Verified by

Environmental Technology Verification (ETV) Program

SRB-BART™

Technology Fact Sheet for Droycon Bioconcepts Inc.

Performance Claim

Droycon's SRB-BART™ (sulfate reducing bacteria - biological activity reaction test) technology allows the determination of the sulfate reducing bacteria (SRB) in water samples at three levels of aggressivity when detected and will differentiate the SRB, when present, into five major communities that include these bacteria. The detection limit is equivalent to 67 cells per litre using a 15 ml water sample.

Technology Application

The SRB-BART™ technology has been used in the field and laboratory for the detection of SRB in waters suspected of having corrosion, offensive black slimes or "rotten" egg odor challenges. This test forms a part of the strategy for the determination of the effectiveness of management practices in natural and engineered water systems. SRB form a significant bacterial component in many biofouling events leading to losses in the integrity of equipment due to corrosion, losses in water quality due to increasing levels of hydrogen sulfide and its daughter products, and the generation of offensive odors. Corrosion generated by SRB activities form a major cost factor in the operation of pipelines, storage facilities and wells of all types in the water, oil and gas sectors.

Performance Conditions

Any water sample taken for testing using the SRB-BART™ must be collected following the protocols for the collection of a water sample for microbiological analysis. Transportation and storage of the sample should follow the standard guidelines practiced for sample handling prior to the initiation of microbiological examination. This should include hygienic aseptic handling, the use of sterile sampling containers and minimizing the sample storage time to less than four hours at room temperature or twenty-four hours when cooled to refrigeration temperatures. The SRB-BART™ technology commonly operates at ambient room temperatures but has the ability to be used at incubation temperatures ranging from +1°C to +55°C under exceptional circumstances. The packaged sterile test vial has a three year shelf-life when stored in a cool dry atmosphere. The SRB-BART™ tester can be used for both field and laboratory based investigations and will generate similar data with respect to time lag and reaction patterns where a water sample is split and incubated under similar conditions.

Technology Description

The SRB-BART™ uses a test vial modified by the insertion of a floating ball and a dried pellet of selective chemicals documented to induce the selective growth of sulfate reducing bacteria. When the water sample (15 ml) is added to the test vial, the ball floats up to create an aspect ratio that encourages the formation of oxidative environments above a reductive zone. The chemicals in the base of the test vial begin to dissolve and diffuse up through the water column. The net effect of these described events is that any SRB in the water sample being analyzed are presented with an upper oxidative and a lower reductive environment within either or both of which they may become active and grow.

The level of SRB activity in the sample is recorded in two manners. First, the semi-quantitative determination of the population is achieved through the time lag (that period of delay) to the first observation of any of the recognized activities. This is converted into a determination of aggressivity based on a standard three scaled steps based on the days of delay (time lag). Second, the reactions observed as the SRB become active, grow and mature can identify which of the five SRB communities are present in the sample. These reactions may be recognized from a standard chart including three reaction types and the observations interpreted at the semi-qualitative level.

Technology Description (continued)

To undertake a biological activity reaction test (BART™), the water sample is added to the fill line using standard microbiological practices and the test vial is then incubated at room temperature (22°C) away from direct sunlight in a secure environment where it can be easily observed. Observation involves lifting the vial up to observe the contents against a dull light source without shaking the vial. Shaking disturbs the lateral environments that are created during the incubation period.

Verification

Droycon Bioconcepts Inc. carried out extensive examination of water samples for SRB and the SRB-BART™ tests have been used independently by Canada Agriculture (Prairie Farm Rehabilitation Administration – Technical Services, PFRA), the U.S. Army Corp of Engineers (sponsored by the Centers for Expertise, Omaha, Nebraska) and Champion Technologies Ltd. of Calgary. In all of these cases, the SRB-BART was selected as the only available test available for convenient use in both the field and laboratory for the determination of the nature of SRB infestations in water. The evaluation of the SRB is made challenging because there has not been an effective standard bacteriological test that would embrace the broad range of species involved in the complex microbial communities that are formed. Evaluation of performance has therefore been achieved through the independent use of the SRB-BART™ for the effective monitoring of SRB activities in waters associated with oil, water, relief, injection, and extraction wells as well as the evaluation of the effectiveness of various rehabilitation protocols. The test performed effectively and reliably at the semi-quantitative and semi-qualitative levels differentiating three levels of aggressivity and five major SRB communities. The verification was reviewed by J. T. Trevors Consulting Services (Guelph, Ontario) using ETV Canada's General Verification Protocol (March 2000).

What is the ETV Program?

The Environmental Technology Verification (ETV) Program is a joint Environment Canada - Industry Canada initiative delivered by ETV Canada Inc. The ETV Program is designed to support Canada's environment industry by providing credible and independent verification of technology performance claims.

For more information on SRB-BART™ please contact:

Droycon Bioconcepts Inc.
315 Dewdney Avenue
Regina, Saskatchewan
S4N 0E7 Canada
Tel.: (306) 585-1762
Fax: (306) 585-3000
E-mail: info@dbi.sk.ca
www.dbi.sk.ca

ETV Canada Contact Information:

ETV Canada Inc.
867 Lakeshore Road
Burlington, Ontario
L7R 4A6 Canada
Tel: (905) 336-4546
Fax: (905) 336-4519
E-mail: etv@etvcanada.com
www.etvcanada.com

Printed February 2002 Expires February 2005