Rapid Sterility Testing

OPTIONS FOR GMP-SOURCE® & cGMP

Faster shipment and product releases.

Rapid Sterility testing, offered as a quality control assay in Aldevron's quality system is recognized by industry, regulatory officials, and pharmacopoeias as an alternative rapid microbial test to USP <71> sterility tests. Aldevron utilizes the BacT/Alert® 3D Dual-T system developed by BioMérieux for rapid sterility testing. The BacT/Alert® 3D Dual-T system is a fully automated system built on BioMérieux's patented colorimetric technology that detects microorganism growth by measuring carbon dioxide (CO2) in the culture medium.

Fast, Automated and Reliable Microbial Detection

Upon loading the culture bottles containing the product into the instrument, the system continuously monitors the production of CO2 by utilizing a colorimetric sensor at the bottom of each culture bottle. As the microorganisms in the sample continue to grow and metabolize the substrates in the culture medium, CO2 levels rise, and the colorimetric sensor turns from dark to light. A light-emitting diode (LED) projects light onto the sensor, and the light reflected is then measured by a photodetector. As more CO2 is produced, more light is reflected. If there is a high initial CO2 content, and unusually high rate of CO2 production, and/or a sustained production of CO2, the sample is determined to be positive for growth. If the CO2 level does not change significantly after a specified number of days at optimal conditions, the sample is determined to be negative for growth.

Characteristic	BacT/Alert® 3D Dual-T	USP <71>
Inoculation Method	**Direct inoculation**	Direct inoculation
Culture Media	**Aerobic and anaerobic culture media**	Aerobic and anaerobic culture media
Incubation Conditions	**Aerobic medium 22.5 ± 2.5°C Anaerobic medium 30 - 35°C**	Aerobic medium 22.5 ± 2.5°C Anaerobic medium 30 - 35°C
Incubation Duration	**7 days**	14 days
[1]Sample Volume Required	**USP <71>**	USP <71>
Method Suitability Test (B&F)	**Required for each new product**	Required for each new product

[1]Number of articles to be tested and minimum quantity to be used for each medium is dictated by USP <71>.

Alternative to Compendial Sterility Methods

USP <1071> Rapid Microbial Tests for Release of Sterile Short-Life Products: A Risk-Based Approach outlines regulatory guidelines for suitable methods for risk-based rapid microbial testing for release of short shelf-life sterile products. USP <1071> specifically mentions respiration as a candidate rapid microbial technology. The BacT/Alert® 3D Dual-T system is a growth-based rapid sterility test, similar to USP <71>. However, BacT/Alert® 3D Dual-T system detects CO2 as a measure of microbial respiration and growth compared to the assessment of culture turbidity as an indicator of microbial growth outlined in USP <71>. Continuous monitoring of the sterility test has significant advantages, including time to result, over the compendial method of a single reading at the end of the incubation period, especially for short shelf-life products such as cell and gene therapies. The BacT/Alert® 3D Dual-T system is designed to detect a wide range of microorganisms through the use of both aerobic and anaerobic culture bottles as well as the ability to incubate bottles at both 20-25°C and 30-35°C, as is the case in USP <71>. The above table provides a more thorough comparison between rapid sterility by BacT/Alert® 3D Dual-T and USP <71>. It is important to note that testing of sterility using the BacT/Alert® 3D Dual-T system is extremely similar to USP <71>, with the biggest difference being time to result of 7 days with the BacT/Alert® 3D Dual-T system versus 14 days of USP <71>.

Validated Method: No Outsourced Tests Required

Aldevron currently has a validated method for rapid sterility using the BacT/Alert® 3D Dual-T system, demonstrating that the method is able to detect a range of microorganisms in the presence of product. In addition, equivalency/comparability has been completed demonstrating that BacT/Alert® 3D Dual-T is a comparable rapid sterility method to the compendial USP <71> Sterility Test by direct inoculation. Additional validation efforts are underway that will align with guidelines in USP <1223> Validation of Alternative Microbiological Methods which will further strengthen our overall rapid sterility method validation. Specifically, efforts will be focused on demonstrating that our method can detect a low CFU challenge. Upon completion of additional validation efforts, Aldevron will be also be able to offer a validated method for the suitability test for sterility known as Bacteriostasis and Fungistasis (B&F). The method suitability test is necessary to confirm that products do not contain antimicrobial properties that would prevent detection of contamination during sterility testing. Results from the B&F test are used to confirm the validity of the sterility result. Providing this method suitability test in-house will considerably enhance Aldevron's overall rapid sterility platform, effectively eliminating the need for any outsource testing relating to sterility.

Industry Acceptance

As pharmacopoeias continue to issue guidance on alternative microbial methods, it is clear that industry and regulatory acceptance for alternative rapid microbial tests is growing. Therefore, in the case of sterility testing, it is not a requirement that the compendial test needs to be performed; the alternative microbial method for rapid sterility is sufficient. Utilizing Aldevron's validated in-house rapid sterility platform (comprised of the test for sterility using the BacT/Alert® 3D Dual-T system and the method suitability test (B&F)) in replacement of USP <71> will eliminate the need to outsource sterility testing, thereby significantly reducing the release time of product.

Contact us about Aldevron Rapid Sterility

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The basis for breakthroughs