

Bacterial Filtration Efficiency (BFE) at an Increased Challenge Level Final Report

Test Article: MEO Kids
Study Number: 1067190-S01A.1 Amended
Study Received Date: 28 Jun 2018
Study Completion Date: 18 Jul 2018
Testing Facility: Nelson Laboratories, LLC
6280 S. Redwood Rd.
Salt Lake City, UT 84123 U.S.A.
Test Procedure(s): Standard Test Protocol (STP) Number: STP0009 Rev 10
Deviation(s): None

Summary: This test procedure was performed to evaluate the BFE of test articles at an increased challenge level. A suspension of *Staphylococcus aureus*, ATCC #6538, was delivered to the test article at a challenge level of greater than 10^6 colony forming units (CFU). The challenge was aerosolized using a nebulizer and delivered to the test article at a fixed air pressure and flow rate of 30 liters per minute (LPM). The aerosol droplets were generated in a glass aerosol chamber and drawn through the test article into all glass impingers (AGIs) for collection. The challenge was delivered for a one minute interval and sampling through the AGIs was conducted for two minutes to clear the aerosol chamber. The mean particle size (MPS) control was performed at a flow rate of 28.3 LPM using a six-stage, viable particle, Andersen sampler for collection.

This test procedure was modified from Nelson Laboratories, LLC (NL), standard BFE procedure in order to employ a more severe challenge than would be experienced in normal use. This method was adapted from ASTM F2101. All test method acceptance criteria were met. Testing was performed in compliance with US FDA good manufacturing practice (GMP) regulations 21 CFR Parts 210, 211 and 820.

Challenge Flow Rate: 30 LPM
Area Tested: ~40 cm²
Side Tested: Side Facing Up in Bag
Challenge Level: 3.3×10^6 CFU
MPS: ~2.9 μ m
Test Monitor Results: Acceptable

Study Director



Janelle R. Bentz, M.S.

Amended Report Date



1067190-S01

Results:
MEO Kids:

Test Article Number	Total CFU Recovered	Filtration Efficiency (%)
1	1.2×10^2	99.9964
2	4.7×10^1	99.9986
3	7.2×10^1	99.9978

The filtration efficiency percentages were calculated using the following equation:

$$\% BFE = \frac{C - T}{C} \times 100$$

C = Challenge Level

T = Total CFU recovered downstream of the test article

Amendment Justification: At the request of the sponsor, results were separated in to reports organized per sample ID.

Bacterial Filtration Efficiency (BFE) at an Increased Challenge Level Final Report

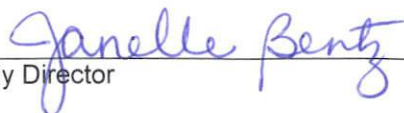
Test Article: MEO Lite
Study Number: 1067190-S01B.1 Amended
Study Received Date: 28 Jun 2018
Study Completion Date: 18 Jul 2018
Testing Facility: Nelson Laboratories, LLC
6280 S. Redwood Rd.
Salt Lake City, UT 84123 U.S.A.
Test Procedure(s): Standard Test Protocol (STP) Number: STP0009 Rev 10
Deviation(s): None

Summary: This test procedure was performed to evaluate the BFE of test articles at an increased challenge level. A suspension of *Staphylococcus aureus*, ATCC #6538, was delivered to the test article at a challenge level of greater than 10^6 colony forming units (CFU). The challenge was aerosolized using a nebulizer and delivered to the test article at a fixed air pressure and flow rate of 30 liters per minute (LPM). The aerosol droplets were generated in a glass aerosol chamber and drawn through the test article into all glass impingers (AGIs) for collection. The challenge was delivered for a one minute interval and sampling through the AGIs was conducted for two minutes to clear the aerosol chamber. The mean particle size (MPS) control was performed at a flow rate of 28.3 LPM using a six-stage, viable particle, Andersen sampler for collection.

This test procedure was modified from Nelson Laboratories, LLC (NL), standard BFE procedure in order to employ a more severe challenge than would be experienced in normal use. This method was adapted from ASTM F2101. All test method acceptance criteria were met. Testing was performed in compliance with US FDA good manufacturing practice (GMP) regulations 21 CFR Parts 210, 211 and 820.

Challenge Flow Rate: 30 LPM
Area Tested: ~40 cm²
Side Tested: Yellow Stickered Side
Challenge Level: 3.3×10^6 CFU
MPS: ~2.9 µm
Test Monitor Results: Acceptable

Study Director



Janelle R. Bentz, M.S.

Amended Report Date

16 Aug 2018



Results:
MEO Lite:

Test Article Number	Total CFU Recovered	Filtration Efficiency (%)
1	1.1×10^1	99.99967
2	1	99.999970
3	1.2×10^1	99.99963

The filtration efficiency percentages were calculated using the following equation:

$$\% BFE = \frac{C - T}{C} \times 100$$

C = Challenge Level

T = Total CFU recovered downstream of the test article

Amendment Justification: At the request of the sponsor, results were separated in to reports organized per sample ID.

Bacterial Filtration Efficiency (BFE) at an Increased Challenge Level Final Report

Test Article: MEO X
Study Number: 1067190-S01C.1 Amended
Study Received Date: 28 Jun 2018
Study Completion Date: 18 Jul 2018
Testing Facility: Nelson Laboratories, LLC
6280 S. Redwood Rd.
Salt Lake City, UT 84123 U.S.A.
Test Procedure(s): Standard Test Protocol (STP) Number: STP0009 Rev 10
Deviation(s): None


Summary: This test procedure was performed to evaluate the BFE of test articles at an increased challenge level. A suspension of *Staphylococcus aureus*, ATCC #6538, was delivered to the test article at a challenge level of greater than 10^6 colony forming units (CFU). The challenge was aerosolized using a nebulizer and delivered to the test article at a fixed air pressure and flow rate of 30 liters per minute (LPM). The aerosol droplets were generated in a glass aerosol chamber and drawn through the test article into all glass impingers (AGIs) for collection. The challenge was delivered for a one minute interval and sampling through the AGIs was conducted for two minutes to clear the aerosol chamber. The mean particle size (MPS) control was performed at a flow rate of 28.3 LPM using a six-stage, viable particle, Andersen sampler for collection.

This test procedure was modified from Nelson Laboratories, LLC (NL), standard BFE procedure in order to employ a more severe challenge than would be experienced in normal use. This method was adapted from ASTM F2101. All test method acceptance criteria were met. Testing was performed in compliance with US FDA good manufacturing practice (GMP) regulations 21 CFR Parts 210, 211 and 820.

Challenge Flow Rate: 30 LPM
Area Tested: ~40 cm²
Side Tested: Side Facing Up in Bag
Challenge Level: 3.3×10^6 CFU
MPS: ~2.9 μ m
Test Monitor Results: Acceptable


Study Director

Janelle R. Bentz, M.S.


Amended Report Date

1067190-S01

Results:
MEO X:

Test Article Number	Total CFU Recovered	Filtration Efficiency (%)
1	7.6×10^2	99.977
2	5.0×10^2	99.985
3	5.9×10^2	99.982

The filtration efficiency percentages were calculated using the following equation:

$$\% BFE = \frac{C - T}{C} \times 100$$

C = Challenge Level

T = Total CFU recovered downstream of the test article

Amendment Justification: At the request of the sponsor, results were separated in to reports organized per sample ID.