EnSURE™ Touch Simulates Charm novaLUM® RLU Scale

An internal evaluation was conducted to assess the performance of using the RLU conversion function on EnSURE™ Touch to mimic the Charm novaLUM® RLU scale. Pure ATP analyte and 10 food products were tested using the RLU simulation mode on EnSURE™ Touch and the novaLUM® ATP system. The results demonstrated the ability of EnSURE™ Touch to accurately mimic the novaLUM® ATP system across a wide range of ATP sources.

Introduction

EnSURE™ Touch is a dynamic instrument that can simulate RLU scales from other ATP systems without needing to manually convert RLUs. The RLU conversion feature enables EnSURE™ Touch to instantly display test results to the end user in the desired RLU scale. This allows customers to easily transition to the EnSURE™ Touch platform without the need to change SSOP cleaning pass/fail thresholds that were set with another system. This study shows the performance of the EnSURE™ Touch RLU converter against the novaLUM® system detecting food suspensions
and pure ATP.

Sample Preparation

Pure ATP analyte concentrations were prepared by taking a 1 µM ATP standard solution (Biothema SKU# 46-051) and serially diluting it 1:10 using pyrogen-free water producing 200 nM, 10 0nM, 20 nM, 10 nM, 5 nM, and 0 nM ATP suspensions. Additionally, serial 1:10 dilutions of foods typical to the food & beverage industry were also prepared including whole milk, 2% milk, non-fat milk, orange juice with pulp, orange juice without pulp, ground beef, raw chicken,
deli turkey, romaine lettuce, and baby spinach. All suspensions were made on the day of testing and used within one hour.

Method

Using a set volume pipettor, 10 µL of food or ATP suspension was added to the swab bud of each ATP swab (UltraSnap™ or PocketSwab®). Swabs were activated according to the manufacturer's instructions. Devices were mixed for 5 seconds and read on the required luminometer. All food suspensions were measured in duplicate for all systems. All ATP dilutions were measured with five replicates on each system. UltraSnap™ test devices were read in the EnSURE™ Touch with the RLU converter function turned on prior to testing. Each system had a pass/fail limit set at 1500 RLUs to simulate the scenario of detecting food residues on a surface.

Results and Discussion

For detection of pure ATP, the EnSURE™ Touch RLU result demonstrated a strong correlation with the novaLUM® RLU result across a large dynamic range of ATP concentrations (Table 1). Using linear regression analysis, the coefficient of determination was 0.9958 showing that the two systems displayed similar results when a standard amount of ATP was applied (Figure 1). For detection of known food suspensions, the EnSURE™ Touch RLU demonstrated a strong correlation with the novaLUM® RLU across a wide variety of food types (Table 2). Using linear regression analysis, the coefficient of determination was 0.9965, again showing strong equivalence between the two systems when a known amount of food is applied (Figure 2). Using a 1,500 RLU pass/fail limit, the two systems agreed 94% of the time when measuring a specific food type and suspension. Of all the samples only 10% beef and 10% chicken suspensions did not agree between both tests. The EnSURE™ Touch system produced a "fail" result while the novaLUM® system produced a "pass" result for the 10% beef suspension. For the 10% chicken suspension, the novaLUM® system produced a "fail" result while the EnSURE™ Touch system produced a "pass" result.

Table 1. Mean ATP Results[a]

ATP per Swab (fmoles)	novaLUM®	EnSURE™ Touch Simulating novaLUM®
	RLU	RLU
2000	584464	502513
1000	336729	297907
200	60984	52649
100	20239	27027
20	5113	5349
10	1543	2109
5	835	1083
0	0	0

[a] 5 replicates per ATP concentration

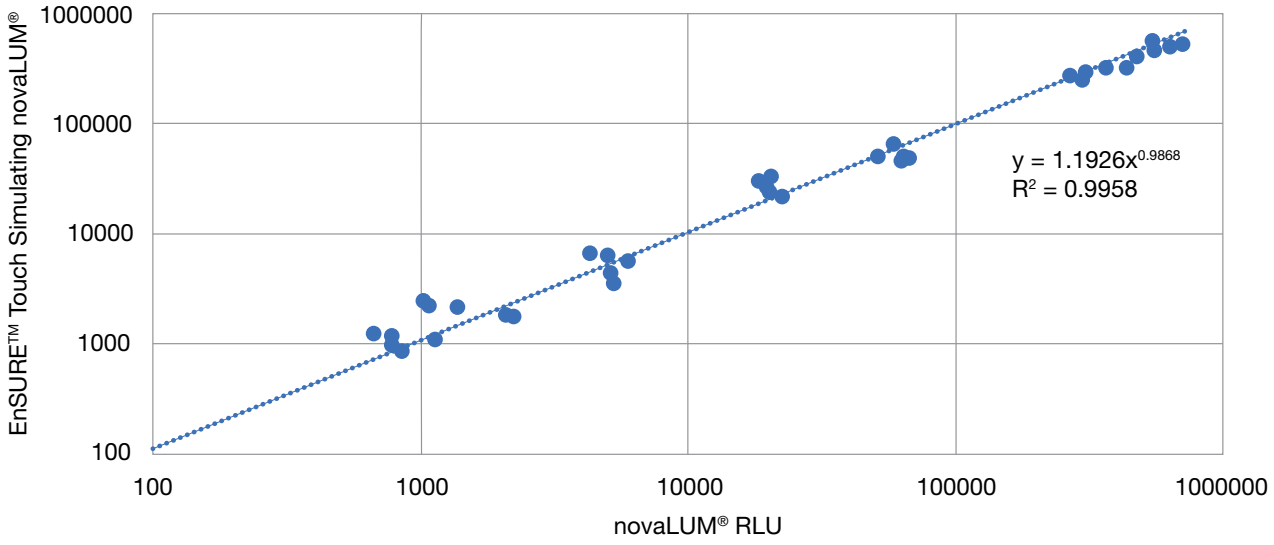

Figure 1. Correlation of novaLUM® RLU and EnSURE™ Touch simulated RLU (novaLUM®) when detecting the pure ATP. All data points.

