

# Pesticide Residue On Organic Versus Conventional Produce and the Effect of Simple Washing Techniques

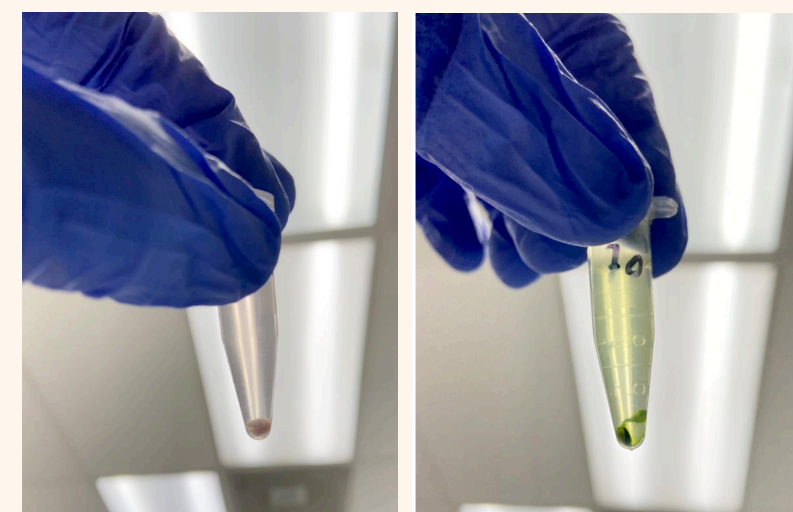
## Materials & Procedures



Preparing the strawberry and spinach samples; one pair of triplicates shown with their respective centrifuge tubes

- 5 grams of organic strawberries and spinach were placed into 6 small containers.
- Both were tested in triplicate.
- All containers were soaked in 10 mL of distilled water for 1 minute.
- The soaked water was then poured into centrifuge tube & stored in refrigerator until shipping.

The photos below were taken by Lance Ford from Attogene Lab



Examples of strawberry and spinach centrifuge tubes at the lab

- 80 test tubes containing controls (distilled water, tap water, and Orthene) and the rinsed residue of organic and conventional strawberries and spinach as described above were sent to the Attogene Lab (Austin, TX) to be tested using ELISA (Enzyme-Linked Immunosorbent Assay).
- ELISA is an immunological assay utilizing antibodies specific for an antigen of interest (in this case, organophosphates).



