

**SageWay Solutions, LLC**  
**Project 20059**  
**Hand Dishwash Liquids**  
**Plate Count**  
**ASTM D4009-Soil B**

Living Clean (100%, 66%,50%, 33%)  
Grove Collaborative  
Palmolive, Pure+Clear  
Mrs. Meyer's

March 12, 2020

Gregory van Buskirk  
SageWay Solutions, LLC  
65 Panorama Ct  
Danville, CA 94506

Dear Gregory:

You sent us a sample of Hand Dishwash Liquid identified as **Living Clean** for Plate Count Evaluations using ASTM D4009, Soil B. You asked us to evaluate it against **Grove, Palmolive** and **Mrs. Meyer's**. In addition to the full-strength evaluations, you asked us to compare the **Living Clean** sample at **66%, 50% & 33%** concentrations. A summary of our findings is below.

**Living Clean (100%) performed the Best in Plates Washed.**

**Palmolive & Living Clean (66%) are comparable to Living Clean (100%).**

| Sample                 | Plates Washed | % of Best |
|------------------------|---------------|-----------|
| Living Clean 100%      | 10.5          | Best      |
| Palmolive (Pure+Clean) | 10.3          | 98%       |
| Living Clean 66%       | 9.5           | 90%       |
| Grove                  | 8.8           | 83%       |
| Mrs. Meyer's           | 8.5           | 81%       |
| Living Clean 50%       | 7.5           | 71%       |
| Living Clean 33%       | 7.0           | 67%       |
| Sig. Dif.              | 2.9           |           |

Descriptions of the test methods and sample information are attached.

Sincerely,



Tod Losey  
Sterling Laboratories

## Sample Information

### Hand Dishwash Detergent

1. **Living Clean**, Dishwashing Detergent Formula - Free & Clear,  
Production Code: SWS-020720-LDL1, 7 February 2020,  
Sample For Sterling Laboratories,  
Received 2-13-20 from SageWay Solutions
2. **Grove Collaborative**, Gel Dish Soap, Free & Clear, More Than 96% Biobased,  
No Synthetic Fragrances, Dyes Or Triclosan, Ultra Effective For Sparkling Dishes  
Apporx. 2 Refills / 32 fl. oz. (946 mL) Refill Pouch,  
Lot #: 19315B UPC #: 8 1997802073 2  
Received 2-7-20 from Grove Collaborative
3. **Ultra Palmolive, Pure+ Clear**, Dish Liquid, Fragrance Free, Hypoallergenic,  
0% Parabens, Phosphates, Formulated Without Phthalates,  
32.5 fl. oz. (961 mL) Squirt-Top Bottle,  
Lot #: 9348US7804, UPC #: 0 3500097248 4,  
Purchased 2-18-20 Meijer, Toledo, OH
4. **Mrs. Meyer's**, Clean Day, Dish Soap, Lemon Verbena,  
Cuts Grease, Biodegradable,  
16 fl. oz. (473 mL) Squirt-Top Bottle,  
Lot #: W3509803 17 32, UPC #: 8 0812412103 4,  
Purchased 2-18-20 Meijer, Toledo, OH

## Photographs of Samples Hand Dishwash Detergent



**Living Clean**



**Grove**



**Palmolive**



**Mrs. Meyer's**

## TEST METHOD

### Hand Dishwash Detergent

### Plate Count

### ASTM D4009-Soil B

#### Soil "B"

|                                 |         |
|---------------------------------|---------|
| <b>Crisco</b>                   | 480.0g  |
| <b>Oleic Acid</b>               | 20.0g   |
| Heat to 120°F. Mix till uniform |         |
| <b>Flour</b>                    | 500.0g  |
| <b>Total</b>                    | 1000.0g |

#### Procedure

The soil is mixed until uniform and heated to 120°F. Keeping the soil mixing, we applied 6.0 grams of the soil to each of the test plates. The soiled plates were allowed to age overnight at room temperature before the testing is started.

We evaluated the samples using a 0.1% concentration according to the method. (4 grams of sample into 4000 mL of water). We diluted the Living Clean samples (33%,50% & 66%), by weight, with Toledo tap water.

We prepared water of 150-ppm hardness by adding calcium and magnesium chlorides to Deionized water. The water is heated to 120-125°F and put it into a reservoir with a 3/8-inch delivery tip 61cm above the bottom of a dishpan, the dimensions of which were 29.2 x 34.3 x 13.3cm. We took 125-ml of water from the reservoir and divided it into 25-ml portions. Into one portion we dissolved the designated amount of sample (0.01g) into a 50 mL beaker and poured it into the center of the dishpan. We rinsed the beaker into the dishpan with multiple rinses using the remaining water portions. When the water reached 122°F, we drained the contents of the reservoir into the center of the dishpan and generated a layer of foam. The start temperature was 117°F (±2°F)

We placed a dishcloth in the pan along with a soiled dish and washed it as described in Method A of the ASTM method. A dish was washed every 30 seconds until only half the surface was covered with foam. That is the end point. The number of plates washed was then recorded.

We ran two (2) washes with each test detergent and averaged the results and calculated the least statistically significant difference between the results at the 95% level of confidence. Differences of 1.5 plates or less are considered comparable.