

HAB-BART Reaction Patterns

Quick Break Training

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HAB-BART testers are designed to detect the activities of general (HAB) bacteria. HAB stands for heterotrophic aerobic bacteria but is has been simplified to general HAB bacteria to make it easier to understand. These bacteria are able to degrade different organics very efficiently both oxidatively (generates biomass and carbon dioxide) and reductively (by fermentation to create mild organic acids as well as carbon dioxide). This test functions using methylene blue to determine what type of activity are occurring in the tester. If the reaction is of the UP type in which the blue disappears from the bottom upwards then the dominant general HAB bacteria are aerobic and the activity is oxidative. If the reaction is of the DO (down) type then the dominant activity is reductive. Thus the two principal tests for the HAB-BART tester are UP or DO implying oxidative or reductive activities. Up reactions imply that there is an adequate supply of oxygen or nitrate while the DO reaction indicates that there is very little oxygen and bacterial activity is primarily fermentative. These reactions then form a primary separation of bacterial activity into two communities.

UP reactions are usually recognized by the blue color disappearing from 2mm up the side wall of the tester above the conical base. During the initial set up of the tester there will be diffusion of the chemicals from the base which may turn the color to a dirty yellow or green. Once the bacteria activity has become established then the blue color 2mm and above the basal cone now turns clear or yellow. This is now a positive detection of an UP reaction in the tester.

DO reaction are a little more challenging to determine since the anaerobic bacteria generally become active just beneath the BART ball causing the oxygen to react and the methylene blue turn clear. Unlike the UP reaction, the DO reaction may initially come and go again and appear like flocculating clouds in the sample. The test may be considered positive for a DO reaction only when there is a stable band of clear ("bleached") just below the ball. This bleached zone will descend downwards as the oxygen reacts.

Time lapses are determined by the establishment of a clear or light yellow zone that begins normally 2 to 5mm above the testers base cone and rises upwards (in the event of an UP reaction); or forms in a table manner as a bleached zone just below the BART ball in the event of a DO reaction. Refer to BART-SOFT v 6.2, Quick-Pop v. 3 or the technical literature for the calculation the size of the population. Reactions are also shown on the website www.dbi.ca. Occasionally the HAB-BART tester will turn black after the first reaction has occurred. This indicates a very high and diverse bacterial population but is not recognized in the test protocol as an interpretable feature.

Bottom line is that the HAB-BART tester is able to differentiate oxidative and reductive conditions within the water sample by whether the reaction is of the UP or DO type respectively. This is particularly the case in environments that have significant forms of organics that the bacteria are able to attack.

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