QMRA Quantitative Microbial Risk Assessment

At QMRA Data Experts Ltd, we have applied QMRA for a variety of wastewater discharges containing virus, protozoa and bacteria pathogens.

In line with the mandates of the Resource Management Act (RMA), human wastewater treatment plants and property developers are required to apply for Council consents to discharge treated wastewater into receiving waters.

To support these consent applications, it is required that the applicants apply high-level science to assess the potential effects of such discharges on the receiving environment.

Increasingly, where discharges may contain high concentrations of microorganisms that could impact upon public health, regional councils are requiring assessments that go beyond the traditional method of conformity to faecal indicator bacteria (FIB) guidelines. Understandably so, wastewater treatment technologies tend to alter correlations between FIB and the pathogens they are meant to be proxies for. Hence, applying the conventional FIB standards to assess a site receiving point discharges of treated wastewater may present a false outlook in terms of health risks.

QMRA – quantitative microbial risk assessment – is a more robust framework used to estimate the public health risk due to exposure to pathogenic micro-organisms (e.g., Campylobacter, Giardia, adenoviruses, noroviruses, enteroviruses) that may be present in wastewater discharges to water.

Within a Monte Carlo simulation paradigm, QMRA incorporates dose-response functions of specific pathogens; the amounts of water individuals ingest during contact recreation; and the amount of raw shellfish individuals consume to determine whether wastewater discharges have a 'more than minor' effect on the receiving environment.

Effects determined in a QMRA are reported based on individual's illness risk (IIR) profiles, usually in relation to recreational uses and consumption of raw shellfish harvested in the receiving environment.