



Avalon Institute of Applied Science Inc.

Each of described below bacterial groups can cause different problems and often a combination of BART tests should be used to determine which bacteria are present and causing problems. To read all of the reactions, lift the test vial carefully and view against an indirect light.

BART METHODOLOGIES

A common list of the methodologies and applications would be:

IRB-BART

A test becomes positive when foam is produced and/or a brown color develops as a ring or dirty solution. The TL (time lag) to that event is the delay. A negative result has no brown color developing, no foaming or clouding. This test is commonly used to detect plugging, corrosion, cloudiness and color. The bacteria that may be detected by this test include iron oxidizing and reducing bacteria, the sheathed iron bacteria, *Gallionella*, pseudomonad and enteric bacteria.

SRB-BART

A very simple test to perform in which a positive test occurs when there is a blackening either in the base cone of the inner test vial (80% of the time) or around the ball (20% of the time). The culture medium is specific for the sulfate-reducing bacteria, such as *Desulfovibrio* and *Desulfotomaculum*. This is a more specific test and specifically relates to corrosion problems, taste & odor problems ("rotten egg" odors), and blackened waters. Slimes rich in SRB tend to also be black in color. A negative indication occurs when there is an absence of blackening in the base cone of the inner test vial or around the ball.

HAB-BART

There is a very real need to determine the amount of heterotrophic aerobic bacterial activities in some wastewater, particularly those that are aerobic. Here, biodegradation may be a primary concern, such as on a hazardous waste site. This test relies upon the ability of the heterotrophic aerobic bacteria to reduce a methylene blue dye. To add the methylene blue to the sample, the test vial once charged is simply placed upside down for 30 seconds to allow the blue color to develop. A positive reaction is detected by the blue color becoming bleached (due to the activity of methylene blue reductase). Bleaching may begin at the base of the test vial or just below the ball. Note that a residual blue ring is likely to remain around the ball, but this does not mean heterotrophs are absent. A negative indication occurs when there is an absence of the blue color becoming bleached. This test is used to detect slimes, plugging, taste and odor, cloudiness and can also detect the amount of aerobic heterotrophic activity on hazardous waste sites.

SLYM-BART

Some bacteria can produce copious amounts of slime that can contribute to plugging, loss in efficiency of heat exchangers, clouding, taste and odor problems. This is one of the most sensitive BART tests. A positive reaction involves a cloudy reaction in the inner test vial often with thick gel-like rings around the ball. A negative test remains clear.

About the Avalon Institute

The Avalon Institute of Applied Science Inc. is a private academic institution that specialises in RESEARCH, CONSULTING and TRAINING in Environmental Sciences, Geological Sciences, Biological Sciences, Biotechnology, Engineering, Automation Systems and Information Technologies for the benefit of the environment, human health and welfare.



About the BART*

The environment contains a myriad of different bacteria that are all capable of causing problems. These problems can range from slimes, plugging, discoloration and cloudiness, to corrosion and infections. Such a wide variety of bacteria are not easy to detect and identify using a single test and yet their impact can make the water unsafe, unacceptable or unavailable due to losses in flow through plugging or equipment failure due to corrosion.

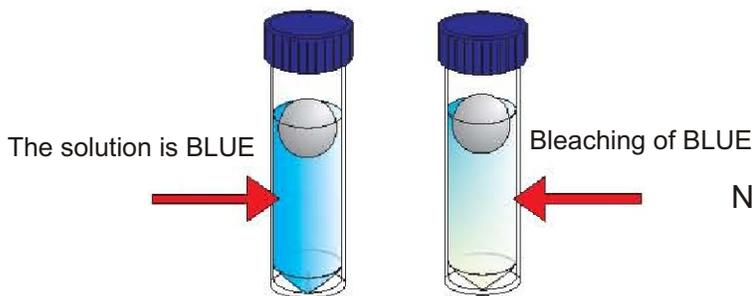
*BART™ is a trademark of Droycon Bioconcepts Inc.

The Biological Activity Reaction Test (BART™) is a water testing system for nuisance bacteria and can involve several different tests. These tests detect the activity (aggressivity) of these nuisance bacteria by the time lag (TL, measured in the number of days from the start of the test to when the first reaction is observed). The longer the TL before the observation of activity, the less aggressive the bacteria are in that particular sample.

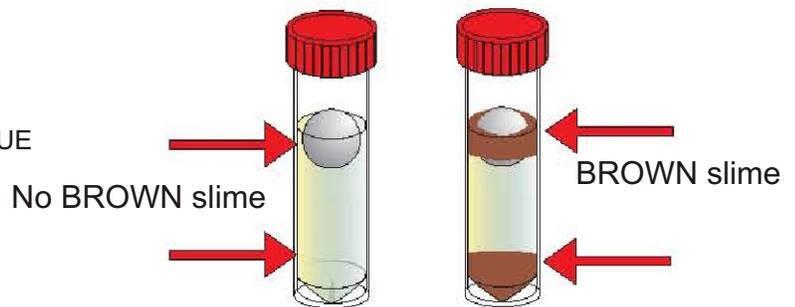
There are seven different tests that are recognizable by colored cap coding and the initial letters preceding the word BART. These include selective tests for:

Bacteria Type	BART Name	Cap Colour
Iron-related Bacteria	IRB-BART	Red Cap
Sulfate-reducing Bacteria	SRB-BART	Black Cap
Heterotrophic Aerobic Bacteria	HAB-BART	Blue Cap
Slime-forming Bacteria	SLYM-BART	Green Cap
Denitrifying Bacteria	DN-BART	Grey Cap
Nitrifying Bacteria	N-BART	White Cap
Fluorescing Pseudomonads	FLOR-BART	Yellow Cap
Acid Producing Bacteria	APB-BART	Purple Cap
Biochemical Oxygen Demand	BOD-BART	Light Blue Cap

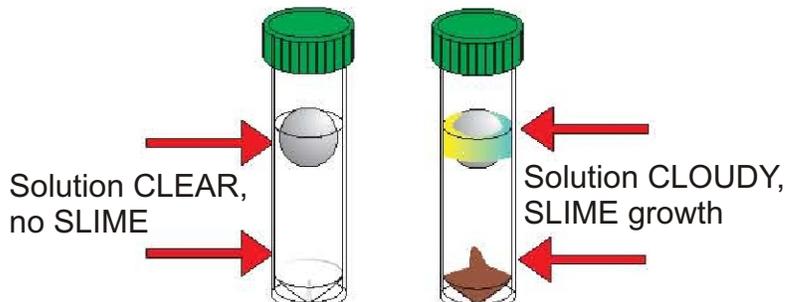
HAB - BART



IRB - BART



SLYM - BART



SRB - BART

