Spore News™

MESA LABS

Volume 8, No. 4

3rd Party Spore News Part II

by Kurt McCauley

Introduction

This spore news is the second in a two part series on the topic of 3rd party testing of BIs. The first article (volume 8, Number 1) can be found at http://sgmbiotech.com/documents/1296059114_V8N1KurtBILabelClaimVerificationTestingbyThirdPartyPartI.pdf.

The topic of the first paper covered 3rd party requirements as stated in the standards and provided some statistics on past studies performed at SGM. This paper will expand on the discussion and provide some suggestions on how to proceed with future testing.

History

Revisiting the historical data discussed in the 1st paper we see that the majority of 3rd party tests were for population verification (45%) followed by D-value verification (36%). Over 90% of the population tests were successfully verified. The methods and materials for these tests are easily controlled thus contributing to the high success rate.

Approximately 70% of the 3rd party tests on the D-value were successfully verified. The equipment, materials and methods for these tests are more complex and thus can lead to increased variability in the test results. At times these process variables can be enough to push the results outside of the stated acceptance criteria. In many of these cases it is likely that the BI is functioning as certified, however when the test results are outside the stated acceptance criteria, the 3rd party will report the D-value claim could not be verified.

There are several well written publications[1,2,3,4,5] discussing sources of variability in equipment, media, methods etc. that contribute to differences in results amongst test labs. To gain a better understanding of these variables, the reader is encouraged to spend some time reviewing these publications.

The acceptance criteria

A 3rd party lab will generally follow the BI manufacturer's methods and materials as closely as possible, but it is

the BI user who typically specifies the acceptance criteria.

Regarding the acceptance criteria for the population verification:
BI users most often state that the population must be within 50% and 300% of the certified value. These criteria are stated in both the *Official Monographs* of the USP[6], and ISO[7]. The in-house historical data indicate that most population verifications (~78%) fall within +/-50% of the certified population. Of the 22% that were not within this range, all were less than 50% of the certified value. Confirmation of population is typically not an issue for well trained and equipped 3rd party labs unless the BI truly has a population that is out of specification.

Regarding the acceptance criteria for the D-value verification:
BI users most often state that the D-value must be within +/-20% of the certified value. This criterion is stated in the *Official Monographs* of the USP[4], however the published data[1,2] do not support this as a realistic range. The ISO position regarding the +/-20% claim[8], based on the published data, states:

"***The D-value shall be within +/-20% of the manufacturers stated value when determined by the manufacturer during the stated shelf life using the method specified by the manufacturer.***"

The authors of the ISO document understood the limitations of the +/-20% claim.

If the +/-20% claim is only valid when performed by the manufacturer, then is there a more suitable number that could be used for a 3rd party test? When reviewing the in-house historical data from the 3rd party testing, we found that approximately half of the failed studies were within +/-27% of the label claim. In these cases it is very possible that these BI were performing as designed but due to the variation discussed above, the D-value was reported as out of specification.

Regarding the more complex sterilization processes (non-traditional), the +/-20% claim will be even more difficult to meet. The Apex BI line has recently become part of Mesa Labs. These BI's were engineered for use in hydrogen peroxide sterilization systems. Apex BI data collected in this process indicate that a +/- 67% acceptance criteria is a realistic claim. When Apex BIs are returned for D-value verification, +/- 67% is used as the acceptance criteria.

Discussion

It is completely understandable why the +/-20% continues to be used as an acceptance criteria for D-value re-assessment. Not only does the USP reference this value, but the publications referenced throughout give little guidance as to what *would* be an appropriate third party verification limit. The in-house historical data (moist heat, dry heat and EtO) suggest that a value in the +/-27% range may be more realistic however additional data are required prior to making any solid claims.

References

[1]GS Oxborrow, CW Twohy, and CA Demitrius, "Determining the Variability of BIER Vessels for EtO and Steam" *Medical Device & Diagnostic industry* 12 No 5 (1990): 78-83

[2]GA Mosely "Estimating the Effects of EtO BIER-Vessel Operating Precision and D-value Calculation" *Medical Device & Diagnostic Industry*" April 2002

[3]NAMSA Guidance document "*Biological Indicator Characterization"* (2007)
http://www.namsa.com/documents/authored- papers/Biological_Indicator_Characterization_Info_sheet.pdf

[4]R Nyberg "*Guidance for Verification of Biological Indicators: Understanding the Acceptance Criteria of D-value and Population Verification"* PharmTech.com (2006)

[5]R Nyberg "To assess or Determine? Unraveling the D-value" Medical Device & Diagnostic Industry (March 2010) Volume 23 No. 3

[6]USP 32 Official Monographs "Resistance performance tests" pg. 1675

[7]ISO 11138-1:2006 "Sterilization of health care product—biological indicators—Part 1: General requirements" Section 6.3.2

[8]ISO 11138-1:2006 "Sterilization of health care product—biological indicators—Part 1: General requirements" Section 6.4.3

Kurt McCauley is the Director of Laboratory Production for Mesa Labs at the Bozeman manufacturing site. He began work at SGM Biotech (now Mesa Labs) in 1995 and has been involved with all aspects of biological indicator production and development. Most recently Mr. McCauley was the Research and Development Laboratory Manager, a position that involved BI design work and oversight of the Contract Studies Laboratory.

Mr. McCauley has a B.S. in Microbiology from Montana State University, is a member of the Institute For Thermal Processing Specialists (IFTPS) and the Association for the Advancement of Medical Instrumentation (AAMI).