CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2017
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ClientType:	Cleaner Manufacturer
ProjectNumber:	Project #1
Substrates:	Liquid
PartType:	Coupon
Contaminants:	Food
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Smell
Purpose:	To evaluate the effectiveness of the supplied cleaners with malodor elimination.
Experimental Procedure:	Nine clean 250 ml glass bottles were filled with 6 ml of spoiled whole milk. The three supplied cleaning products required dilutions. The DFE Sabre cleaner was diluted to 4/128 fluid ounces, the Enviro Care Liqui Bac was diluted to 6/128 fluid ounces, and the DFE B.L.O.C. cleaner was diluted to 64/128 fluid ounces. Three bottles were treated for each supplied cleaner for three treatment cycles, with each treatment cycle consisting of two sprays of the respective cleaner directly into the bottle. Following each treatment cycle the bottles were swirled around so the cleaner can mix with the cleaner. After each treatment cycle the panelists rated the malodor of the milk in the bottles. The panelists rated the malodor of the milk after each treatment cycle, from a value of 1 defined as no malodor to a value of 5 as high malodor. Subsequently, the nine milk bottles were allowed to ferment at room temperature overnight to see if there are any increase in malodor level after an overnight sit. Thereafter, the same panelists rated the malodor of the milk after the overnight aging of the milk bottles. The nine bottles were then subjected to a final treatment cycle, which consisted of two sprays of their respective supplied cleaners. The panelists then rated the malodor level for each milk bottles.
Results:	Table pertaining to the treatment of the malodor in the milk bottles with 3 treatment cycles.

Cleaner	DFE Sabre						
Treatment:	Untreated					Average	Overall Avg.
Bottle 1	4.0	4.0	5.0	3.0	3.5	3.9	3.5
Bottle 2	3.5	3.5	5.0	3.0	2.0	3.4	
Bottle 3	3.0	4.0	4.0	3.0	2.0	3.2	
Treatment:	Sprays: 2					Average	Overall Avg.
Bottle 1	1.5	2.0	2.0	1.5	1.5	1.7	1.7
Bottle 2	1.0	1.5	1.5	1.5	1.0	1.3	
Bottle 3	1.5	3.5	2.0	2.5	1.0	2.1	
Treatment:	Sprays: 4					Average	Overall Avg.
Bottle 1	1.0	1.5	4.0	3.0	2.5	2.4	2.0
Bottle 2	1.0	1.5	3.5	2.5	2.0	2.1	
Bottle 3	1.0	2.0	1.5	1.5	1.0	1.4	
Treatment:	Sprays: 6					Average	Overall Avg.
Bottle 1	1.0	1.0	1.0	1.0	1.5	1.1	1.6
Bottle 2	1.5	1.5	3.0	2.0	1.0	1.8	
Bottle 3	1.5	1.5	2.0	1.5	2.5	1.8	

Cleaner	Enviro Care Liqui Bac						
Treatment:	Untreated					Average	Overall Avg.
Bottle 1	4.0	3.5	5.0	5.0	4.5	4.4	4.1
Bottle 2	4.0	5.0	5.0	4.5	3.5	4.2	
Bottle 3	4.0	3.0	4.0	4.5	3.0	3.7	
Treatment:	Sprays: 2					Average	Overall Avg.

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Bottle 1	1.5	3.0	1.0	1.5	1.5	1.7	1.9
Bottle 2	1.5	2.0	3.5	2.0	1.0	2.0	
Bottle 3	1.5	1.5	3.5	2.0	1.0	1.9	
Treatment:	Sprays: 4					Average	Overall Avg.
Bottle 1	1.0	2.0	2.0	1.0	1.0	1.4	1.3
Bottle 2	1.0	1.0	1.0	1.5	1.0	1.1	
Bottle 3	1.0	1.0	1.5	1.0	2.0	1.3	
Treatment:	Sprays: 6					Average	Overall Avg.
Bottle 1	1.5	2.0	2.5	2.0	1.5	1.9	1.9
Bottle 2	1.5	1.5	3.5	2.0	1.0	1.9	
Bottle 3	1.0	2.0	2.0	2.5	1.5	1.8	

Cleaner	DFE B.L.O.C.						
Treatment:	Untreated					Average	Overall Avg.
Bottle 1	4.0	3.5	4.5	4.0	5.0	4.2	4.0
Bottle 2	3.5	4.0	4.5	4.5	2.0	3.7	
Bottle 3	5.0	4.5	5.0	4.0	2.5	4.2	
Treatment:	Sprays: 2					Average	Overall Avg.
Bottle 1	3.0	3.5	1.5	2.5	4.5	3.0	3.0
Bottle 2	3.5	3.5	3.5	3.5	2.0	3.2	
Bottle 3	3.0	4.0	3.5	2.0	1.0	2.7	
Treatment:	Sprays: 4					Average	Overall Avg.
Bottle 1	3.0	3.5	2.5	2.5	2.0	2.7	2.5
Bottle 2	2.5	2.5	2.5	2.0	1.5	2.2	
Bottle 3	3.0	4.0	1.5	3.0	1.0	2.5	
Treatment:	Sprays: 6					Average	Overall Avg.
Bottle 1	3.0	3.0	2.0	2.0	2.0	2.5	2.4
Bottle 2	2.5	2.5	2.5	2.0	1.5	2.2	
Bottle 3	3.0	3.0	2.5	3.0	1.0	2.5	

Summary Table:			
Cleaner	Untreated Malodor Rating	Treatment (Cycle)	Avg. Treatment Rating After 3 Cycles
DFE Sabre	3.5	3	1.6
Enviro Care Liqui Bac	4.1	3	1.9
DFE B.L.O.C.	4.0	3	2.4

Overnight Results: Table pertaining to the malodor increase from an overnight sit after the 3rd treatment cycle.

