

SANIDATE 5.0[®]-BLUEBERRY STUDY

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Objective: Test the efficacy of Sanidate 5.0[®] in controlling mesophilic microorganisms on Blueberries.

Location: Heagan Farms
6800 Blueberry Lane
Manor GA 31550-3332
Owner: Alex Cornelius
Ph: 912-284-0266
Cell: 912-281-4160

Test Date: 07/02/08

Materials and Methods:

The Blueberry processing plant at this location has two dump tanks, each 350-gallon size. Each tank is equipped with pH/ORP control system (Pulse Instruments; Model-PI1001).

Treatments:

Treatment-1: 1:2500 in Tank-1 (18 fl.oz) + 1:400 in Tank-2 (112 fl.oz).

Treatment-2: 1:2500 in Tank-1 (18 fl.oz) + 1:2500 in Tank-2 (18 fl.oz).

PH and ORP measurements:

Sample	pH	ORP
Untreated water	7.2	91
1:400	4.5	420
1:2500	6.3	342

Sample	ORP Differential
1:400	329
1:2500	251

Sampling for microbial analysis:

For each treatment, blueberry samples (~400 g) were collected at four different points as follows:

Treatment 1:

Four samples were collected from this treatment.

1S1- Berries collected before going to 1st Tank (Untreated control) (Fig.1; S-1)

1S2- Berries sampled right after 1st tank, treated with 1:2500 (Fig 1; S-2)

1S3- Berries samples right after 2nd tank, treated with 1:400 (Fig-2; S-3)

1S4- Berries sampled at the end of the line, before packaging. (Fig. 3; S-4)

Treatment 2:

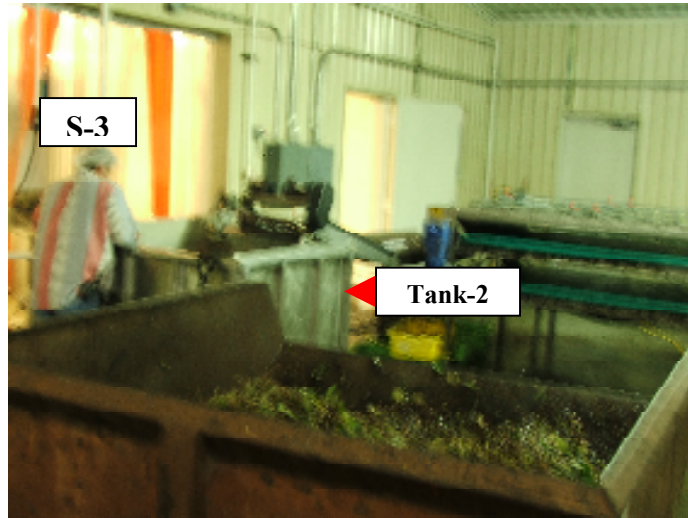
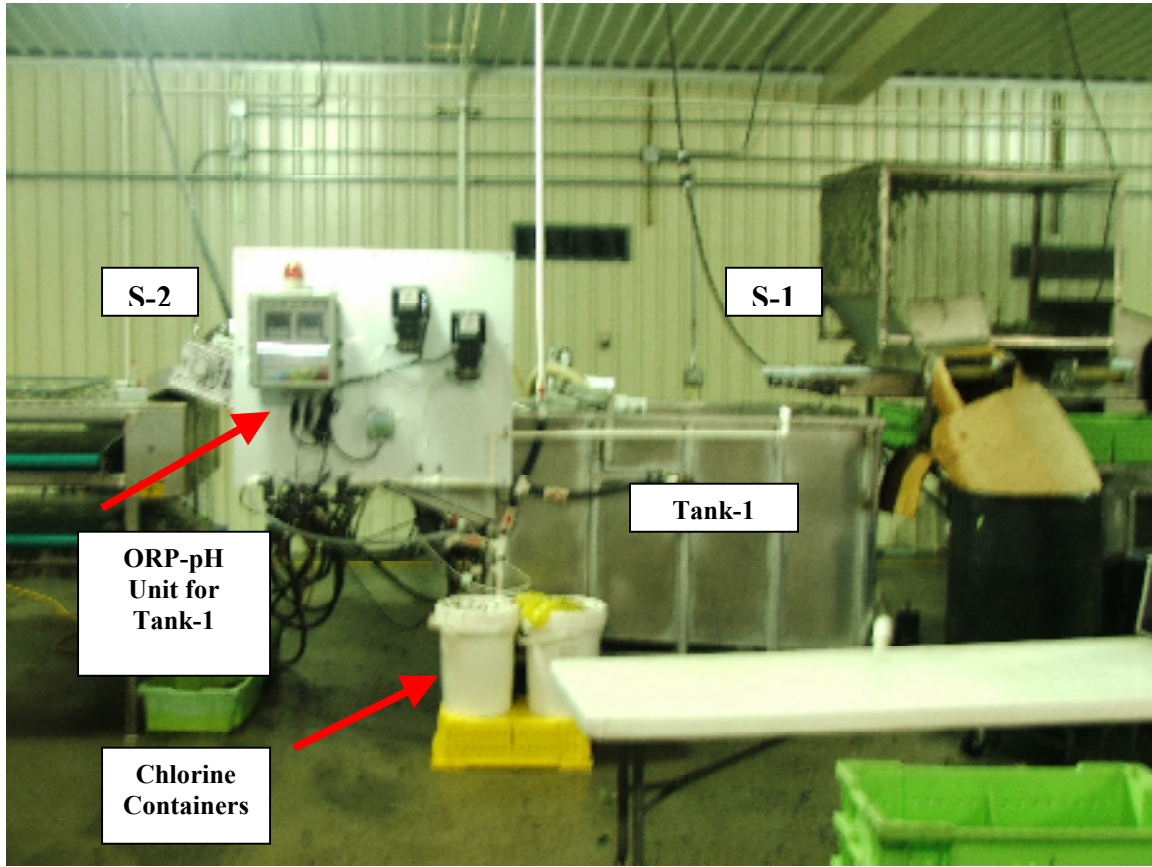
Four samples were collected from this treatment.