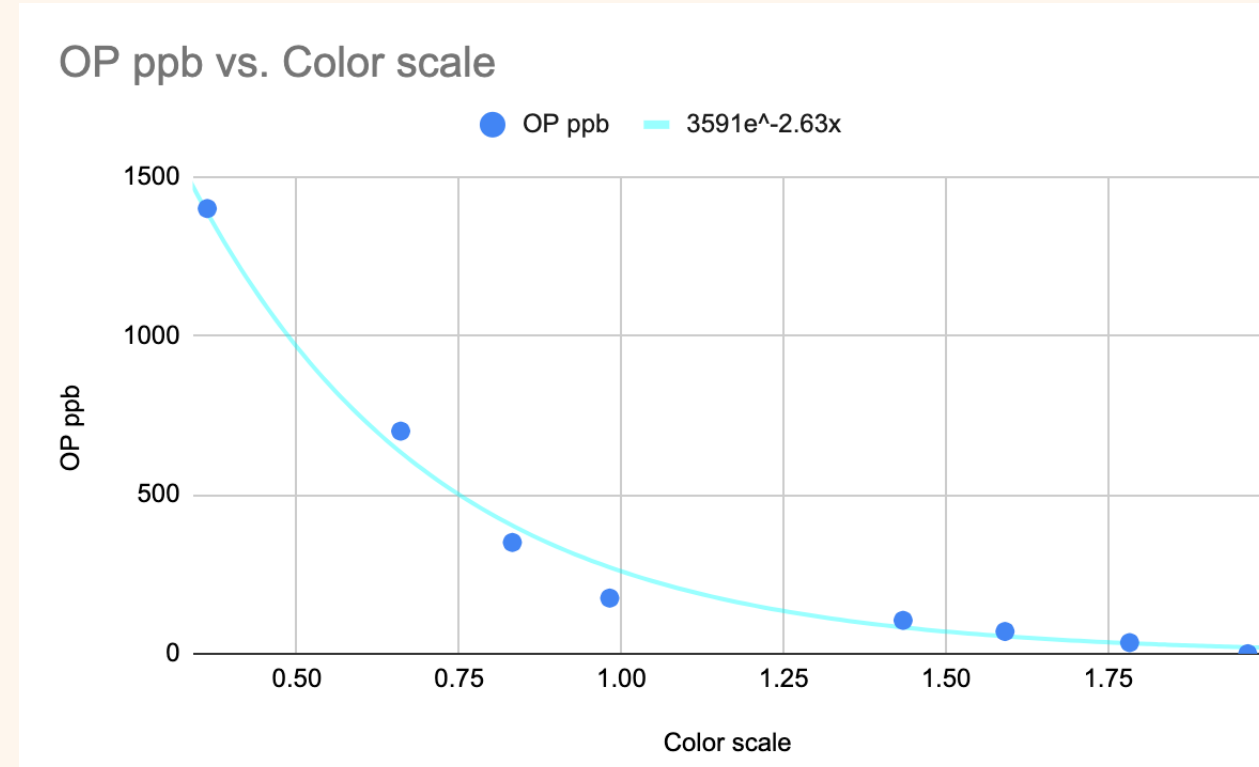
Wells placed in spectrophotometer

Chart of optical densities of all samples

1	2.019	9	1.934	17	2.002	25	2.007	33	2.040	41	1.918	49	1.890	57	1.609	65	1.919	73	1.920
2	1.946	10	1.890	18	1.851	26	1.867	34	1.916	42	1.873	50	1.868	58	1.887	66	1.845	74	1.786
3	1.981	11	1.923	19	1.911	27	1.878	35	1.941	43	1.865	51	1.810	59	1.852	67	1.880	75	1.836
4	1.943	12	1.840	20	1.774	28	1.844	36	1.899	44	1.833	52	1.863	60	1.783	68	1.850	76	1.911
5	1.665	13	1.904	21	1.855	29	1.835	37	1.909	45	1.835	53	1.775	61	1.858	69	1.778	77	1.881
6	1.451	14	2.013	22	1.997	30	1.923	38	1.957	46	1.885	54	1.719	62	1.697	70	1.870	78	1.880
7	2.003	15	1.923	23	1.997	31	1.991	39	1.928	47	1.918	55	1.261	63	1.809	71	1.885	79	1.858
8	2.149	16	2.015	24	2.118	32	2.050	40	1.942	48	1.240	56	1.251	64	2.000	72	2.058	84	1.881

The chart on the right shows the numbered centrifuge tubes (numbers 1–79 and 84). The centrifuge tube numbers are paired with their optical densities above. Note that test tubes 3 and 84 (the Orthene x1 and x10) did not react with the antibody.

Conversion of color scale to parts per billion (ppb) under the equation  $y$  (ppb) =  $359e^{-2.63x}$  (color scale)

