Introduction
Metaldehyde is the active ingredient found in 80% of slug pellets in the United Kingdom [1]. If it were not used, up to £97million could be incurred annually in crop damage [1]. Conventional treatment methods are either ineffective or not economically viable. However, the Northumbrian Water Group have found that several of their slow sand filters (SSFs) and biobeds are able to achieve high removal efficiencies of metaldehyde.

Overall Objectives
• Establish why only some slow sand filters achieve high removal efficiencies of metaldehyde.
• Determine the degradation rates from using slow sand and biobed samples in batch degradation studies.
• Identify and quantify the metaldehyde degrading microorganisms.

Methods and Results

Field Sampling
Figure 1a. and 1b. Field sampling was undertaken to monitor how chemical, microbial and operational parameters impact metaldehyde removal in SSFs.

Molecular Analysis
Figure 3. Flow cytometry analysis used to assess the total bacteria cell count in SSF media.

Batch Degradation Studies
Figure 5. Bioreactor being used for degradation studies. CO₂ and metaldehyde measurements are taken with GC-MS and LC-MS respectively.

Conclusions
• The SSFs remove metaldehyde differently, statistical analysis will allow factors which impact this removal to be identified and assessed.
• The flow cytometry analysis is indicative that there is a gradient of total bacteria concentration in a SSF. The screening tests show that the SSF and biobed samples are able to degrade metaldehyde to varying extents. Thus degradation tests will be undertaken for each media available.

References