2S1- Berries collected before going to 1st Tank (Untreated control) (Fig.1; S-1)

2S2- Berries sampled right after 1st tank, treated with 1:2500 (Fig 1; S-2)

2S3- Berries samples right after 2nd tank, treated with 1:2500 (Fig-2; S-3)

2S4- Berries sampled at the end of the line, before packaging (Fig. 3; S-4)





Microbial Analysis:

Sampled Blueberries (10 g) were placed in a Ziplock bag containing 50 ml of buffered peptone water and homogenized for 2 min. After homogenization, the sample was serially 10-fold diluted with 9 ml sterile buffered peptone water. Total mesophilic microorganisms were enumerated after spread plating 100 µl onto duplicate plates of Standard Methods Agar for total bacteria (SMA: Difco), Sabourad Dextrose Agar for fungi (SDA; Difco) and incubated at 32°C for 48 h or 96 h (For fungi). Xylose Lysine Desoxycholate Agar (XLD: Centurion) was used as selective media for enumeration of enteric pathogens including total coliforms, *Escherchia coli*, *Salmonella* and *Shigella*.

Results:

Tables 1 and 2 shows the populations of mesophilic microorganisms on Blueberry samples. Fig.1 shows the log reductions in total plate counts from two treatments. Fig.2 shows the pictures of plates from treatment-2.

Untreated Blueberries (1S1 and 2S1) had about 50,000 to 150,000 CFU/g of total bacteria before going into dump tanks. After Blueberries passed through Tank 1, which was

treated with 1:2500 Sanidate 5.0 (1S2 and 2S2), total bacterial counts have decreased significantly. There was **almost 3-log reduction** in total bacteria in these samples.

After blueberries passed through Tank-2 which was either treated with either 1:400 or 1:2500 (1S3 and 2S3), **there were zero plate counts**. This treatment has resulted in almost 5-log reduction in total plate counts compared to the untreated control.

At the end of the line after tank-2, near packaging, bacterial counts on blueberry samples (1S4 and 2S4) **appeared to have increased again**, which may be due to handling of blueberries by workers with bare hands and unsterilized air from the blowers.

Conclusion:

Overall, the use of Sanidate 5.0 at 1:400 to 1:2500 rates appeared to be **very effective** in controlling mesophilic microorganisms on Blueberries.

Table 1. Total plate counts for samples collected in Treatment 1.