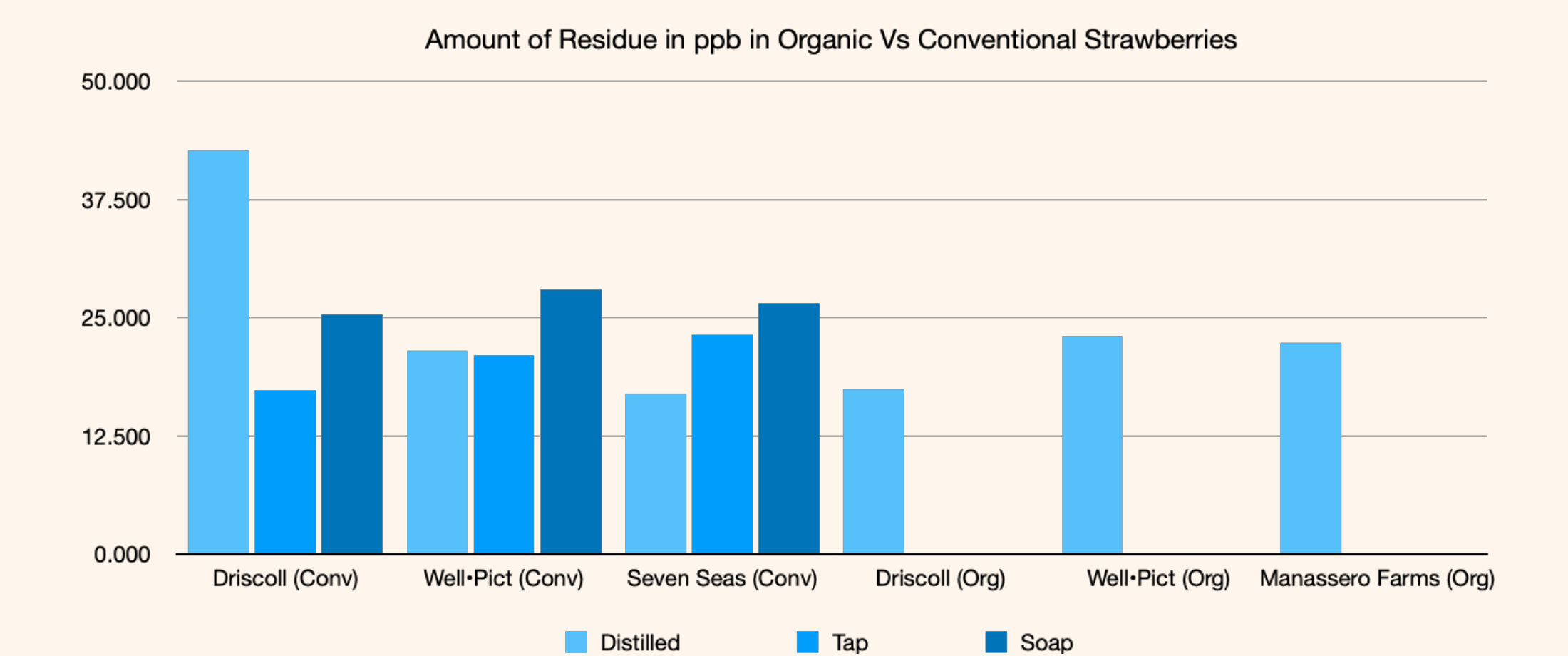


Controls	Distilled Water	Tap Water	Orthene Solutic	Orthene x10	
	1	2	3	84	
<b>Strawberries</b>	<b>Conventional</b>				
	Driscoll	4,5,6	7,8,9	10,11,12	
	Well•Pict	13,14,15	16,17,18	19,20,21	
	Seven Seas	22,23,24	25,26,27	28,29,30	
<b>Organic</b>	Driscoll	31,32,33			
	Well•Pict	34,35,36			
	Manassero Farr	37,38,39			
	<b>Conventional</b>				
	Ocean Mist	40,41,42	43,44,45	46,47,48	
Pacific	49,50,51	52,53,54	55,56,57		
Bonipak	58,59,60	61,62,63	64,65,66		
<b>Organic</b>	Lakeside	67,68,69			
	Cal Organic	70,71,72			
	Organic Farm	73,74,75			
	<b>Orthene Soak</b>	Driscoll Strawberry		76	77
	Lakeside Spinach			78	79

