (AFFSET).

#### References

- [1] Chaudhry M. Q.; Boxall A. B.; Aitken R.J.; Hull M. "A Scoping Study into the Manufacture and Use of Nanomaterials in the UK," London, UK, Department for Environment Food and Rural Affairs (2005).
- [2] Hoet P.H., Bruske-Hohlfeld I. and Salata O.V., "Nanoparticles - known and unknown health risks," J. Nanobiotechnology, 2, 12 (2005).
- [3] Riediker M.; Yeatts K. "Epidemiology of ambient air pollution and cardiovascular disease (concise review) [update 15.02.2006]". In Harrison's Principles of Internal Medicine [electronic document]. - 16th ed. - New York : McGraw-Hill, 2006.