



## QUICK SERVICE RESTAURANT IN-STORE SANITIZER EVALUATION

### 1. Introduction

QSRs are uniquely challenged to address sanitation due to the high traffic (customers/deliveries) through the stores and the low amount of down time for cleaning/sanitizing during operating hours. QSRs require a reliable solution which provides them the confidence they want to know their rigorous sanitation standards are being met and a system which is efficient and easy to manage in the fast-paced setting.

In an on-going, collaborative effort to investigate PURE Products as such solutions, this test serves to build upon previous testing in a leading Quick Service restaurant (QSR) which have shown PURE Hard Surface to be 96% more effective than the current sanitizer in use. Previous studies have also shown PURE Hard Surface as a superior solution to specific challenges, such as the produce slicer. This study takes a finer look at three treatment plan options to ensure the plans can be easily implemented in the stores while continuing to provide greater sanitization throughout the store.

**The data in this report suggests that implementation of any of the three PURE Plans offers the opportunity to achieve an 83 to 450% reduction in the risk of a Food Safety Event in a QSR setting.**

### 2. Objective:

- 1 To solve an immediate need for increased food safety by providing an effective solution to sanitization of the produce slicer.
- 2 To compare the effectiveness of PURE Hard Surface disinfectant and food contact surface sanitizer to the current in-store cleaning and sanitizing product when used on surfaces throughout the facility following three implementation proposals.

Efficacy was evaluated based on Aerobic Plate Count (APC) results from swabs taken from designated areas at multiple times during the day using the following criteria:

Microorganism	Target
APC	≤1,000 CFU/swab

### 3. Method and Procedures

Each restaurant was using a chain approved, EPA registered quarternary ammonia (QUAT) sanitizer, which was diluted and dispensed into the 3<sup>rd</sup> sink chamber at the washing station. The product label instructions state that the product should be diluted between 150 ppm – 400 ppm active. Dilution and dispensing is achieved using an installed Sink Rite metering system and test strips are available on-site to confirm proper dilution. General practice is for employees to fill red sanitizer buckets from the third sink for use to sanitize surfaces throughout the restaurant.

#### 3.1. Control Stores - Current Sanitizer

Beginning January 8, 2014, test samples were collected under the direction of Silliker Labs. Test samples were collected twice each day, in the morning and in the afternoon for three consecutive days. Due to scheduling conflicts, several of the initial samples were taken from the Control stores early in the morning prior to the store opening. These stores had little to no customer traffic or employee activity since the store was cleaned the previous evening.

3.2. PURE Treatment Plans

On January 6, 2014, PURE personnel delivered test product to each of the test stores and provided each store with instructions for the test plan they were to implement. PURE personnel educated managers and employees about the products(s) they were to use and posted signs and instructions to ensure that the test parameters were readily available to all store employees. An adequate supply of product was supplied for each store and placed in the location directed by the manager on duty. PURE personnel removed all red sanitizer buckets, where indicated below, so that they were not readily available. PURE personnel visited each location on January 6 – 7, 2014, in the morning and afternoon to answer any questions the employees had and to ensure all of the employees were made aware of the test parameters.

Beginning January 8, 2014, test samples were collected by independent Silliker Labs technicians. Test samples were collected twice each day, in the morning and in the afternoon for three consecutive days.

In each of the PURE Treatment Plans, the following instructions were provided for cleaning and sanitizing the food prep counters and the produce slicer:

**Food Prep Counters (2 areas):**

1. Spray PURE Hard Surface disinfectant/sanitizer onto a white cloth until wet.
2. Wipe the food prep counter board with the wet cloth.  
Alternately, remove board and spray with PURE Hard Surface disinfectant/sanitizer away from food prep line, then wipe dry.

**Produce slicer (Use PURE Hard Surface disinfectant/sanitizer)** - Clean the produce slicer after each use as instructed below:

1. Clean slicer after use in the first sink compartment (wash) using a brush according to current store procedures.
2. Rinse the slicer in the second sink compartment (rinse).
3. Transfer to the third sink compartment to sanitize for 1 minute (sanitize).
4. When sanitization is complete, move the slicer back to the second sink, allow excess liquid to drain off.
5. Apply 5 sprays of PURE Hard Surface and allow to air dry.

