

# Development of early warning parameters for the removal capacity of T&O by BAC

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## Abstract:

BAC filtration after ozonation can be exploited to remove organic pollutants like biodegradable organic matter, disinfection by-product precursors, and taste and odour compounds. In this study, the effectiveness of BAC filtration to remove taste and odour (T&O) compounds was evaluated through long-term (7 months) bench-scale column experiments using ozonated waters spiked with geosmin and 2-MIB. Specifically, this study aimed to (1) determine the current capacity removal of T&O compounds by biological activated carbon (BAC); (2) evaluate a suitable replacement schedule of BAC column material based on actual performance assessment rather than rely on (chemical) testing of the media or using a fixed replacement schedule; and (3) develop “early warning” parameters for reduction in T&O removal capacity. The following general conclusions can be drawn from the current results:

1. BAC showed an excellent geosmin removal (97%) during the 7 month continued period (34k bed volume - BV). 2-MIB removal was a bit lower but with 88% still at very high levels.
2. The adsorptive capacity of fresh granular activated carbon was exhausted after 6-7 months of operation. After this duration, the removal of T&O compounds was still high (98% geosmin, 88% 2-MIB). Based on these results, the BAC filter would not need to be renewed when biodegradation sets in (i.e., after exhaustion of the filter’s adsorptive capacity) as the biological activity of the filter was sufficient to reach the target T&O reduction.
3. Longer empty bed contact time (EBCT >3min) resulted in better T&O removals. The effectiveness of the biofilter to remove T&O can also be evaluated from the consumption of DO and formation of nitrate during biofiltration.