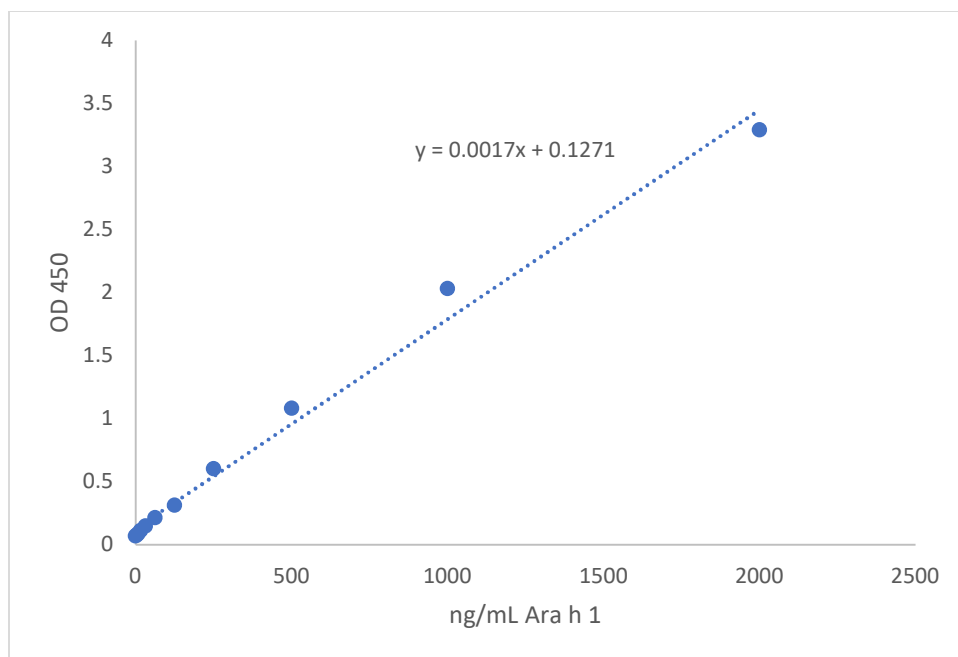


Supporting Information

	P1-16	PT-31	P1-10	P2-8	P2-18
AraH1 protein (nM)	54.4 ± 5.5	238.1 ± 35.3	69.2 ± 9.4	265.8 ± 25.8	104.7 ± 13.5
Peanut butter (ppm)	141 ± 21.9	311.3 ± 108.5	544.7 ± 110.3	650.8 ± 152.7	386.5 ± 89.1
Peanut flour (ppm)	144.3 ± 31.4	791.7 ± 648.6	557.2 ± 166.6	466.1 ± 187.1	383.1 ± 143.5

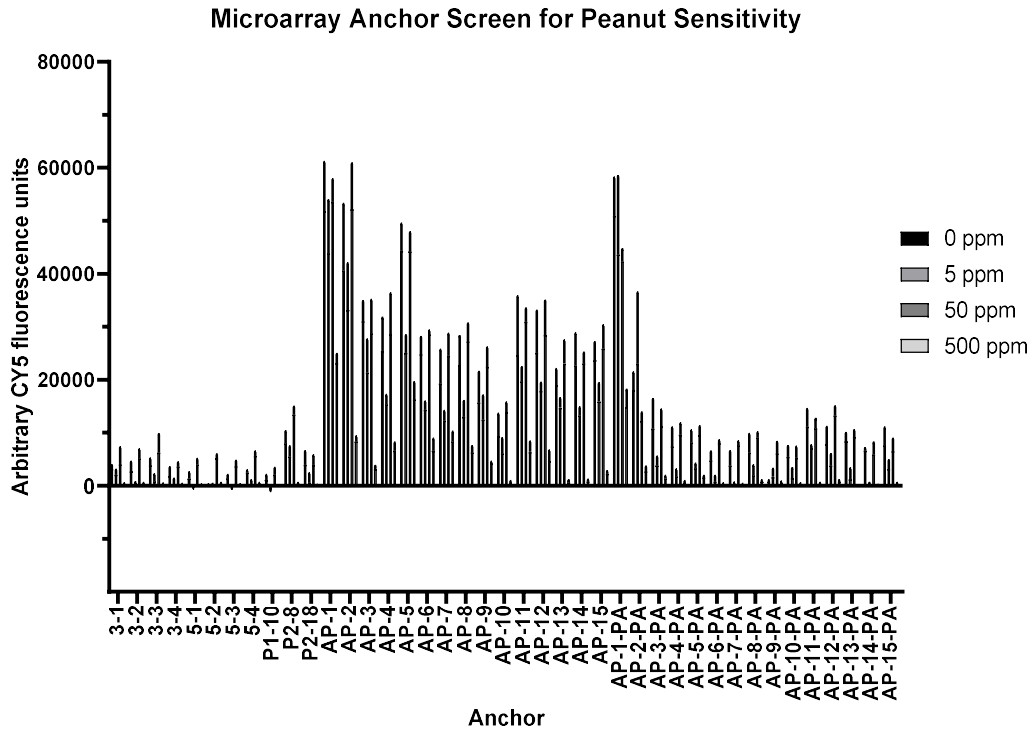
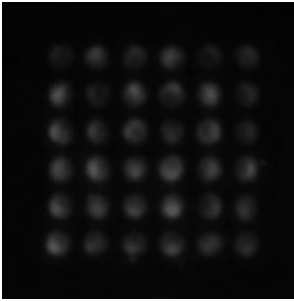
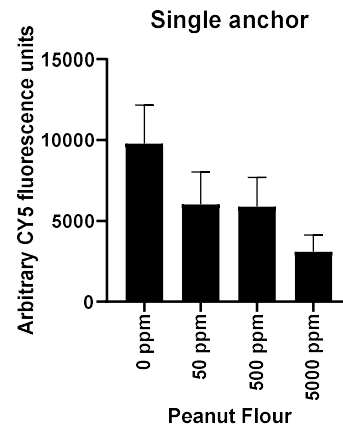
SI Table 1. Summary of determination of dissociation constants (K_d s). K_d values shown are mean +/- standard error.