3.2.1. PURE Treatment Plan 1 - PURE Hard Surface as add on to current system -3 stores

PURE Plan 1 stores were asked to maintain their current cleaning and sanitization practices using the chain approved sanitizer product. In addition, the stores were asked to apply PURE Hard Surface throughout the store to the areas outlined in the schedule below:

	Times per Day	When
Beverage Condiment Area:	2	<ul style="list-style-type: none"> <li>• After lunch rush</li> <li>• At closing</li> </ul>
Nozzles	1	<ul style="list-style-type: none"> <li>• At closing</li> </ul>
Dining Tables	2	<ul style="list-style-type: none"> <li>• After lunch rush</li> <li>• At closing</li> </ul>
Food Prep Counter	4	<ul style="list-style-type: none"> <li>• After AM Prep</li> <li>• After lunch rush</li> <li>• After dinner rush</li> <li>• At closing</li> </ul>
Food Prep Tables	4	<ul style="list-style-type: none"> <li>• After AM Prep</li> <li>• After lunch rush</li> <li>• After dinner rush</li> <li>• At closing</li> </ul>
Restroom	1	<ul style="list-style-type: none"> <li>• At closing</li> </ul>
Cold Storage	0.14	<ul style="list-style-type: none"> <li>• Once per week</li> </ul>
Produce Slicer	1	<ul style="list-style-type: none"> <li>• After use</li> </ul>

**3.2.2. PURE Treatment Plan 2 – PURE Hard Surface as total replacement for current sanitizer (EXCEPT for 3rd compartment sink) – 3 stores**

PURE Plan 2 stores were asked to replace the current sanitizer and use PURE Hard Surface for cleaning and sanitizing surfaces throughout the store, with exception of the produce slicer and those items sanitized in the third compartment sink by immersion. The produce slicer was cleaned and sanitized following the special instruction outlined above. The red sanitizer buckets were put away during the test week to ensure only PURE Hard Surface was applied throughout the store to the areas as outlined in the schedule below:

	Minimum Treatment Times per Day	When
Beverage Condiment Area:	4	<ul style="list-style-type: none"> <li>• After AM prep</li> <li>• After lunch rush</li> <li>• After dinner rush</li> <li>• At closing</li> </ul>
Nozzles	1	<ul style="list-style-type: none"> <li>• At closing</li> </ul>
Dining Tables	8	<ul style="list-style-type: none"> <li>• After each use</li> </ul>
Food Prep Counter	8	<ul style="list-style-type: none"> <li>• After each use</li> </ul>
Food Prep Tables	8	<ul style="list-style-type: none"> <li>• After each use</li> </ul>
Rest Room	1	<ul style="list-style-type: none"> <li>• At closing</li> </ul>
Cold Storage	0.14	<ul style="list-style-type: none"> <li>• Once per week</li> </ul>
Produce Slicer	1	<ul style="list-style-type: none"> <li>• After use</li> </ul>

**3.2.3. PURE Treatment Plan 3 – PURE Cleaning System as total replacement (EXCEPT for 3rd compartment sink) – 3 stores**

The PURE Cleaning system includes PURE Hard Surface disinfectant/food contact surface sanitizer and PURE Multi-Purpose and Floor Cleaner. PURE Plan 3 stores were asked to replace the current sanitizer and use PURE Hard Surface for sanitizing surfaces throughout the store, with exception to the produce slicer and those items sanitized in the third compartment sink by immersion. The produce slicer was cleaned and sanitized following the special instruction outlined above. In addition, PURE Multi-Purpose Cleaner was used with PURE Hard Surface for cleaning between sanitizing application. The red sanitizer buckets were put away during the test week to ensure only the PURE Cleaning System was applied throughout the store to the areas as outlined in the schedule below:

	Minimum Treatment Times per Day	When
Beverage Condiment Area:	4	<ul style="list-style-type: none"> <li>• After AM Prep- PURE Multi-Purpose</li> <li>• After lunch rush – PURE Hard Surface</li> <li>• After dinner rush- PURE Multi-Purpose</li> <li>• At closing-PURE Hard Surface</li> </ul>
Nozzles	1	<ul style="list-style-type: none"> <li>• At Closing – PURE Hard Surface</li> </ul>
Dining Tables	8	<ul style="list-style-type: none"> <li>• After each use; alternate PURE Hard Surface and PURE Multi-Purpose</li> </ul>
Food Prep Counter	8	<ul style="list-style-type: none"> <li>• After each use; alternate PURE Hard Surface and PURE Multi-Purpose</li> </ul>
Food Prep Tables	8	<ul style="list-style-type: none"> <li>• After each use; alternate PURE Hard Surface and PURE Multi-Purpose</li> </ul>
Rest Room	1	<ul style="list-style-type: none"> <li>• At closing-PURE Hard Surface</li> </ul>
Cold Storage	0.14	<ul style="list-style-type: none"> <li>• Once per week- PURE Hard Surface</li> </ul>
Produce Slicer	1	<ul style="list-style-type: none"> <li>• After use –PURE Hard Surface</li> </ul>

### 3.3. Test Surfaces

Test samples were collected from each of the following test surfaces:

Food Line Front of store

Food Prep Counter (2)  
Area 1  
Area 2

Back of Store\*

Food prep tables (2)

Main Store

Customer dining table (1)

Produce slicer\*

Blades  
Collection board

**\* Due to the greatest potential for cross-contamination to food and the frequency of direct food contact from these surfaces, these areas are considered "Critical" Food Contact Surfaces.**

## 4. Results

The APC results were reported in colony forming units (CFU) per swab. The target was set at  $\leq 1,000$  CFU/swab, which was previously defined by the QSR's Quality Assurance team as a successful result. Any result that was  $>1,000$  CFU/swab was termed an "EVENT", and therefore a potential risk to food safety. Any result that was  $<10$  CFU/swab was termed a "0" result and considered highly successful.

The most concerning areas for food safety are those areas that pose the greatest risk of food contamination. On a daily basis, the food preparation tables and the produce slicer are the primary surfaces in this QSR presenting the greatest risk of cross contamination to food product and these are considered Critical Food Contact Surfaces. Second to that is the food preparation counter, however, in most stores, food product is not prepared directly on the food prep counter.

Over the three days of testing, there were 22 Events reported in the Control Group, 12 Events in the PURE Plan 1 Group (45% less than the Control Group), 4 Events in the PURE Plan 2 Group (82% less than the Control Group) and 9 Events in the PURE Plan 3 Group (59% less than Control Group). 18 of the 22 Events reported in the Control Group were found on non-food prep counter areas, and 100% were from Critical Food Contact Surfaces (produce slicer and food preparation tables). 2 of the 3 Events in PURE Plan 1 Group were from the produce slicer and no Events were non-food prep counter Events in either the PURE Plan 2 or Plan 3 Groups (Figure 1).

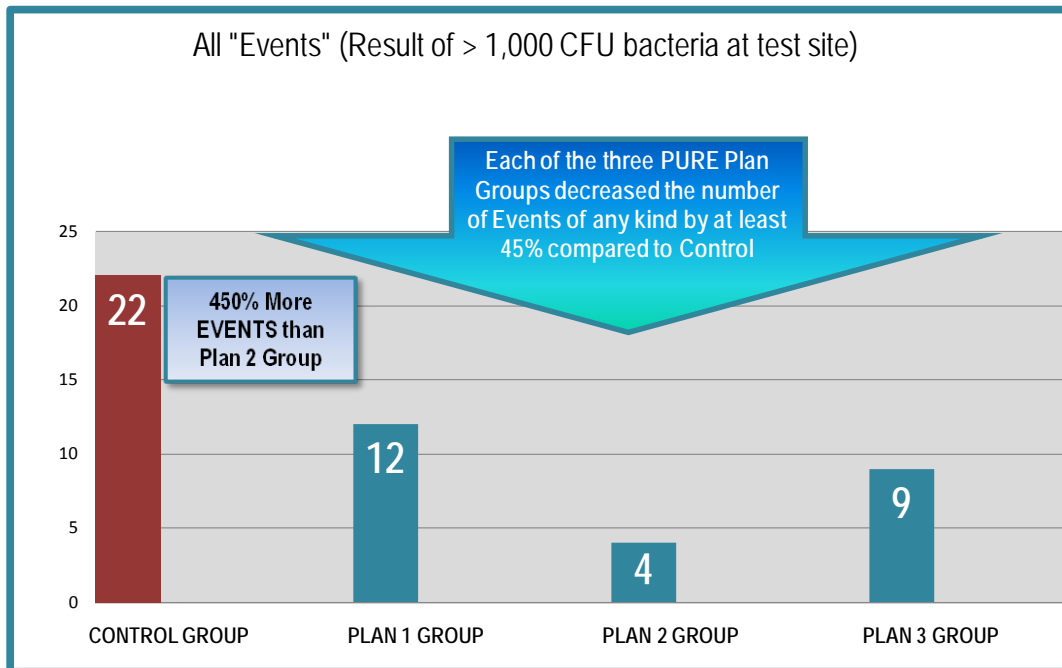


Figure 1

The control store achieved 40 “zero” results over the three days, while the PURE Plan 1, 2 and 3 stores achieved 87, 87 and 80 “zero” results respectively (Figure 2). In all cases, PURE Plans offered a minimum 100% increase in “zero” results when compared to the control.