## Results

Amount of Residue in ppb in Organic Vs Conventional Strawberries

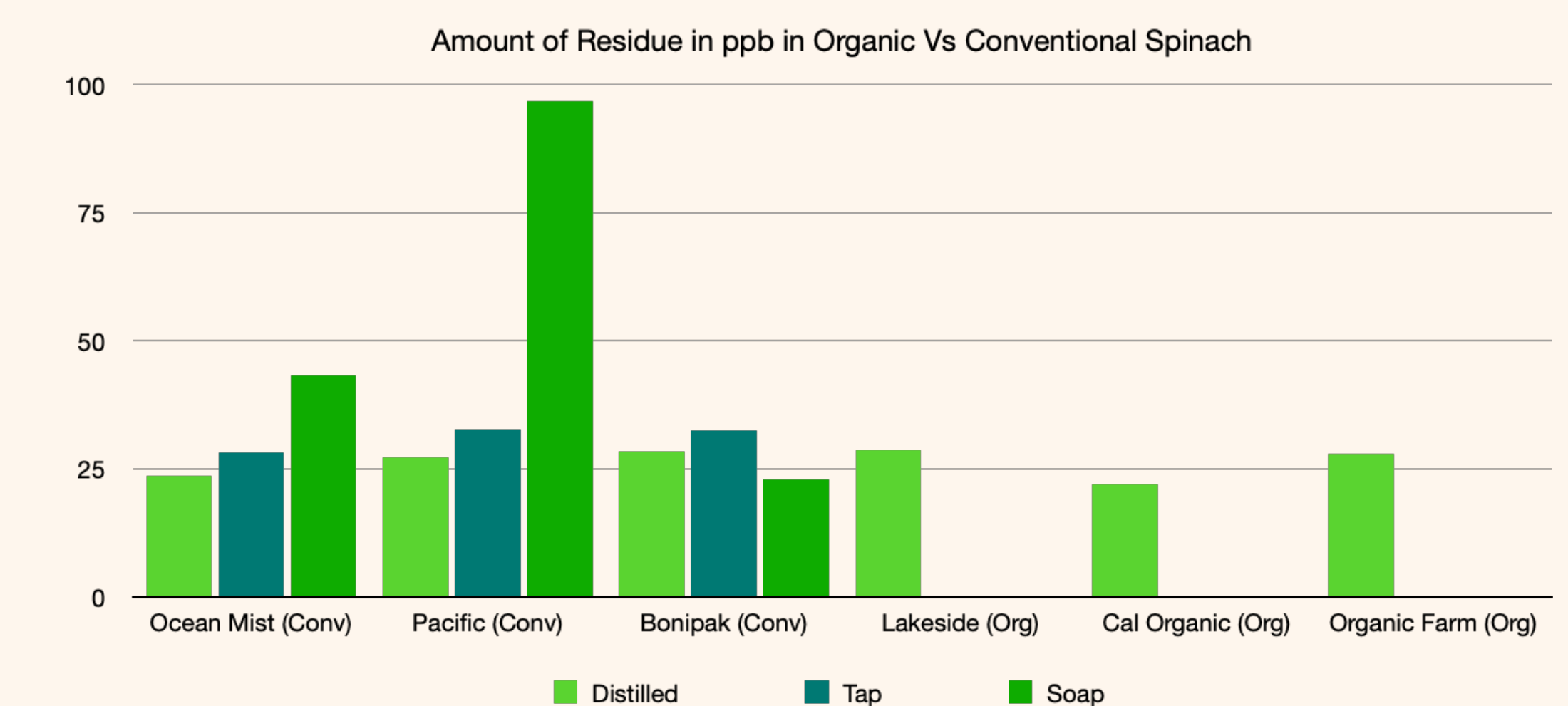
	Distilled	Tap	Soap	
Driscoll (Conv)		42.606	17.286	25.312
Well•Pict (Conv)		21.447	20.945	27.899
Seven Seas (Conv)		16.926	23.208	26.469
Driscoll (Org)		17.377		
Well•Pict (Org)		23.086		
Manassero Farms (Org)		22.369		



- The conventional strawberries showed an overall similar amount of pesticide residue as the organic, except for Driscoll's strawberries.
- Washing the Driscoll's with distilled water decreased these levels by 60%.
- Interestingly, washing with soap seemed to increase the amounts of residue somewhat.

Amount of Residue in ppb in Organic Vs Conventional Spinach

	Distilled	Tap	Soap	
Ocean Mist (Conv)		23.577	28.12	43.17
Pacific (Conv)		27.246	32.753	96.792
Bonipak (Conv)		28.342	32.582	22.965
Lakeside (Org)		28.717		
Cal Organic (Org)		21.961		
Organic Farm (Org)		27.899		



- The conventional spinach also showed an overall similar amount of pesticide residue as the organic.
- Interestingly again, washing with soap seemed to increase the amounts of residue on Ocean Mist and particularly Pacific spinach.