



301 Conover Station SE; Conover, NC 28613

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Received Date: August 26, 2020
Completed Date: October 15, 2020

REFERENCE:

TS **160247**
Style: Huacaya Alpaca
Color: Brown
Description: Alpaca Hair, washed by customer

Sample Type: Fiber
Sample Form: Clippings
Size: N/A

REFERENCE:

TS **160248**
Style: Suri Alpaca
Color: Brown
Description: Alpaca Hair, washed by customer

Sample Type: Fiber
Sample Form: Clippings
Size: N/A

Project goal:

The Alpaca Owners Association (AOA) approached Manufacturing Solutions Center (MSC) with the project to investigate the antibacterial attributes of alpaca fiber.

Initial testing had been performed at MSC in 2018 on unwashed Suri and Huacaya alpaca fibers. This testing, run on a single replicate to ASTM E2149, showed slight increase of 6.38% for Huacaya and a slight reduction of 3.83% for Suri fibers, which indicates bacteriostatic properties.


Since alpaca fiber in its raw state is soil laden, it is not processed further into yarn or fabric without washing. The fibers used for this project were washed by AOA using their standard procedure using a mild detergent to remove the soil and dried at ambient temperature. The detergent used is a pH neutral solution without any bactericidal agents.

Fibers used for testing are Grade 3.

Study protocol is to test Huacaya and Suri to standard ASTM E2149 using E.coli as well as S. aureus. Testing is to be run in duplicate.

Project conclusion:

Both Huacaya and Suri alpaca fibers show significant antibacterial efficacy against E.coli using standard test method ASTM E2149. The naturally occurring load of bacillus contamination had to be removed prior to testing.


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TEST RESULTS: First Round

Antimicrobial Activity:

- ASTM Standard E2149-13a "Standard Test Method for Determining the Antimicrobial Activity of Antimicrobial Agents Under Dynamic Contact Conditions," ASTM International , West Conshohocken, PA, 2013 , DOI: 10.1520/E2149-13A, www.astm.org.

This test is accredited under the laboratory's ISO/IEC 17025 accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation L2238

160247 Huacaya Alpaca	Results: cfu/ml		
	Inoculum only 1hr	Sample 1hr Contact	Percent Reduction
• Staphylococcus aureus ATCC 6538	2.55E+05	>490000	#VALUE!
• Escherichia coli ATCC 25922	2.25E+05	2.50E+05	-11.11%

Calculate % reduction to 100 (B-A)/B = R; section 12.8

160248 Suri Alpaca	Results: cfu/ml		
	Inoculum only 1hr	Sample 1hr Contact	Percent Reduction
• Staphylococcus aureus ATCC 6538	2.55E+05	>490000	#VALUE!
• Escherichia coli ATCC 25922	2.25E+05	>49000000	#VALUE!

Calculate % reduction to 100 (B-A)/B = R; section 12.8

Observation: Pour plates of the samples showed high bacillus contamination so that these results are not useful.

To decontaminate samples they are "washed" in 70% isopropyl alcohol by shaking them for 15 min , dried in a bio safety cabinet and then exposed to UV radiation for 30 min

Samples are run as double replicates, tested to standard ASTM E2149 w. E.coli

TEST RESULTS: Second Round

160247 Huacaya Alpaca	Results: cfu/ml		
	Inoculum only 1hr	Sample 1hr Contact	Percent Reduction
• Escherichia coli ATCC 25922	2.30E+05	1.10E+05	52.17%
• Escherichia coli ATCC 25922	2.30E+05	1.70E+05	26.09%

Calculate % reduction to 100 (B-A)/B = R; section 12.8

160248 Suri Alpaca	Results: cfu/ml		
	Inoculum only 1hr	Sample 1hr Contact	Percent Reduction
• Escherichia coli ATCC 25922	2.30E+05	>490000	#VALUE!
• Escherichia coli ATCC 25922	2.30E+05	4.90E+05	-113.04%

Calculate % reduction to 100 (B-A)/B = R; section 12.8

Observation: Even after shaking in alcohol and uv-radiation there is still a significant amount of contamination on the fiber, especially on the Suri alpaca.

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To decontaminate samples to a higher degree samples are sterilized using a steam autoclave for 60min, 15PSI at 251°F, dried at ambient temperature in the bio safety cabinet. Test single replicate to standard ASTM E2149 w. E.coli.

TEST RESULTS: Third Round

160247 Huacaya Alpaca	Results: cfu/ml		
	Inoculum only 1hr	Sample 1hr Contact	Percent Reduction
• Escherichia coli ATCC 25922	4.30E+05	1.50E+05	65.12%

Calculate % reduction to 100 (B-A)/B = R; section 12.8

160248 Suri Alpaca	Results: cfu/ml		
	Inoculum only 1hr	Sample 1hr Contact	Percent Reduction
• Escherichia coli ATCC 25922	4.30E+05	9.10E+04	78.84%

Calculate % reduction to 100 (B-A)/B = R; section 12.8

Observation: Pour plates prove that the alpaca fiber is finally bacillus free.

Antimicrobial Activity:

- ASTM Standard E2149-13a "Standard Test Method for Determining the Antimicrobial Activity of Antimicrobial Agents Under Dynamic Contact Conditions," ASTM International , West Conshohocken, PA, 2013 , DOI: 10.1520/E2149-13A, www.astm.org.

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Testing Information:

- Calculation is based on inoculum only after contact time.
- Escherichia coli ATCC 25922
- Growth media: Tryptic Soy Broth
- Sample weight: 1.0 g +/- 0.1g
- Sterilization: none
- Target inoc. Level: (1.5-3.0) x 10⁵ CFU/ml
- Wetting agent: 0.01% Triton X
- Inoculum carrier: 7.1 Phosphate buffer
- Contact time: 60min +/- 5min
- Solution activity: not observed
- Temperature: 35 +/- 2° C
- Samples are prepared and enumerated using automatic equipment; Tempo, BioMerieux.
- Cultures stored at 5° +/-2°C.