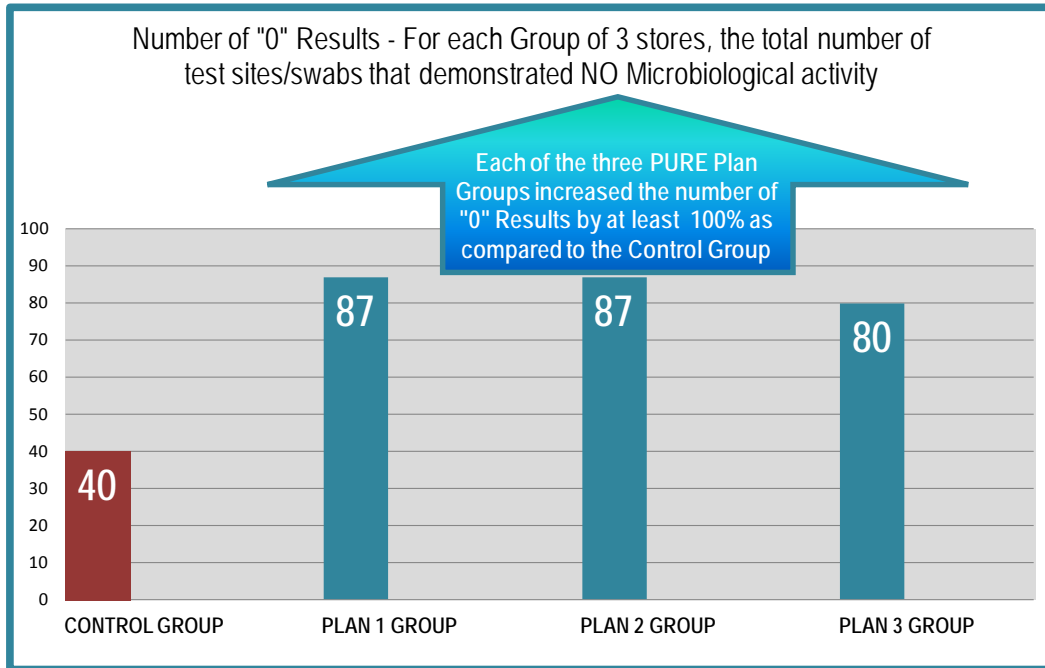


Figure 2

Considering all reported Events on average, PURE Plan Groups demonstrated a 62% reduction in Events compared to the Control Group and a 94% reduction in non-food prep counter Events compared to the Control Group (Figure 3).

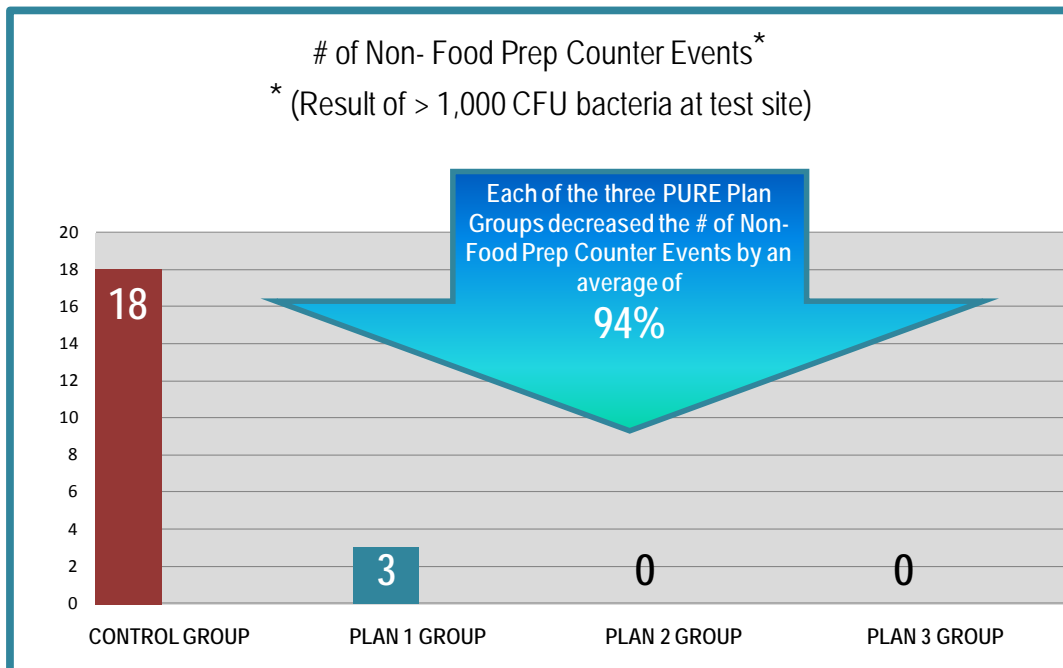
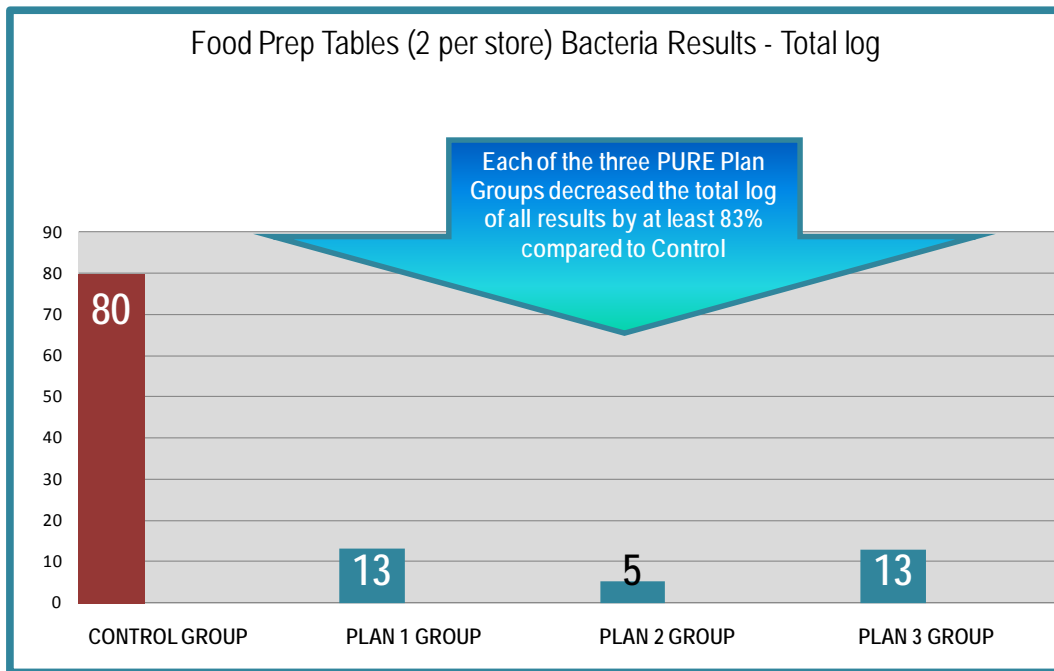


