

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2025
 DateRun: 05/05/2025
 Experimenters: Amelia Wagner
 ClientType: Cleaner Manufacturer
 ProjectNumber: Project #1
 Substrates: Textile
 PartType: Coupon
 Contaminants: Clay
 Cleaning Methods: Mechanical Agitation
 Analytical Methods: Colorimeter

Purpose: To re-test the efficacy of the best performing reformulation (4% enzyme mix) in comparison to the efficacy of the baseline product on removing clay from polyester at 105-125F

Experimental Procedure: Prep: 20 total 5x5 inch blue polyester fabric swatches were used for testing (10 per cleaner). Each fabric swatch was measured for reflectance, redness/greenness, and yellowness/blueness with a colorimeter 5 times in 3 separate areas (0.5x0.5) where the fabric would eventually be stained. The three areas were treated as individual coupons. The 5 measurements for each area were averaged together and used as the representative measurements of the specified area/coupon. Each area was stained with the clay and left to air dry for 24 hours. Colorimeter measurements of each stain were then recorded.

Washing procedure: The fabric swatches were washed in a washing machine with 45 mL of Liquid Laundry Detergent and 6.5 gallons of water on a normal washing cycle set for a medium load. The water used has a water hardness level of 63 PPM mg/L. The washing cycle consisted of a wash step (~12 mins), a rinse step (~14 mins), and a spin step (~5 mins). The fabric swatches were washed heated with a temperature range of 105F-125F in their respective cleaners. The fabric swatches were then left to air dry. After drying, the colorimeter was used to re measure the 3 staining areas on each fabric swatch.

Analysis:

Detergency: Unadjusted measure of the percentage the cleaned fabric was returned to its original state (uses only L values/measures of lightness)

$$\% \text{ Detergency} = 100X((L_{\text{clean}} - L_{\text{dirty}}) / (L_{\text{initial}} - L_{\text{dirty}}))$$

Where:

L=reflectance (0 black - 100 White)

Results:

Cleaner	L Initial	L Dirty	L Clean	% DET	AVG % DET
MS LLD	59.84	85.86	60.29	98.3	98.59%
	59.72	85.74	60.05	98.73	
	59.78	85.1	60.1	98.74	
	59.97	85.4	60.29	98.74	
	60.12	85.92	60.43	98.8	
	59.99	85.78	60.34	98.64	
	59.87	83.08	60.18	98.66	
	60.22	84.16	60.47	98.96	
	59.68	85.96	60.14	98.25	
	59.9	85.98	60.4	98.1	
Chemtrax 4% enzyme mix	59.92	85.97	60.3	98.54	98.63%
	59.66	85.82	60.1	98.32	
	59.83	86.16	60.29	98.25	
	59.75	86.03	60.23	98.17	
	59.89	85.6	60.27	98.52	
	60.07	86.05	60.35	98.92	
	60.02	85.9	60.23	99.19	
	59.96	84.29	60.28	98.68	
	59.93	85.46	60.12	99.26	
	59.77	85.95	60.18	98.43	

Summary:

Conclusion:

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On average the Chemtrax 4% enzyme mix performs better than the MS LLD in removing clay from polyester with the utilization of heat.