

Engineered Inorganic Nanoparticles and Cosmetics: Facts, Issues, Knowledge Gaps and Challenges

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Abstract

The cosmetic industry is among the first adaptors of nanotechnology through the use of engineered nanoparticles (ENPs) to enhance the performance of their products and meet the customers' needs. Recently, there have been increasing concerns from different societal stakeholders (e.g., governments, environmental activist pressure groups, scientists, general public, etc.) concerning the safety and environmental impact of ENPs used in cosmetics. This review paper seeks to address the twin concerns of the safety of cosmetics and the potential environmental impacts due to the constituent chemicals—the ENPs. The safety aspect is addressed by examining recently published scientific data on the possibility of ENPs penetrating human skin. Data indicates that although particular types of ENPs can penetrate into the skin, until now no penetration has been detected beyond the stratum corneum of the ENPs used in cosmetics. Yet, important lessons can be learned from the more recent studies that identify the characteristics of ENPs penetrating into and permeating through human skin. On the part of the environmental impact, the scientific literature has very limited or none existent specific articles addressing the environmental impacts of ENPs owing to the cosmetic products. Therefore, general ecotoxicological data on risk assessment of ENPs has been applied to ascertain if there are potential environmental impacts from cosmetics. Results include some of the first studies on the qualitative and quantitative risk assessment of ENPs from cosmetics and suggest that further research is required as the knowledge is incomplete to make definitive conclusions as is the case with skin penetration. The authors conclude that the cosmetic industry should be more transparent in its use of nanotechnology in cosmetic products to facilitate realistic risk assessments as well as scientists and pressure groups being accurate in their conclusions on the general applicability of their findings. Transparency in cosmetics needs nanotechnology, but nanotechnology in cosmetics also needs transparency _ _ _