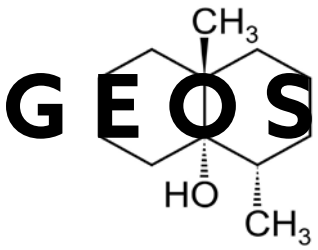
ULTRAAQUA
UV DISINFECTION SYSTEMS



GEOSMIN MITIGATION

WHAT IS GEOSMIN AND WHY IS IT A PROBLEM?

Geosmin and Methyl-Isoborneol (MIB) are naturally occurring compounds commonly found in fish in RAS (Recirculating Aquaculture Systems) production. Both substances accumulate in the fat tissue of the fish and leads to a muddy earthy taste of the fish. Every year this leads to high economic losses for the aquacul-ture industry caused by prolonged production times due to the need to off-flavor the fish in purge tanks and further by the rejection of produce by the fish refining companies.

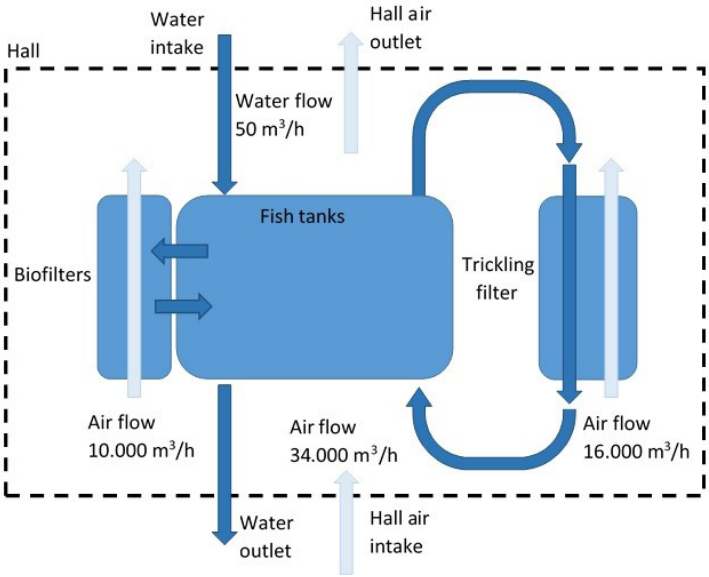


FIGURE 1 - TYPICAL LAYOUT OF RAS CULTURE SYSTEM

GEOSMIN MITIGATION CHALLENGE

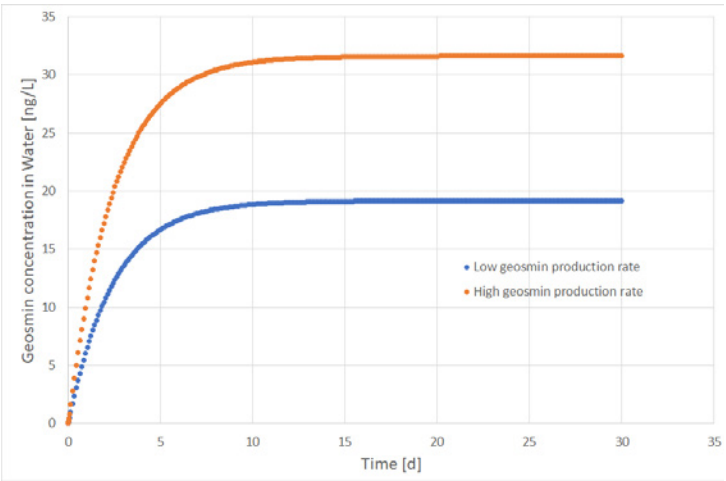


FIGURE 2 - MODEL PREDICTED BUILD-UP AND LEVELS OF GEOSMIN IN RAS SYSTEMS WITH LOW- AND HIGH GEOSMIN SYSTEM FORMATION RATES

As of today, the usual method to remove geosmin from the fish is by placing them into large high purity water tanks that are rich in oxygen. This way the geosmin from their bodies gets transferred to the water until it reaches equilibrium. However, this is a relatively costly method as to ensure proper removal, large quantities of pure water is required. In addition to this, the purge process adds on average of 10 days of fish delivery time - that is needed for the geosmin to be reduced to limits of 5ng/L.

