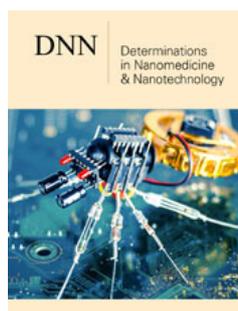


Nanotechnology Waste: An Ecotoxicology Risk?

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Introduction

The word “Nano” is a prefix denoting 10⁻⁹m (a billionth of a meter) and the nanoscale usually refers to structures with a length scale of 1-100 nanometers applicable to nanotechnology. The idea of nanotechnology was presented far back as 1959 by Richard Feynman, who stressed that materials can be formed by manipulating individual atoms and anticipated the scientific transformation of the 21st century by nanotechnology - a world of nanoscale products, processes, devices and machines Hornyak [1] and Ozin et al. [2]. Over the years, Feynman’s predictions have elicited interest from scientist, investors, corporations, Government and policy makers, which have made nanotechnology a reality. The advantage of low material usage and power requirement; unique functionality, modified physical and chemical properties of nanoscale materials have seen their application and usage in various aspects of human endeavours such as health and medication, energy, agriculture, electronics, transportation, security, information and communication technology Wilkinson [3]; Saini et al. [4]; Ramsden [5]; Campos-Cuerva et al. [6] and Ikhuoria [7].

As with science and new technology, the development of a novel scientific breakthrough creates along with it a new dimension of pollutants and toxins which may portend risk to human health and environment. Over the years, the World economic structure have seen the underdeveloped and developing nations been the final users in the life cycle of innovative technologies/products; thereby confronted with the environmental and human health risk associated with their decommissioning and disposal. In most cases, the damage has been done to human and environmental health before the hazard potentials of these materials are identified and protective actions taken. A typical example was the dumping of toxic waste in Koko community in Delta State, Nigeria in 1988. Similarly, the science and development of nanoscale materials and products will generate its own new dimension of pollutants and toxins; capable of causing ecological disruptions and implication on human health.

Therefore, from an Ecotoxicologist perspective, there is need for focused studies on identifying the stability of nanoparticles in the environment; monitoring of generated waste in the production of nano-materials; the human health risk and ecological disruptions associated with the exposure to nano-materials at the end of their material life cycle when they are discarded into the environment as waste. This is of necessity in protecting the environment and human health of underdeveloped and developing nations; which acquire new technology products after their half-life cycle have been utilized in developed nations. And thereby confronted also with the challenge of proper toxic waste handling and disposal.

Conclusion

Obviously, the importance and usage of nanotechnology cannot be exhaustively discussed as each succeeding research highlights newer products and application. Therefore, there is need for ecotoxicological studies to identify the various environmental imprints associated with the usage and life cycle of nanoscale materials and products; and ensure that necessary proactive measures are carried out for environmental safety.

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