Sample	Total Bacteria (CFU/g)	Total Bacteria Log ₁₀	Log ₁₀ reduction	Fungi (CFU/g)	Total Coliforms	<i>E. coli</i>	Other enteric pathogens (<i>Salmonella</i> , <i>Shigella</i>)
1S1 (Untreated Control)	5.0 X 10 ⁴	4.7	-	0	0	0	0
1S2	8.8 X 10 ²	2.9	1.8	0	0	0	0
1S3	0	0.0	4.7	0	0	0	0
1S4	3.0 X 10 ³	3.5	1.2	0	0	0	0

Table 2. Total plate counts for samples collected in Treatment 2.

Sample	Total Bacteria (CFU/g)	Total Bacteria Log ₁₀	Log ₁₀ reduction	Fungi (CFU/g)	Total Coliforms	<i>E. coli</i>	Other enteric pathogens (<i>Salmonella Shigella</i>)
2S1 (Untreated Control)	1.5 X 10 ⁵	5.2	-	0	0	0	0
2S2	1.4 X 10 ³	3.1	2.1	0	0	0	0
2S3	0	0.0	5.2	0	0	0	0
2S4	4.0 X 10 ²	2.6	2.6	0	0	0	0

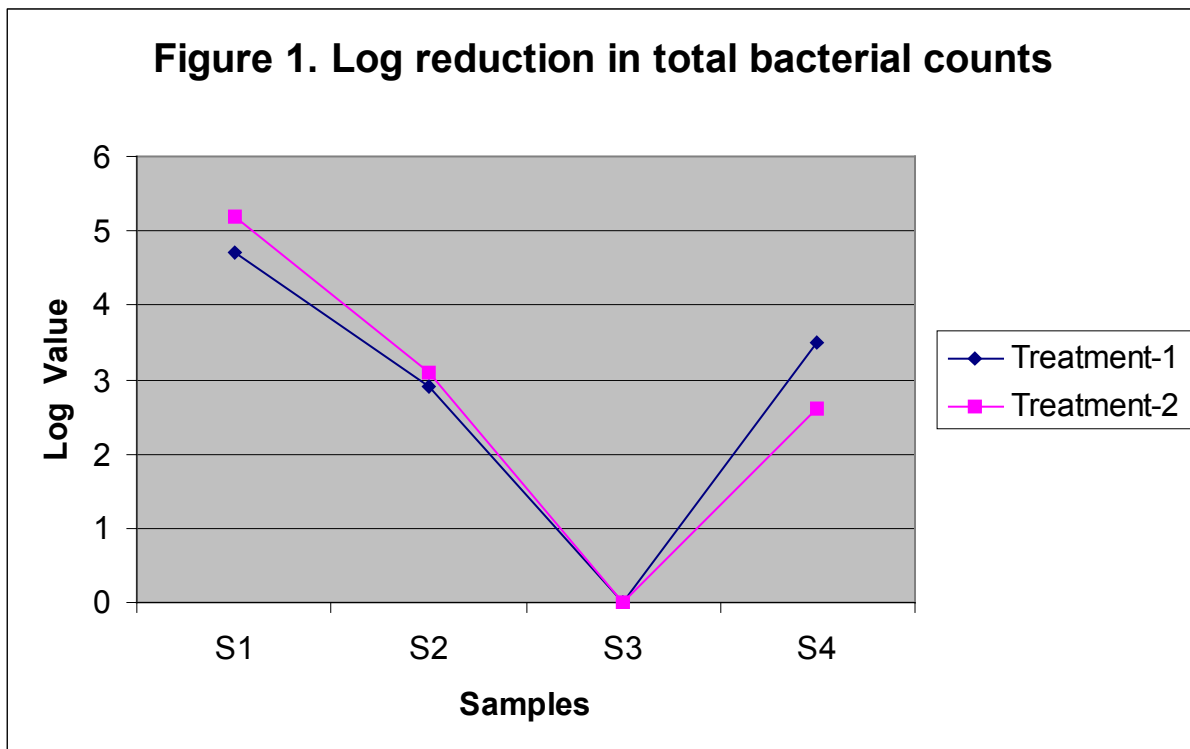


Figure 2: Bacterial plate pictures. (a) Untreated Control (b) 1:2500 in Tank-1 (c) 1:2500 in Tank-2 (Clean Plate) (d) At the end of the line after Tank-2

