CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2013
DateRun:	11/25/2013
Experimenters:	Jason Marshall, Suman Das
ClientType:	Cleaning Equipment Mfr
ProjectNumber:	Project #1
Substrates:	Liquid
PartType:	Coupon
Contaminants:	Odor
Cleaning Methods:	Low Pressure Spray
Analytical Methods:	Smell
Purpose:	To evaluate supplied products for odor elimination

Experimental Procedure:

Clean 200 ml glass bottles were filled with 1 ml of whole milk. The bottles were capped and stored at room temperature for three days. At the end of the three days, the bottles were opened and observed for signs of spoiling odor.

The Toucan Eco product was run through two cycles using 2.8 grams of salt and 1330 grams of water at room temperature. Resulting free chlorine level was recorded. Three bottles were opened and treated with four sprays of one of the supplied cleaning products. Bottles were capped and swirled to mix the cleaner with the milk.

A panel was initialized to the various odors. An untreated bottle, a bottle with spoiled milk, a bottle with Toucan Eco solution, a bottle with Formula 409, Febreze and a bottle with water only were presented to the panelist. The exposure was to set a bench mark for each possible odor contributor.

The treated bottles were then presented uncapped to one member of the odor panel. The panelist was asked to describe odor and rank the level of intensity of the malodor. Each panelist was subjected to three bottles for each product/milk mixture plus a selection of the initial odor bottles in random odor.

After the panelists observed the odors, bottles were recapped and allowed to set for two days. Bottles were reopened and assessed for odors. Each bottle was subjected to a second round of treatment and one panelist was used to asses malodor levels. A second and third round of treatment and sitting were performed to determine longevity of odor elimination for each product.

ChemistriesEvaluated: Toucan Cleaner (200 ppm); Formula 409 All Purpose Antibacterial; Proctor & Gamble Febreze free-nature; Water:

Results:

After the initial treatment, each of the observers noted that no product eliminated all of the malodor in each test bottle. The Toucan treated bottles had initial success with two bottles with no malodor and the third with low malodor. The Formula 409 treated bottles had a strong odor from the product with some malodor present. The Febreze bottles had moderate amount of malodor present. The control bottles treated with water each had a strong malodor. To ensure enough product was applied to the bottles, a second round of treatment and analysis was conducted within two hours of the initial treatment. The Toucan bottles had no malodor and the distinct smell of product. The Formula 409 was 60:40 split between malodor and product in two of the bottles and a 40:60 malodor to product in the third. The Febreze samples had little malodor present.

Toucan	Formula 409	Febreze	Water
No malodor, some product	medium/ strong malodor	medium malodor	Strong Malodor
Low malodor, some product	even split malodor	medium malodor	Strong Malodor
No malodor, some product	40:60 malodor/ product	some malodor	Strong Malodor

Following the two day interval after being treated, the results were slightly different.

Second round of sprays			
Toucan	Formula 409	Febreze	Water

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no malodor, little product	60:40 malodor, product	little malodor	Strong Malodor
no malodor, some product	40:60 malodor, product	little malodor	Strong Malodor
no malodor, only product	60:40 malodor, product	little malodor	Strong Malodor

When the treated bottles sat for an additional two days, the malodor came back in the Toucan product with no trace of the product. An even mix of malodor and product was observed with the Formula 409 bottles. The Febreze bottles had a different odor than the original malodor and product. Water still smelled strongly of the malodor.

Sit for 2 days after being treated

Toucan	Formula 409	Febreze	Water
Strong Malodor	50:50 malodor, product	different odor	Strong Malodor
Strong Malodor	50:50 malodor, product	different odor	Strong Malodor
Strong Malodor	50:50 malodor, product	different odor	Strong Malodor

The bottles were then sprayed with the products and analyzed again to determine malodor elimination. The Toucan bottles again had no to little malodor. The Formula 409 bottles were mostly product at an 80:20 split. The Febreze was a more even split with slightly more product odor than the malodor.

Sit for 2 days after initial treatment then sprayed with product

Toucan	Formula 409	Febreze	Water
No malodor	All product no malodor	Product 50:50	Strong Malodor
Product: malodor 90:10	All product no malodor	no malodor	Strong Malodor
Product: malodor 85:15	All product no malodor	Mostly product	Strong Malodor

The bottles were then allowed to sit for another two days to determine long term effect on malodor elimination. As in the other trials, the Toucan bottles reverted back to the malodor with no odor of product present. The Formula 409 smelled more like the product than the malodor. The Febreze remained fairly constant with slightly more product odor than the malodor.

Sit for 2 days after being treated

Toucan	Formula 409	Febreze	Water
no product all malodor	Mostly product 80:20	Product 60:40	Strong Malodor
no product all malodor	Mostly product 80:20	Product 60:40	Strong Malodor
no product all malodor	Some product no malodor	Product 60:40	Strong Malodor

Summary:

Substrates:	Liquid
Contaminants:	Odor

Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Toucan	Toucan Eco	100		☑	Good initial elimination
Clorox Company	Formula 409 All Purpose Cleaner	100		☑	Good initial elimination
Procter & Gamble	Febreze Free Nature	100		☑	Fair initial elimination

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Water	Water	100		☐	No elimination

Conclusion: Toucan product had good initial control of the malodor but over time, the malodor returned. Formula 409 Antibacterial product also had good initial malodor control and had better long term control. The Febreze had marginal success during initial treatment and maintained a similar level of control over time.