



The Wastewater Specialists

Optimising your assets

Alison Lowe
Environmental Manager
Rotorua Lakes Council
Private Bag 3029
Rotorua Mail Centre
Rotorua 3046

5th April 2022

Toxicity Testing of Geothermal Samples

Dear Alison,

We have undertaken respiration-based toxicity testing (RBTT) of the six geothermal samples collected on 24th March 2022. The results of this RBTT are summarised and discussed below, with the full toxicity test reports attached.

Results

The concentration of each of the six samples causing 10% (EC₁₀), 20% (EC₂₀) and 50% (EC₅₀) inhibition of nitrifying bacteria is shown in the following table, along with the EC₅₀ of the general (non-nitrifying) biomass.

Sample	Nitrification EC ₁₀	Nitrification EC ₂₀	Nitrification EC ₅₀	General EC ₅₀
RLC2203131-01	N/A ¹	N/A	N/A	N/A
RLC2203131-02	10 – 20%	20 – 100%	20 – 100%	N/A
RLC2203131-03	N/A	N/A	N/A	N/A
RLC2203131-04	N/A	N/A	N/A	N/A
RLC2203131-05	N/A	N/A	N/A	N/A
RLC2203131-06	N/A	N/A	N/A	N/A

Discussion

Of the six samples, only one (RLC2203131-02) exhibited inhibitory characteristics. However, this one sample was very inhibitory to nitrifying bacteria when undiluted, and exhibited low level inhibition

¹ N/A means the level of inhibition (EC₁₀, EC₂₀ or EC₅₀) wasn't reached

of nitrifiers at a 20% (1:5) dilution. This sample was also moderately inhibitory to the general biomass when undiluted.

While RLC, and their Wastewater Operations contractor TRILITY, should determine the acceptable level of risk and appropriate dilution of discharges at which no inhibitory effect is observed, we suggest the following factors should be taken into consideration:

- › The inhibitory effect of individual trade waste discharges, and the dilution available.
- › The inhibitory effect of other known, and unknown, discharges into the Rotorua sewer network.
- › Potentially synergistic effects between inhibitory substances in different wastewater streams.
- › An appropriate safety factor to ensure an appropriate level of protection to the WwTP.

If you would like to discuss these results, please don't hesitate to contact me.

Yours sincerely,



Hugh Ratsey
Wastewater Process Scientist