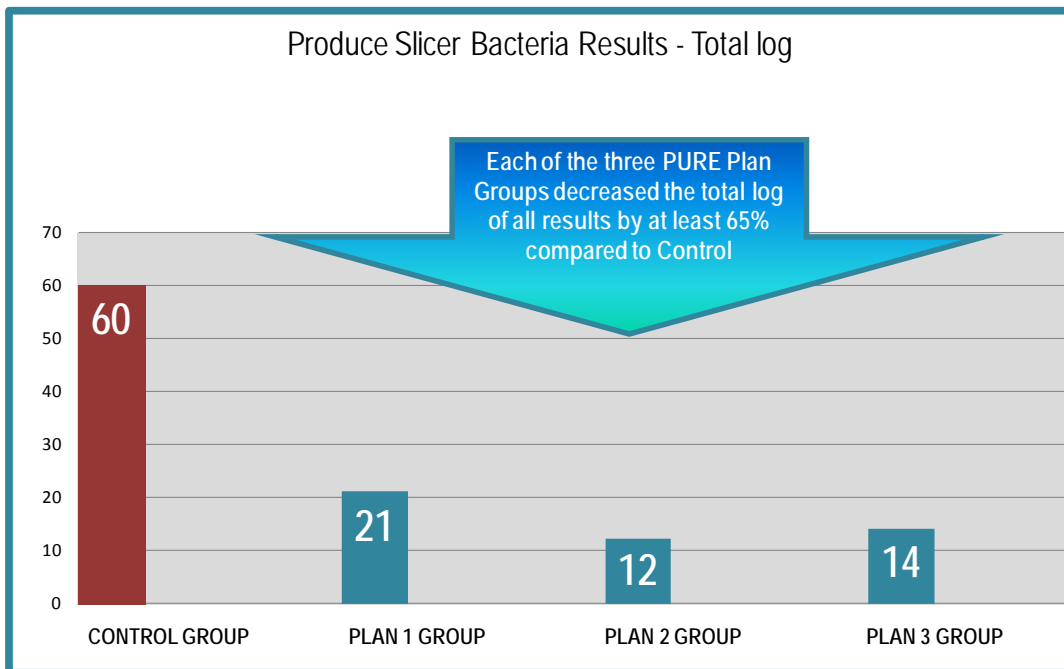
Figure 3

On the food preparation tables, both PURE Plan 1 Group and PURE Plan 3 Group demonstrated an 83% reduction in the total log of the bacterial counts compared to the Control Group, while PURE Plan 2 Group demonstrated a 93% reduction (Figure 4).