Cleaner	DFE Sabre						
Treatment:	Overnight: Untreated					Average	Overall Avg.
Bottle 1	4.5	4.0	5.0	5.0	4.0	4.5	4.2
Bottle 2	3.5	3.5	4.5	5.0	5.0	4.3	
Bottle 3	3.0	5.0	3.5	4.0	3.0	3.7	
Treatment:	DFE Sabre					Average	Overall Avg.
Bottle 1	2.5	3.0	3.0	2.5	3.0	2.8	2.4

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Bottle 2	2.5	3.0	2.5	2.0	2.0	2.4	
Bottle 3	1.5	2.5	2.0	1.5	2.0	1.9	

Overall Results

Cleaner	Enviro Care Liqui Bac						
Treatment:	Overnight Untreated					Average	Overall Avg.
Bottle 1	3.0	2.0	3.5	4.0	4.0	3.3	3.6
Bottle 2	3.0	3.5	4.0	4.5	3.5	3.7	
Bottle 3	3.0	2.5	4.0	5.0	5.0	3.9	
Treatment:	Overnight: 2 sprays					Average	Overall Avg.
Bottle 1	1.5	1.5	2.0	2.5	3.5	2.2	2.3
Bottle 2	1.5	2.0	2.0	3.0	2.5	2.2	
Bottle 3	1.5	2.0	2.0	3.0	3.5	2.4	

Overall Results

Cleaner	DFE B.L.O.C.						
Treatment:	Overnight Untreated					Average	Overall Avg.
Bottle 1	4.5	5.0	5.0	5.0	5.0	4.9	4.5
Bottle 2	4.0	3.5	4.5	5.0	5.0	4.4	
Bottle 3	4.0	4.0	4.5	4.0	5.0	4.3	
Treatment:	Overnight: 2 sprays					Average	Overall Avg.
Bottle 1	3.5	3.5	4.5	4.5	4.5	4.1	3.7
Bottle 2	3.5	2.5	3.5	4.0	3.5	3.3	
Bottle 3	3.0	3.5	3.5	4.0	4.5	3.7	

Overnight Summary Table:

Cleaner	Treated Avg. Malodor Rating Before Overnight Sit	Overnight Sit Untreated Avg.	Overnight Treatment Malodor Avg. 2 Sprays
DFE Sabre	1.6	4.2	2.4
Enviro Care Liqui Bac	1.9	3.6	2.3
DFE B.L.O.C.	2.4	4.5	3.7

Summary:

Substrates:	Liquid				
Contaminants:	Food				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Rochester Midland Corporation	DFE Sabre	100	0.00	☑	
Rochester Midland Corporation	Enviro Care Liqui Bac.	100	0.00	☑	
Rochester Midland Corporation	Biological Liquid Odor Control Cleaner	100	0.00	☑	

Conclusion:

A cleaning agent is considered effective if the overall average malodor level following the treatment cycles is below a 2. A ranking value of 1 is considered close to no smell of malodor, while a maximum rating of 5 is considered the worst malodor level. The panelist rated the malodor of the milk based on the closeness of its smell towards the cleaner's smell. After the initial three treatment cycles, the cleaners that neutralized the malodor the best was the DFE Sabre and Enviro Care Liqui Bac with both cleaners having an average overall malodor rating below 2. The DFE B.L.O.C. cleaner was ineffective, with a rating of 2.4, which is above the required threshold for the cleaner to be considered effective. Following the overnight sit, all nine milk bottles exhibited an increase in malodor rating. Milk bottles treated with DFE Sabre had the highest increase in malodor after an overnight sit, with a malodor increase of 2.6 from its initial three treatment cycles. In addition, milk bottles treated with Enviro Care Liqui Bac was observed to have the least increase

in malodor level after the overnight sit, with a malodor increase of 1.7. However, the cleaners were not able to mitigate the increase in malodor after one treatment cycle that consisted of 2 sprays of the respective cleaner.

In conclusion, DFE Sabre and Enviro Care Liqui Bac were effective in removing the malodor. Whereas DFE B.L.O.C. was not effective in removing the malodor. Milk bottles treated with Enviro Care Liquid Bac was observed to have the least increase in malodor level overtime, followed by DFE Sabre and DFE B.L.O.C. However, none of the cleaners were able to mitigate the increase in malodor after just one treatment cycle from the overnight aging after its initial treatment cycles. Therefore, the most effective to the least effective cleaner is listed as the following: Enviro Care Liqui Bac, DFE Sabre and DFE B.L.O.C.