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RESEARCH BASED ULTRAAQUA UV CONSULTANCY

ULTRAAQUA UV research department has first-hand experience in solving and documenting geosmin control. The most optimal strategy in removing geosmin is to avoid or minimize the concentration of geosmin in the culture tanks and thus minimize the need for off-flavoring in the purge tanks further on. Our R&D engineers and chemists have developed quantification tools to model and predict geosmin formation rates in RAS systems. Results of the different scenarios can then be used to make decisions on how to best implement a geosmin mitigation strategy.

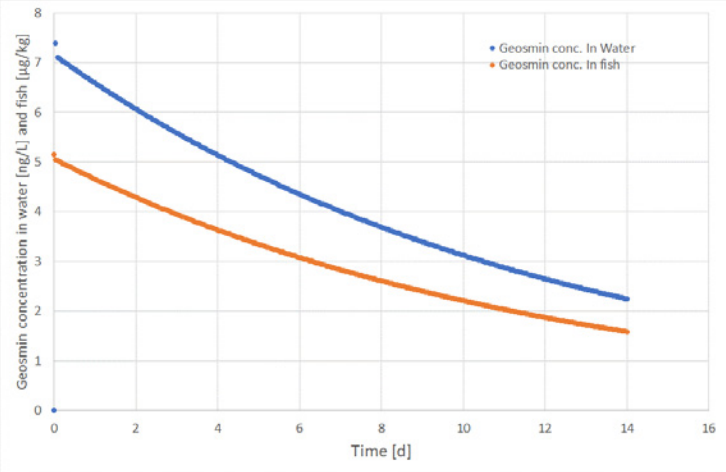

FIGURE 3 - MODEL PREDICTED CONCENTRATIONS OF GEOSMIN IN FISH AND WATER DURING OFF-FLAVOURING IN THE PURGE TANKS

SOLUTIONS PROVIDED BY ULTRAAQUA UV

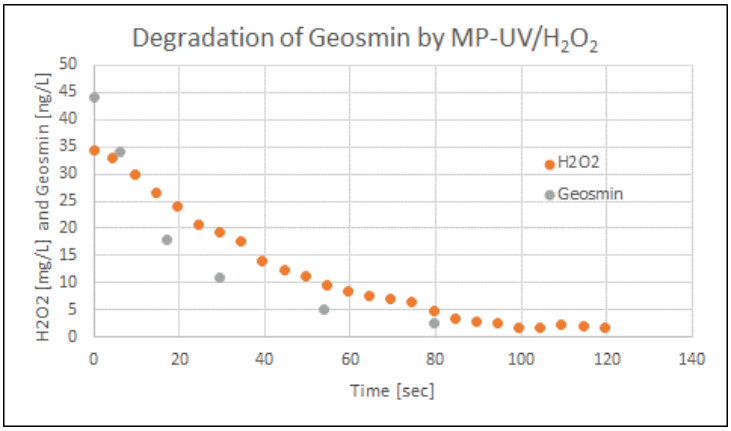

FIGURE 4 - DEGRADATION OF GEOSMIN IN RAS PROCESS WATER BY UV/H_2O_2 AOP PROCESS IN ULTRAAQUA MEDIUM PRESSURE UV REACTOR

ULTRAAQUA consultants will assist in optimizing plant lay out and management strategies to reduce geosmin formation. In addition, ULTRAAQUA offer equipment to remove accumulated geosmin. The optimal solution typically varies from site to site depending on local characteristics. Often the optimal solution involves ULTRAAQUA AOP systems for combined chemical oxidation and photolysis breakdown. It is important to note that due to RAS intenseness, the multiple processes involved and variation in farm management each case is sensitive and different requiring close investigation.

IF YOUR RAS PROCESSES ARE SIGNICANTLY HINDERED BY GEOSMIN CONCENTRATION PLEASE CONTACT ULTRAAQUA UV ENGINEERS AT SALES@ULTRAAQUA

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