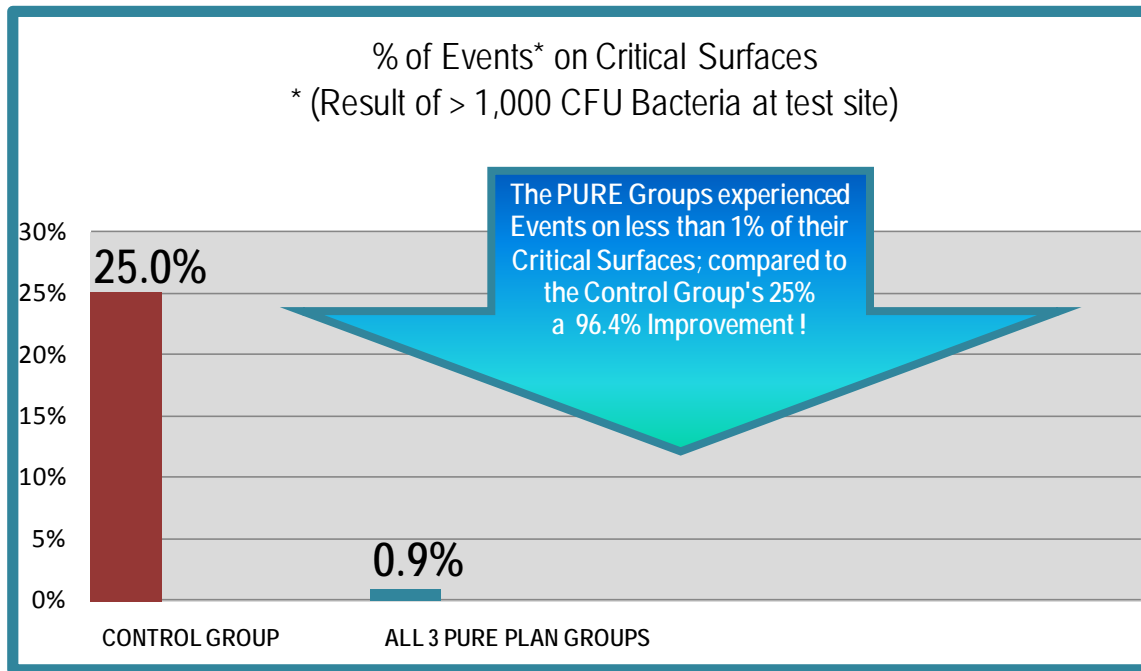
**Figure 4**

On the produce slicer, PURE Plan 1 Group demonstrated a 65% reduction in the total log of the bacterial counts compared to the Control Group while PURE Plan 2 demonstrated a 79% reduction and PURE Plan 3 Group demonstrated a 76% reduction (Figure 5).



**Figure 5**

It is significant to note that 25% of the tests from critical surfaces in the 3 Control Group stores resulted in an Event (>1,000CFUs) while less than 1% (.9%) of the tests from critical surfaces in the 9 PURE Plan Group stores resulted in an Event. This represents a 96.4% improvement in controlling Events on the most critical surfaces in the store (Figure 6).



**Figure 6**

## **5. Discussion**

The efficacy of PURE Hard Surface has been demonstrated in previous in-store studies and is supported by numerous studies from third-party laboratories. The goal of this study was to support the on-going evaluation of PURE products in a QSR system by evaluating three treatment plan options and demonstrating that the treatment proposals presented are efficacious and practical for implementation across the chain.

Overall, the PURE Plans demonstrated a 62% improvement over the current sanitizer and a 94% improvement on non-food prep counter test surfaces. The Control Group encountered 83% more Events than PURE Plan 1 Group, 450% more Events than the PURE Plan 2 Group and 144% more Events than the PURE Plan 3 Group. The dining tables saw the fewest positive results across all plans and seemed well controlled in the Control Group as well as by the PURE Plan Groups.

### **5.1. Critical Food Contact Surfaces: Produce slicer/Food preparation tables**

Controlling microorganisms on surfaces where direct food contact occurs is a critical part of food safety practices. The PURE Plan Groups offered at least an 83% improvement over the Control Group on the food preparation tables and no less than a 65% improvement on the produce slicer. In the plans where only PURE products were used in the store (Plan 2 and 3), there were no Events reported on critical surfaces for the entire week of testing, demonstrating the benefit over the current sanitizer on the most critical food safety surfaces in the store.

### **5.2. Food Prep Counter Areas**

The most challenging surfaces for all of the groups were the food prep counters, which accounted for 55% of the total events. The grooves in the boards from repeated cutting are a safe harbor for microorganisms and the boards are difficult to properly sanitizing during the day due to the high customer traffic. We believe that further improvement in the sanitization of these surfaces can be achieved with one or two cleaning

protocol modifications that will allow PURE Hard Surface to penetrate the grooves on the board and kill the microorganisms dwelling inside.

