ANZBP Factsheet on Microplastics

July 2020

The Australian New Zealand Biosolids Partnership (ANZBP) supports the water industry to sustainably use biosolids. Biosolids contain organic carbon which is valuable for soil structure and health, and important nutrients including nitrogen and phosphorus that are beneficial for soils, and can replace the use of artificial fertilizers, reducing reliance on petrochemical and mined nutrient sources.

Biosolids also contain micro-nutrients e.g. copper, zinc, calcium, magnesium, iron, molybdenum and manganese that are essential for healthy crop and pasture production. In ANZBP's 2018/19 End-Use Survey, 67% of Australia's biosolids were used in agriculture. This is a huge improvement from when biosolids were historically discarded as waste in landfills. Striving towards a 'circular economy', communities can use biosolids to help close the nutrient and carbon loop.

The source of biosolids is from treatment plants that receive wastewater from households and urban industries and therefore they may contain low concentrations of a range of micro-pollutants. Stringent regulations protect the receiving environment by setting the maximum concentration that is considered 'safe' for that application, however, sometimes contaminants appear that are not yet regulated. Several water utilities pro-actively support research to measure potential pollutants that are unregulated, to ensure they are confident in the sustainability and safety of their biosolids reuse programs.

Recently, there has been media concern about micro-plastics making their way into our waterways and oceans and on to agricultural land via the application of biosolids. Of concern are potential risks to aquatic and soil animals and ecosystems, and transference of contaminants into the human food chain. Investigations into these effects are still in their infancy, and the ANZBP welcomes further investigation into the effects of microplastics at locally relevant concentrations on the ecosystem of application sites. Research on microplastics in other countries is not directly transferable to the Australian/New Zealand context, for a number of reasons, in particular, the source control of inputs to sewage systems.

There are many pathways for microplastics to enter the environment, including litter, road runoff, compost, and potentially via treated effluent release or from biosolids land application. Sewage treatment plants are designed to give some level of treatment for large pieces of plastic (typically pieces larger than 5mm are caught in the preliminary screening step), however, microplastics are very difficult to remove due to their small size (<5mm). Reliable estimates of the load of micro-plastics are difficult due to lack of standardised analysis methodologies. The ANZBP supports the development of standardised analysis methodologies for microplastics.

Despite the need for standardised analysis methods and lack of certainty on Australian and New Zealand biosolids microplastics concentrations and loads, preliminary analysis indicates that the contribution of microplastics in soils from biosolids land application is unlikely to cause appreciable risk to environmental or human health.

A standardised approach to detecting microplastics in water and soil matrices can lead to targeted research into any potential harm that may be caused by their presence, and ways to reduce the load of microplastics going into the environment. Consistent with a number of micropollutants that may end up in biosolids or recycled water, it is often easier to reduce the load at the source, rather than trying to remove them at the end of the process. Given the increasing production and use of synthetic fabrics, some researchers have called for filtering technologies that can be applied to domestic washing machines to prevent and reduce the release of microfibers.

Controlling the source of all plastics entering the environment is a complex but important global and regional goal. Responsible management of biosolids requires a consideration of potential issues from a number of perspectives: environmental, economic and social. Management decisions based on a single issue will always result in an unbalanced outcome.

Overall, consideration of the environmental, economic and social benefits of biosolids land-application provides multiple benefits through recycling of valuable nutrients to depleted soils, reduced reliance on petrochemical and mined sources of plant nutrients, and cost-effective management of municipal wastewater, with no known major detrimental effects to soil, plants, the food chain, human health or soil and water organisms in the past 20 years of modern biosolids reuse standards in Australia and New Zealand. Until further information indicates otherwise, the ANZBP believes these benefits outweigh risks of biosolids land-application due to microplastics.

For further technical detail and references on this topic, please see the ANZBP Preliminary Report on Microplastics Risk for the Australian and New Zealand Biosolids Industry.