

White Paper

Effects of Quaternary Amine Sanitizers on the Activity of
Microbial Drain Cleaners



QM Introduction

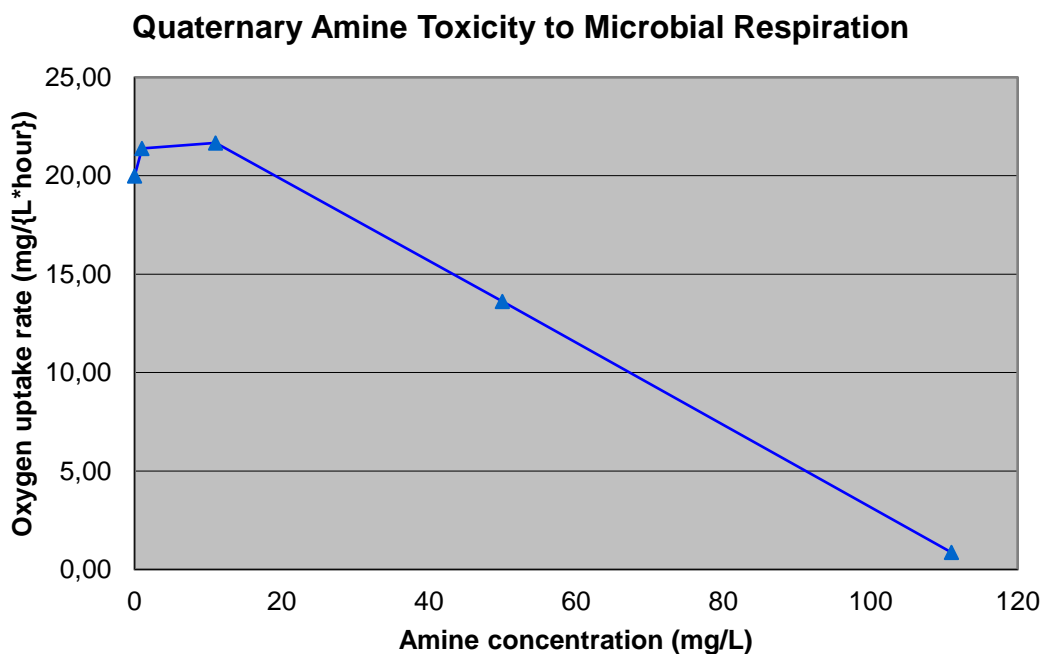
Quaternary amine compounds are used extensively in kitchen and food preparation operations as utensil and drinking glass sanitizers in the 150 to 200 mg/L (active ingredient) concentration range. When these solutions are spent, they are washed down into drains and enter the plumbing system and grease trap. Sanitizers, by definition, are formulated to kill bacteria on the surfaces they are cleaning. The impact of these biocidal compounds on microbial – based drain and trap cleaners is the subject of this paper.

QM Activity Measurement

Oxygen uptake rate is a direct measure of the activity of growing/reproducing microbes. It is a measure of their respiration which has been shown to be directly proportional to their activity.

QM Test Results

The following figure shows the oxygen uptake rate at 20°C for an actively growing suspension of a commercial microbial drain cleaner/deodorizer after 1 minute exposure to varying quaternary amine concentrations.



Note that the microbial activity drops by about 50% at a concentration between 60 and 70 mg/L quaternary amine. Thus, microbes will survive and maintain significant activity when the sanitizer compound wash downs are diluted to four times the original volume, assuming the original concentration was 200 mg/L or less (that is, when quaternary amine concentration is below 50 mg/L). This will usually happen in the grease trap. Small grease traps may not have sufficient volume to dilute such discharges. Running clean water into an upstream sink during sanitizer wash down will help to maintain microbial activity in the drains and grease trap.

Biofilm (the slime layer developed on surfaces in the plumbing system by regular use of microbial products) as well as food fats and proteins will offer some protection to the microbes in the system and a proportion of the microbes protected by these semisolids will usually survive each discharge. This is the reason that sanitizer label directions require pre-cleaning of food preparation surfaces to ensure effectiveness at the use concentrations specified. In addition, spores, seed-like protective microbial states, will easily survive higher sanitizer concentrations and will grow out when the concentration is reduced.

Strategies to Maintain Microbial Activity

- Add microbial/enzymatic drain cleaners at the end of the night to maximize the period of time for growth and degradation before the next discharge of toxic wastewater.
- Periodic addition (continuous drip, daily, twice per week or weekly, depending on site conditions and product) is necessary to maximize microbial activity and reestablish beneficial strains more susceptible to sanitizers.
- Dilute sanitizer wash downs by running water at the “highest” sink in the drain system and by using large quantities of rinse water for the sanitizer.