First, we recommend a new SOP for sanitizing the food QSR store operations, and should be at least once per day and preferably following the lunch rush. The process is as follows:

1. Starting at one end of the food prep counter, remove one board, clean under the board with a wipe wet with PURE Hard Surface.
2. Turning from the food prep counter, spray the top surface of the board with PURE Hard Surface.
3. Replace the board, allowing it to remain wet and move on to the next section.
4. Repeat Step 1 – 3 on each of the boards along the food prep counter.
5. Return to the first board and wipe dry, working down the length of the food prep counter.

Second, we recommend an alternate process for cleaning and sanitizing the boards at end of the night:

1. Clean the boards in the first sink compartment (wash) using a brush according to current store procedures.
2. Rinse the boards in the second sink compartment (rinse).
3. Transfer to the rack to drain.
4. Apply PURE Hard Surface to both sides of the board, ensuring sufficient coverage and application to the highly scored areas on the board.
5. Allow to air dry.
6. In the morning, re-apply a fine mist of PURE Hard Surface and wipe dry before replacing on the food prep counter.

In stores that operate for 24-hours, this can be done in the early morning hours or at time when the customer traffic is very low. PURE Hard Surface should remain on the boards for at least 2 minutes before wiping dry and replacing on the food prep counter.

### 5.3. Plan comparison

Each PURE Plan provided a benefit over the current sanitizer used alone. The PURE Plans implementing only PURE products (Plan 2 - 3) offered the highest benefit of the three plans, particularly on critical food contact surfaces.

In order to determine the product use for each plan during the week, the unused product was collected, weighed and compared to the expected use for that plan.

Plan	Expected Use per Week PURE Hard Surface	Actual Use per Week PURE Hard Surface	% of Expected Use PURE Hard Surface	Expected Use per Week MP Cleaner diluted	Actual Use per Week MP Cleaner diluted	% of Expected Use PURE MP Cleaner diluted
Plan 1	32.25 fl oz	27.36 fl oz	85%			
Plan 2	58.75 fl oz	32.26 fl oz	55%			
Plan 3	32.25 fl oz	23.9 fl oz	74%	60 fl oz	21.76 fl oz	36%

It is possible that the higher than usual store volume experienced during the test week prevented the employees from using the product as frequently as outlined in the treatment plan. Although the product use was well below what was expected, the PURE products were still able to demonstrate superior control when used in the stores. In addition, given the persistence offered by PURE Hard Surface, it is expected that the improved sanitation demonstrated by PURE Hard Surface disinfectant in this study, as well as previous in-store studies, would continue to build with ongoing use.



#### 5.4. Store surveys

It is important to ensure that in addition to providing the efficacy needed to ensure food safety, the employees can efficiently use the product(s) during the workday and that the use of the product does not create additional demands on the employees.

As a pre-formulated product, PURE Hard Surface disinfectant offers many benefits over the current quaternary ammonia product. In the concentrated form, the current sanitizer is a potential health and safety hazard. The MSDS states that the concentrate can cause skin and eye burns, is flammable and corrosive and harmful if swallowed. Further, if the dispensing unit is not functioning properly, there exists either a hazard of exposure to the product above the levels allowed by law for food contact surfaces or the potential for reduced efficacy due to insufficient levels of active. PURE Hard Surface disinfectant eliminates the potential for improper dilution and, does not require replacement throughout the day and is stable for at least 2 years. Additionally, PURE Hard Surface does not rely on employees to test each batch to ensure compliance with Federal, State and Local laws, as does the current product.

Based on the safety profile, PURE offers an improved user experience and eliminates employee exposure to the current sanitizer, which is highly irritating to the skin.

Employees at each of the test stores were provided Product Evaluations to rate the product based on various attributes ranging from performance on certain surfaces, product packaging, product aesthetics, ease of using the product and label directions.

Of those surveyed, 95% were either very satisfied or satisfied with the product quality of PURE Hard Surface and 83% were either very satisfied or satisfied with product performance on all surfaces tested. 95% of those surveyed were either very satisfied or satisfied with the low skin irritation experienced when using PURE Hard Surface while 91% were either very satisfied or satisfied that the product has no odor. 88% of those surveyed were either very satisfied or satisfied with the PURE HS product packaging and overall use attributes; 91% were very satisfied with the label direction. 86% of those surveyed felt that PURE Hard Surface is better than the current restaurant sanitizer and would likely recommend the product be used in their stores. (Table 1)