Table 2. Food Suspension RLUs and Pass/Fail Results					
Food Products[a]	**Food Suspension (w/v%)**	**novaLUM®**	**EnSURE™ Touch Simulating novaLUM®**	**novaLUM®**	**EnSURE™ Touch Simulating novaLUM®**
		RLU	**RLU**	**1500 RLU Limit**	**1500 RLU Limit**
Whole Milk	10	45379	30057	Fail	Fail
	1	2707	4402	Fail	Fail
	0.1	0	0	Pass	Pass
2% Milk	10	23327	23695	Fail	Fail
	1	1847	2259	Fail	Fail
	0.1	0	0	Pass	Pass
Non-Fat	10	36586	26323	Fail	Fail
	1	2488	2950	Fail	Fail
	0.1	0	0	Pass	Pass
OJ w/ Pulp	10	1752244	874448	Fail	Fail
	1	177323	151968	Fail	Fail
	0.1	34507	25286	Fail	Fail
	0.01	1814	2189	Fail	Fail
	0.001	0	0	Pass	Pass
OJ w/o Pulp	10	1547372	954247	Fail	Fail
	1	216434	144846	Fail	Fail
	0.1	20236	15812	Fail	Fail
	0.01	985	1498	Pass	Pass
	0.001	0	0	Pass	Pass
Ground Beef	10	1020	2328	Pass	Fail
	1	0	0	Pass	Pass
	0.1	0	0	Pass	Pass
Raw Chicken	10	3573	1429	Fail	Pass
	1	0	0	Pass	Pass
	0.1	0	0	Pass	Pass
Deli Turkey	10	6819	2673	Fail	Fail
	1	0	0	Pass	Pass
	0.1	0	0	Pass	Pass
Romaine Lettuce	10	137776	111723	Fail	Fail
	1	21095	12977	Fail	Fail
	0.1	376	1290	Pass	Pass
	0.01	0	0	Pass	Pass
Baby Spinach	10	42699	35796	Fail	Fail
	1	3003	3642	Fail	Fail
	0.1	0	0	Pass	Pass

[a] 2 replicated per dilution tested

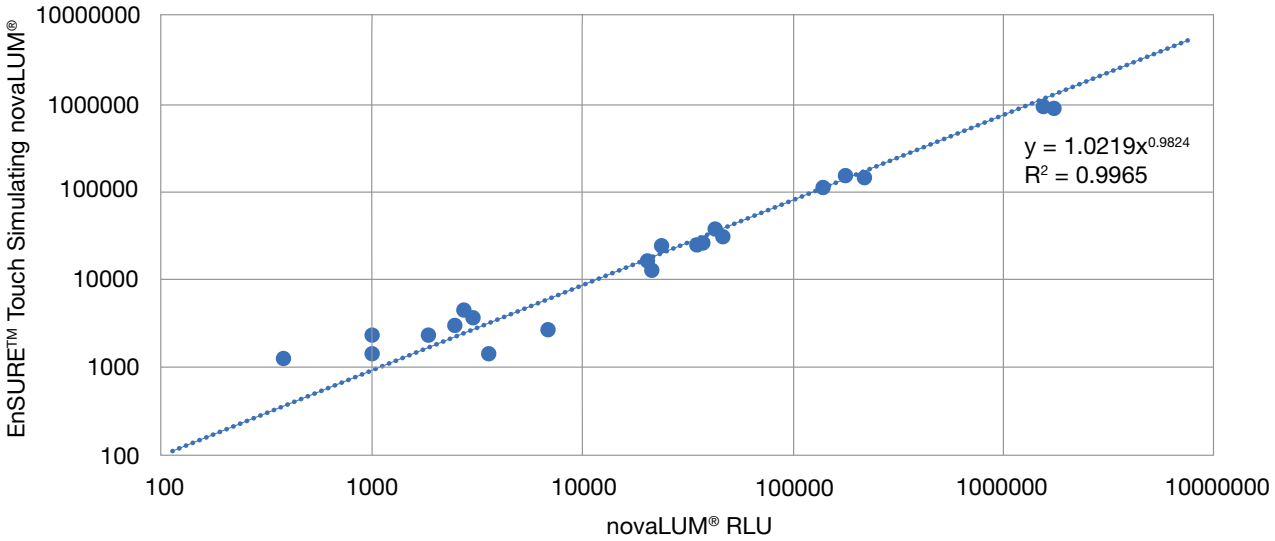

Figure 2. Correlation of novaLUM® RLU and EnSURE™ Touch simulated RLU (novaLUM®) when detecting food suspensions. All data points.

Conclusions

The results of the pure ATP and food suspension testing demonstrates the ability of EnSURE™ Touch to mimic the RLU display scale of the novaLUM® system accurately. The ability to mimic another system allows users to easily transition to the EnSURE™ Touch platform and keep their current pass/fail limits. This alleviates completely having to change SSOPs to reflect the traditional Hygiena™ RLU scale. Overall, the EnSURE™ Touch RLU simulation function is a great tool when upgrading to the EnSURE™ Touch hygiene monitoring platform.