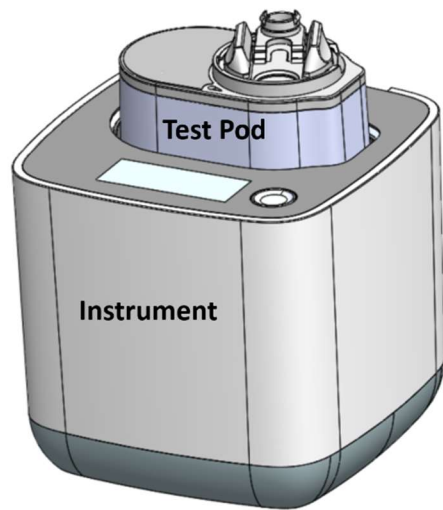
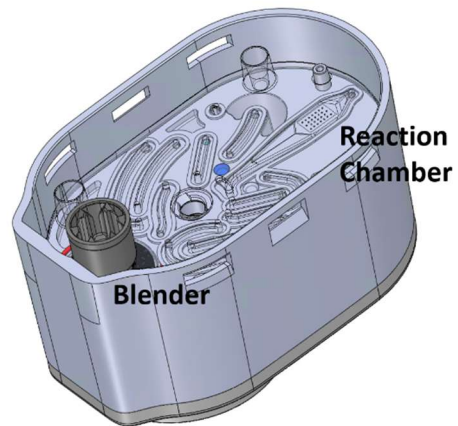
Sample	OD 450	Calculated ng/mL Ara h 1	Calculated ppm Ara h 1
Peanut flour (100 ppm)	3.22 (+/- 0.07)	1820	1.8

Analyte	Corresponding Concentration (Literature Value)	Percentage of Peanut Flour
Peanut flour	50 ppm	---
Peanut protein	12.5 ppm	25%
Ara h 1	1.8 ppm (26 nM)	3.5% (14% of peanut protein)

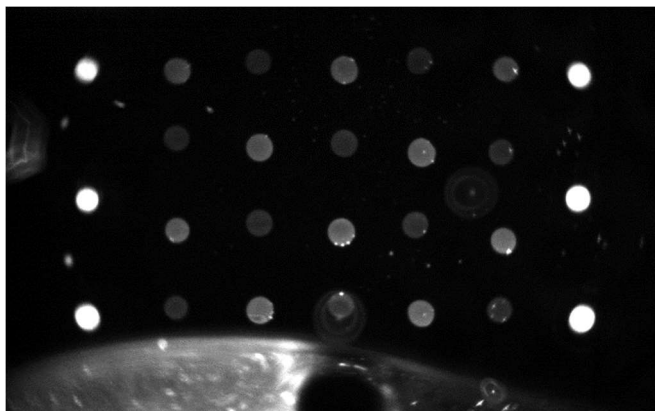
SI Figure 1. Determination of Ara h 1 content in commercially-available peanut flour by ELISA. Analysis performed as directed by Indoor Biotechnologies Ara h 1 ELISA 2.0 kit. Comparison to expected values from the literature.