For the stores using the Multi-Purpose Cleaner, 100% of those surveyed were either very satisfied or satisfied with the product quality and ease of use. 98 % were either very satisfied or satisfied with product performance on all surfaces tested as well as product packaging and overall use attributes. Every person surveyed was either very satisfied or satisfied with the low skin irritation and lack of odor experienced when using PURE MP Cleaner. 89% of those surveyed felt that PURE MP Cleaner is better than the current cleaner and would likely recommend the product be used in their stores. (Table 2)

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**Table 1 - PURE Hard Surface Survey Results**

**Evaluation of PURE Hard Surface**

**Response Distribution  
(Number of Responses/Rating)**

<i>Please rate the following aspects of the product and product usage.</i>	<b>Very Satisfied</b>	<b>Satisfied</b>	<b>Neutral</b>	<b>Unsatisfied</b>	<b>Very Unsatisfied</b>	<b>Not Applicable</b>
Product Quality	16	5	1	0	0	0
Ease of Use	16	2	3	0	1	0
<b>Performance on:</b>						
<i>Food Contact Surfaces</i>	16	2	3	0	1	0
<i>Dining Tables</i>	14	4	3	0	0	0
<i>Produce Slicer</i>	17	1	3	0	0	1
<i>Stainless Steel</i>	14	4	3	0	0	0
<i>Beverage Nozzles</i>	15	2	3	0	0	2
<i>Bathroom Surfaces</i>	13	5	2	0	0	1
Skin Irritation	19	2	1	0	0	0
Product Odor	20	0	2	0	0	0
Bottle Shape and Size	19	1	2	0	0	0
Sprayer Size and Function	16	1	3	0	2	0
Label Directions	20	0	2	0	0	0
Ease of Filling Bottles	17	3	1	0	0	0
Use of the Transfer Spout	17	2	2	1	0	0
Overall Satisfaction	16	2	4	0	0	0
In your opinion, is PURE Hard Surface better, worse or about the same as your current sanitizer?	<b>Much Better</b>	<b>Better</b>	<b>About the same</b>	<b>Worse</b>	<b>Much worse</b>	
	15	4	1	1	1	
Would you recommend this product in your store?	<b>Very Likely</b>	<b>Somewhat Likely</b>	<b>Neutral</b>	<b>Not likely</b>	<b>Very Unlikely</b>	
	17	2	1	1	1	

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**Table 2 - PURE Multi-Purpose Cleaner Survey Results**

Evaluation of PURE MP Cleaner	Response Distribution (Number of Responses/Rating)					
	Very Satisfied	Satisfied	Neutral	Unsatisfied	Very Unsatisfied	Not Applicable
<i>Please rate the following aspects of the product and product usage.</i>						
Product Quality	6	3	0	0	0	0
Ease of Use	7	2	0	0	0	0
Performance on:						
<i>Food Contact Surfaces</i>	5	4	0	0	0	0
<i>Dining Tables</i>	5	4	0	0	0	0
<i>Stainless Steel</i>	5	4	0	0	0	0
<i>Bathroom Surfaces</i>	4	4	0	0	0	1
<i>Glass</i>	6	3	0	0	0	0
Skin Irritation	6	3	0	0	0	0
Product Odor	5	4	0	0	0	0
Bottle Shape and Size	5	4	0	0	0	0
Sprayer Size and Function	4	4	0	0	1	0
Label Directions	5	4	0	0	0	0
Ease of Filling Bottles	5	4	0	0	0	0
Ease of Diluting Product	5	4	0	0	0	0
Overall Satisfaction	5	4	0	0	0	0
In your opinion, is PURE Multi-Purpose Cleaner better, worse or about the same as your current cleaner?	<b>Much Better</b>	<b>Better</b>	<b>About the same</b>	<b>Worse</b>	<b>Much worse</b>	
	5	3	1	0	0	
Would you recommend this product in your store?	<b>Very Likely</b>	<b>Somewhat Likely</b>	<b>Neutral</b>	<b>Not likely</b>	<b>Very Unlikely</b>	
	6	2	1	0	0	

**6. Conclusion**

As expected, this study further validates and supports previous testing at this QSR, demonstrating that PURE Hard Surface offers a greater level of microbial control overall than the incumbent product. This study also provides support for three separate in-store use protocols, one of which includes the addition of PURE Multi-Purpose and Floor Cleaner. PURE Multi-Purpose cleaner can replace two of the current products (floor cleaner and glass cleaner), and PURE Hard Surface can replace the current stainless steel polish and bathroom cleaner, providing additional benefit to the stores by reducing chemical costs. Implementation of each plan was very manageable by the stores and the majority of employees preferred the PURE products to the current products in use.

**The data in this report suggests that implementation of any of the three PURE Plans offers the opportunity to achieve an 83 to 450% reduction in the risk of a Food Safety Event.**