DEVELOPMENT OF A NANO-RISK ASSESSMENT TOOL BASED ON A HOLISTIC APPROACH

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ABSTRACT

The identification of various assorted occupational and consumer hazards in nanotechnology necessitates the development of efficient risk management systems, in order to adequately safeguard vulnerable parties, while not hindering research progress. Driven by the need for advanced risk assessment methods, we initiated development of a digital tool intended to support such operations. Our tool is being designed as an assistive platform for small- and medium-scale facilities/laboratories producing and using nanomaterials. Studying the progress made in analogous systems in recent years [1] [2], it was determined that our approach should be steered towards more specialized risk assessment techniques. Specifically, the risk assessment process is organized in three connected but discretely studied parts (Hazard, Probability and Exposure Assessments). The tool analyses and assesses input information concerning nanomaterial characteristics, nanomaterial processes, and details about the workplace. In this presentation, the outline of the architecture of our system will be explained, and the rationale for developing the "hazard analysis" component of the tool, based on the evaluation of existing research on nanotoxicology, will be introduced. The module is based on a control banding approach, which is a widely used assessment methodology in cases where information is limited. The most decisive hazard factors are designated, and the resolution of the research findings for each parameter is condensed into a scoring system that is designed to satisfactorily represent the contribution of every respective factor. Through the overall analysis of the hazard determinants, a hazard profile for the studied nanoparticle can be formulated. Thus, a foundation is provided, in order for the risk assessment process to continue in the Probability and Exposure stages. We maintain that judicious use of a system of this character can be a helpful tool in risk prioritization and decision-making processes.

Acknowledgements

This study was partially supported by European Commission funded projects BIORIMA H2020 (GA No. 760928), MODCOMP H2020 (GA No. 685844).

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