

Ecotoxicology of C60 Fullerenes in Fish

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Investigating the ecotoxicology of nanoparticles is an important objective both for protecting the environment from unexpected negative effects and for preserving positive public opinion on the benefits of nanotechnology. Some previous research has indicated that the fullerene C60 (or “buckyball”) can cause toxicity in aquatic organisms and raised concern about the potential for negative effects of these materials.

Henry et al. (2007) demonstrated that some of the early concern about the aquatic toxicity of C60 was unjustified because toxic effects were more likely a consequence of substances used in experiments to enhance solubility of particles rather than from the C60 itself. This work showed that substances associated with tetrahydrofuran (THF) used to prepare aggregates of C60 in water were associated with changes in gene expression (an indication of toxic effects) in larval zebrafish; these changes did not occur when fish were exposed to C60 without THF. Further work by these investigators has shown that fish exposed to C60 through the diet did not suffer toxicity at the concentrations tested.



Figure. Zebrafish *Danio rerio* embryos and larva.

Assessing the toxicity of nanoparticles in the environment is challenging and requires development of new methods that must consider the characteristics of particles and their behavior in addition to their concentration.

Reference/Publication

Henry, T. B., F. Menn, J. T. Fleming, J. Wilgus, R. L. Compton, G. S. Sayler. 2007. Attributing the toxicity of aqueous C60 nano-aggregates to tetrahydrofuran decomposition products in larval zebrafish by assessment of gene expression. *Environmental Health Perspectives* 115(7):1059-1065.