A**B****C**

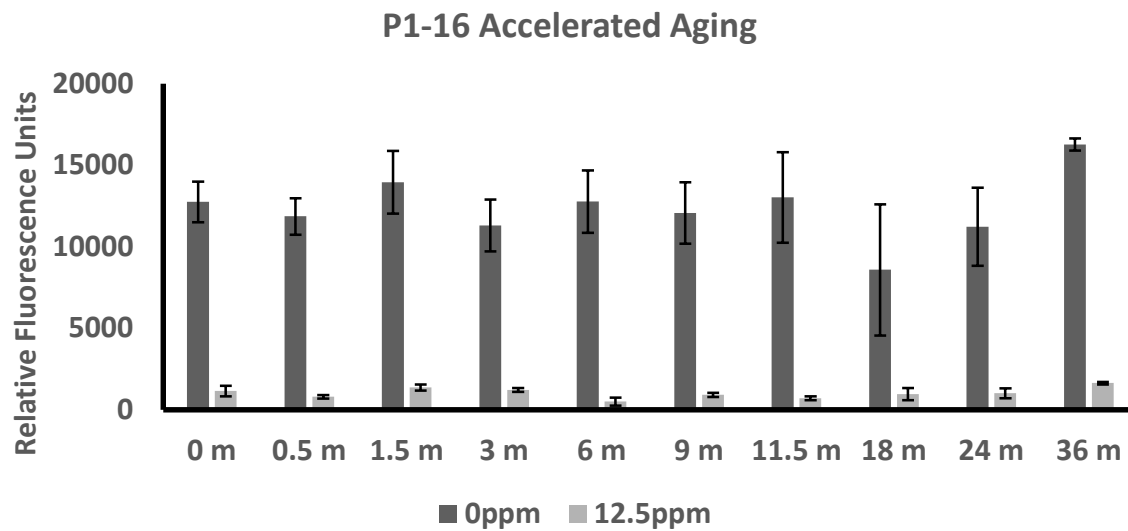
SI Figure 2. AP-PA-1 anchor is the optimal oligonucleotide sequence identified in a microarray screen. A. Forty-one sequences were covalently attached to epoxysilane coated glass slides and screened for their ability to hybridize with CY5-P1-16 aptamer. B. Representative image of CY5-P1-16 aptamer bound to the complement anchor. Each spot was printed with 10 μ M anchor. C. From the screen, one anchor was chosen and printed with a longer carbon linker. For A and B, sensitivity was also assessed by incubating CY5-P1-16 aptamer with increasing concentrations of clarified peanut flour homogenate prior to exposure with each anchor. CY5 fluorescence was quantified after washing and drying the slides. Three independent replicates of each concentration were tested with error bars representing the standard deviation of the mean.

A**B**

SI Figure 3. Illustrations of the integrated assay test pod and instrument. A. Single-use test pod is driven by the durable instrument. B. Cutaway view of pod shows area where food sample is homogenized and the reaction chamber containing the surface bound anchor sequences.



SI Figure 4 – An example of a poor image in which several spots cannot be used due to poor reaction flow (remaining fluid in bottom of image) and particulates of food debris (bright speckles). Poor spots are not considered in final analysis.



SI Figure 5. AF647-P1-16 retains its sensitivity to peanut over an accelerated aging of 3 years. Time on x-axis is in months (m).

Component/Additive	Amount (relative to pure component)	Example Food and Amount
Sucrose	100%	Table Sugar (100%)
Aspartame	4%	Equal Packet (4%)
Sucralose	1%	Splenda Packet (1%)
Insoluble Fiber	90%	Corn Starch (90%)
Soluble Fiber	1%	Black Beans (10%)---
Food Coloring	1%	Trix Cereal (0.1%)
Saturated Fat	100%	Coconut Oil (92%)
Unsaturated Fat	100%	Olive Oil (86%)
Sodium	2%	Cured ham (1.5%)
Magnesium	1%	Pumpkin seeds (0.5%)
White Vinegar	25%	Traditional vinaigrette (25%)
Citric Acid	1%	Lemon juice (8%)
Gallic Acid	0.1%	Red Wine (0.1%)
Alginate	1%	Restructured meat (1%)
Alginate	0.1%	---
Lecithin	1%	Egg (1%)

SI Table 2. Food components and additives tested in guard band studies. Rightmost column lists an example food with the highest expected amount of substance tested.

