

ABSTRACT

Nanotechnology has been a rapidly developing field for several decades, having an influence that spans numerous fields. One application of nanotechnology currently being researched is in the area of water and wastewater treatment. The unique properties of nanoparticles, such as high specific surface area, anti-microbial activity, and photocatalytic activity among others, are being shown to be suitable for the removal of contaminants and pathogens in water. This thesis investigated the latest developments in this particular area of nanotechnology research. The latest research regarding the impacts of nanoparticles on health and the environment was also investigated.

Several conclusions were made based on the findings of this study. With regards to water treatment applications, nanoparticles were found to be effective for their adsorptive, anti-microbial, and photocatalytic properties as well as their ability to act as filtering membranes. These properties show nanoparticles to be a cost-effective, sustainable treatment option. Likewise, nanoparticle-enabled methods have wide applications in wastewater treatment, although the complex infrastructure and processes associated with wastewater treatment make their implementation problematic.

With regards to health impacts, nanoparticles have the potential to cause numerous health problems in virtually all areas of the body. That being said, the health impacts of nanoparticles on industry workers have yet to be definitively determined. There is also ongoing research on the impact of nanoparticles on human stem cells and the use of stem cells and nanoparticles for the treatment of various health problems. These studies are yielding promising results thus far, although more research is required.