

## Detecting ATP shown to be an unreliable method for detecting allergens

### SUMMARY

A study was performed to evaluate the ability of an ATP test system to detect food allergens. An ATP detection system is being marketed as a method of reducing the possibility of food allergen contamination by detecting ATP (adenosine triphosphate) on food contact surfaces. The theory is that if ATP is detected, the ATP may have originated from an allergenic source, and further sanitation is required before the production of non-allergenic food should begin.

Repeated trials indicate that neither the presence nor absence of ATP is a reliable predictor of the presence of food allergens. Food allergens can exist in environments where no detectable ATP is present. Also, an abundance of ATP is not a reliable predictor of the presence of food allergens.

### METHODOLOGY

AllerGiene (Lot #CA091905, Exp. 04/06) was evaluated using samples containing four known allergenic foods: eggs, peanut, milk, and wheat; and one known non-allergenic food with extremely stable ATP, ketchup. Each allergenic sample was also tested using an appropriate Veratox test kit. Both systems were performed according to their written test procedures. As directed in the AllerGiene instructions, blanks were checked by evaluating six replicates of reagent water, and found to contain zero RLU of ATP. Also as directed in the AllerGiene instructions, the test's stated expected performance was verified by using a supplied positive control tablet (the tablet result was 55,269 RLU, which exceeded the minimum positive requirement of 40,000).

Each sample type was evaluated directly undiluted, and then diluted with increasing ratios to evaluate each test's ability to detect allergens at increasingly smaller concentrations. Each sample to be

tested with the Veratox test was prepared, extracted and diluted as detailed in its instructions, except that no extraction additive (which contains ATP) was added. As directed in its instructions, Veratox values underwent serial dilution to fall within the test's standard curve, and higher values were extrapolated based on results.

Samples were tested using the AllerGiene system by pipetting 25 µL of sample diluted with sterile water (determined to provide the swab's saturation volume) onto a swab and measuring its ATP content with a Charm LUMGiene luminometer. The LUMGiene was set to a threshold of 100 RLU as pass/fail criteria. Four replicates for each diluted solution were tested on the AllerGiene. Three replicates for each dilution were tested using the Veratox system. All data points were calculated from an average of replicate test results.

### RESULTS

As shown in the table below, simple ATP readings and Veratox allergen test results that show true allergen content do not correlate across different food products containing potential allergens of concern. For instance, a sample containing a known allergen can be diluted to be ATP free, but not allergen free.

### CONCLUSION

ATP can only be considered as an index for the general cleanliness of the surface and is not to be associated with presence of allergens. If the commodity of concern contains a known amount of ATP, it may be useful to use as an index for cleaning process. Removal of ATP does not prove that all allergen has been removed. Also, AllerGiene's use in monitoring food allergen is limited by many other food ingredients, such as raw eggs, which contain little detectable ATP when tested with AllerGiene, but remains allergenic.

**TABLE 1. Veratox ELISA quantitative food allergen test results vs. AllerGiene ATP food allergen test results.** As the results show, neither the presence nor absence of ATP is a predictor of the presence of a food allergen. The wheat results are shaded to indicate that wheat samples were diluted using slightly different dilution ratios. (NFDM=Nonfat dried milk)

Dilution	EGG		PEANUT BUTTER		NFDM		KETCHUP		WHEAT		
	AllerGiene (RLU)	Veratox (ppm)	AllerGiene (RLU)	Veratox (ppm)	Wheat Dilution						
None	4,777,858	8,350,000	259,420,086	16,600,000	39,804,668	4,000,000	3,216,367	Not applicable	182,199,820	32,750,000	None
1:100	199,037	83,500	2,618,775	166,000	46,286,150	40,000	41,647,109		100,628	13,100	1:1,600
1:1,000	0	8,350	155,532	16,600	3,609,900	4,000	4,107,383		27,698.5	1,310	1:16,000
1:10,000	0	835	16,495	1,660	0	400	84,304		0	131	1:160,000
1:100,000	0	83.5	46,335	166	0	40	0		0	13.1	1:1,600,000
1:1,000,000	0	8.4	0	16.6	0	4	0				