Food	0ppm					12.5ppm				
	Sample Avg.	Sample SD	Control Avg.	Control SD	Ratio	Sample Avg.	Sample SD	Control Avg.	Control SD	Ratio
Alfredo Sauce	93.7	5.7	47.5	8.1	-97%	30.3	3.2	29.2	2.8	-4%
Applesauce	109.0	49.6	56.5	26.5	-93%	16.8	2.6	19.5	2.1	14%
Asian Dressing	53.8	18.3	30.0	5.0	-79%	15.2	2.4	17.0	2.3	10%
Blue Cheese Dressing	46.5	7.6	25.9	5.5	-79%	14.8	1.2	17.8	2.1	17%
Fruit punch	93.5	10.7	43.0	5.6	-117%	27.1	2.5	29.6	3.1	9%
Oat cereal	127.6	12.6	52.3	6.5	-144%	32.2	6.5	29.7	6.5	8%
Chicken Gravy	72.1	8.3	38.2	6.4	-89%	22.9	3.3	21.9	3.8	-4%
Coconut Milk	84.7	13.9	40.6	10.3	-109%	23.3	2.7	24.4	3.3	5%
Coffee Creamer	93.9	3.5	38.6	3.6	-143%	21.6	1.2	20.3	1.7	-6%
Flavored tortilla chips	38.1	8.7	20.9	4.9	-83%	21.2	4.6	17.9	4.7	19%
Fruit flavored chewy candy	84.7	4.7	42.6	2.9	-99%	19.6	5.0	24.1	5.7	19%
Fluff	106.6	8.6	55.7	5.7	-91%	22.9	1.9	26.6	2.3	14%
French Dressing	62.0	8.0	27.9	3.4	-123%	17.6	4.3	18.6	5.3	5%
Corn chips	109.5	16.8	54.5	10.2	-101%	31.0	2.0	34.3	1.7	9%
Sweetened cereal A	81.7	14.6	47.5	12.6	-72%	29.6	5.8	30.6	4.2	3%

					-						
					83						16
Frosting	77.3	3.5	42.2	3.4	%	23.8	2.9	28.5	2.7	%	
					-						
Sweetened cereal					91						11
B	70.3	9.9	36.7	4.7	%	21.2	0.3	23.8	1.9	%	
					-						
Electrolyte					12						
beverage	92.9	10.7	41.9	5.3	2%	26.2	2.0	27.6	2.4	5%	
					-						
					71						21
Granola	65.8	20.5	38.6	11.4	%	28.1	3.0	23.2	0.5	%	
					-						
Hoisin Sauce	45.8	12.0	18.7	5.8	5%	17.6	2.6	16.2	3.2	9%	
					-						
					16						
Honey	91.1	14.2	34.7	6.1	3%	23.5	2.7	25.1	4.7	6%	
					-						
Chocolate-					85						11
covered wafer	63.2	20.6	34.1	10.4	%	21.1	4.9	18.9	4.5	%	
					-						
Marshmallow					10						
cereal	73.3	4.5	35.9	4.4	4%	23.5	2.7	22.9	2.1	2%	
					-						
					79						21
Mashed Potatoes	56.6	6.4	31.7	4.9	%	23.6	2.4	19.6	2.5	%	
					-						
					10						
Meringue	93.2	5.1	44.6	4.8	9%	19.4	1.2	21.4	1.5	9%	
					-						
					94						24
Milk Chocolate	65.3	3.8	33.7	2.6	%	27.0	0.2	21.7	1.2	%	
					-						
Mint Chocolate					10						30
Chip Ice Cream	71.0	6.3	34.2	4.8	8%	36.1	7.3	27.8	3.9	%	
					-						
					72						
Muffin	59.3	9.1	34.5	1.7	%	23.6	11.1	25.1	9.3	6%	
					-						
					10						16
Mushroom Soup	67.0	3.8	32.8	3.0	4%	17.3	1.1	20.6	1.8	%	
					-						
					90						11
Nacho Cheese	82.3	6.7	43.2	3.7	%	22.9	1.2	25.7	1.0	%	
					-						
					12						
Olive Oil	83.8	20.3	37.7	9.9	2%	22.7	2.6	24.7	2.0	8%	

