Nano risk evaluation in laboratory environment by LOPA method

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Abstract

Nanotechnologies are widely used in various industrial settings and by the year 2020, it is expected that nearly 20% of all products manufactured in the world will take a certain amount of nanotechnology. However, there is a substantial imbalance of knowledge between application of nanotechnology and its impact on health and environment, also considering that nanoparticle synthesis by chemical methods assumed a key role for economic, industrial and scale-up issues. The information currently available on nanomaterial risk assessment within the workplace are limited: systematic methods for assessing exposure are not known yet and the number of workers exposed is hardly estimated. This knowledge gap imposes to the scientific community the need to join efforts to provide a shared opinion on safety, health and welfare of workers who use, manipulate, or produce nanomaterials, adopting as well preventive and protective measures proportionated to the risk according to the precautionary principle. We develop a novel framework for Nano risk assessment within the laboratory context, by combining LOPA and HazId techniques, assigning credit factors to specific operative procedures and safety training, suitable to mitigate risk exposure and avoid over-conservative evaluations. Conclusions are drawn on applicative results and possible direction for further implementation of the approach, in view of sustainable, healthy and safe production at industrial level.