CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2023

DateRun: 07/17/2023

Experimenters: Amelia Wagner

ClientType: Food Manufacturer

ProjectNumber: Project #2

Substrates: Stainless Steel

PartType: Coupon

Contaminants: Oil, Food

Cleaning Methods: Ultrasonics

Analytical Methods: Gravimetric

Purpose: To test the effectiveness of ENZO NRF cleaner in comparison to current cleaner 5229 AFCO LF and LFE Enzymatic cleaner that was previously tested and found successful.

Experimental Procedure: Six stainless steel coupons were used for each cleaner, three being the 304 alloy and three being the 316 alloy, for a total of 18 coupons. The initial weights of each coupon were taken. The coupons were then soiled with Cedar's Chocolate Hommus by wiping a thin layer, but leaving some chunky spots, on the bottom half of the substrate. A heat gun was applied to each coupon at its highest temperature for 2 mins each to mimic the pasteurization process that happens within the mixing tanks, allowing the soil to better adhere to the coupons. After the coupons cooled, their dirty weights were taken. Six coupons (three 304 and three 316) were subjected to heated ultrasonics using 5229 AFCO LF 1.1% for 20 mins at 160F. Six coupons (three 304 and three 316) were subjected to heated ultrasonics using LFE Enzymatic Cleaner 2.5% for 20 mins at 130F. The last six coupons (three 304 and three 316) were subjected to heated ultrasonics using ENZO NRF 2% for 20 mins at 90F. The coupons then were left to air dry before clean weights were taken.

Results:

Cleaner	Soil	Substrate	Initial wt of cont.	Final wt of cont.	%Cont Removed	% AVG	% Overall
5229 AFCO LF 1.1% @ 160F	Choco Hummus	Stainless Steel Alloy 304	0.1381	0.0134	90.30	80.94	74.69
			0.0887	0.0278	68.66		
			0.0942	0.0152	83.86		
		Stainless Steel Alloy 316	0.1033	0.0338	67.28	68.45	
			0.0714	0.0351	50.84		
			0.2918	0.0373	87.22		
LFE Enzymatic Cleaner 2.5% @ 130F	Choco Hummus	Stainless Steel Alloy 304	0.1939	0.0023	98.81	99.25	98.92
			0.2546	0.0020	99.21		
			0.3370	0.0009	99.73		
		Stainless Steel Alloy 316	0.2825	0.0076	97.31	98.59	
			0.3168	0.0042	98.67		
			0.2388	0.0005	99.79		
ENZO NRF 2% @ 90F	Choco Hummus	Stainless Steel Alloy 304	0.0477	0.0005	98.95	98.41	96.31
			0.0336	0.0003	99.11		
			0.0353	0.0010	97.17		
		Stainless Steel Alloy 316	0.0465	0.0019	95.91	94.21	
			0.0373	0.0015	95.98		
			0.0302	0.0028	90.73		

Summary:

Conclusion: ENZO NRF 2% @ 90F is an effective cleaner and is comparative to LFE Enzymatic Cleaner using a lower concentration and less heat.