					-					-
Caramel					13					37
Chocolate Bar	82.4	5.2	35.7	1.9	1%	35.0	5.8	25.6	7.6	%
					-					
Pasta Sauce	66.8	14.9	33.7	4.8	98	18.1	3.6	18.3	4.0	1%
					%					
					-					
Pear Baby Food	94.7	6.9	38.1	3.7	14	20.5	2.9	20.6	2.9	0%
					9%					
					-					-
Rainbow Sherbet	59.1	6.2	35.4	6.0	67	32.1	5.0	24.8	3.3	29
					%					%
					-					-
Ranch Dressing	40.4	4.1	24.9	4.5	62	25.6	4.5	21.7	4.2	18
					%					%
					-					
Rice	79.5	22.2	43.8	10.4	82	32.4	15.9	36.7	16.0	12
					%					%
					-					
Rice Noodles	110.8	16.5	61.5	7.5	80	27.4	1.2	32.0	1.5	14
					%					%
					-					
Sauerkraut	77.8	8.8	38.8	6.8	10	21.8	2.5	21.7	3.8	0%
					1%					
					-					
Shortbread					15					
Cookie	104.7	3.7	40.6	3.3	8%	20.1	1.3	20.2	1.1	0%
					-					
Sweet Chili Sauce	47.0	7.5	25.9	4.9	81	14.3	1.4	15.9	1.7	10
					%					%
					-					
Tomato Soup	61.8	2.0	34.3	3.6	80	19.4	1.7	21.2	3.1	9%
					%					
					-					
Sweetened					11					-
Cereal C	99.0	5.7	46.2	5.8	4%	33.0	7.4	32.6	5.8	1%
Chocolate-					-					-
covered cookie					12					14
bar	65.6	22.2	29.5	5.4	2%	24.6	8.6	21.5	5.1	%
					-					
Vanilla Blueberry					74					19
Gelato	49.1	2.9	28.2	0.9	%	20.1	8.5	24.9	10.3	%
					-					
Vanilla Crispy					10					
Squares	98.0	10.1	48.2	8.9	3%	28.4	2.0	30.0	0.7	5%
					-					-
Vanilla Ice Cream	73.5	6.8	34.9	4.6	11	29.6	3.0	21.3	2.2	39
					0%					%

					-					
					82					12
Vanilla Wafer	75.0	2.8	41.2	6.8	%	18.7	4.8	21.1	4.2	%
					-					
					93					
White Chocolate	76.6	2.9	39.8	4.9	%	20.2	1.0	21.1	2.4	4%
					-					-
					82					30
Yogurt	46.1	10.0	25.3	4.7	%	20.0	3.8	15.4	2.4	%

SI Table 3. Assay can differentiate between foods with and without peanut protein. Fifty commercially available foods, spiked with 0 ppm or 12.5 ppm peanut protein, were tested with AF647-P1-16 aptamer. At least four replicates were run for all foods. Test and control intensities reported as averaged relative fluorescence units. Ratio reported as normalized difference ($1 - \text{test/control}$). All foods except onion powder with 0 ppm peanut protein show a percent decrease less than -50%, while all foods with 50 ppm peanut flour show a percent decrease greater than -50%.

Food	Sample Avg.	Sample SD	Control Avg.	Control SD	Ratio
Granola Bites	11.6	2.9	13.4	3.7	13%
Nut Clusters	16.1	6.3	17.7	5.4	9%
Chocolate with Peanuts	12.5	7.9	14.8	3.6	15%
PB Sweetened Cereal	18.8	4.9	19.0	5.3	1%
PB Oat Cereal	20.3	5.7	21.4	4.8	6%
PB Chocolate Chip Cookie	15.9	5.4	17.9	1.3	11%
PB Crackers	17.8	5.7	19.4	7.2	8%
PB Granola Bar	13.8	4.5	15.6	2.5	12%
PB Mugcake	12.3	1.3	17.0	1.6	27%
PB Chocolate Sandwich Cookie	10.7	2.3	16.1	1.3	34%
PB Wafer	16.4	3.0	21.1	3.9	22%
PB Snack Cake	9.8	2.3	15.2	2.6	36%
Peanut Butter Dressing	9.5	1.6	12.2	2.2	22%
PB Cup	11.3	2.7	16.8	3.5	33%
Caramel Chocolate with Peanuts	11.7	2.8	13.9	3.1	16%
Thai Peanut Noodles	12.1	6.7	15.6	5.5	22%
PB Protein Bar A	21.3	5.8	27.0	7.6	21%
PB Protein Bar B	23.9	3.1	34.7	4.8	31%
PB Sandwich Cookie	28.9	2.6	35.4	3.3	18%
Peanut Butter Sauce	13.9	6.3	20.1	8.3	31%

SI Table 4. Foods that contain peanut test positive for peanut protein in integrated assay. Twenty commercially available foods that contain peanut were tested with AF647-P1-16 aptamer. At least four replicates were run for all foods. Test and control intensities reported as averaged relative fluorescence units. Ratio reported as normalized difference ($1 - \text{test/control}$).