

Post-harvest removal of sooty blotch and flyspeck signs from apples using sodium hypochlorite, chlorine dioxide, and soap

Sandra Hernandez, Jean Batzer, and Mark Gleason
Iowa State University

RESULTS

Table 1 describes the analysis of variance for the experiment; results indicate that the efficiency to remove SBFS from Honey Gold apples differed between the six replications of the experiment ($p < 0.0001$) (Table 1). No significant differences in efficiency, were obtained for orchard ($p = 0.1459$), but this orchard effect interacted with the dipping treatments ($p = 0.0358$). The efficiency to remove the fungus depended on the length of brushing ($p < 0.0001$), but it did not interact with either the dipping treatment ($p = 0.9474$) or orchard ($p = 0.6158$).

Table 1. ANOVA: Post-harvest Dipping Solutions Experiment

Source	DF	Pr > F
Replication (R)	5	<0.0001
Orchard (O)	1	0.1459
Dipping Treatment (D)	5	<0.0001
O x D	5	0.0358
Brushing Time (B)	3	<0.0001
O x B	3	0.6158
B x D	15	0.9474
O x B x D	15	0.7981
Error	235	

Effects of four brushing times over SBFS signs on Honey Gold apples

The results in Table 2 indicated that the lower times of brushing, 15 and 30 sec, did not differ significantly in their efficacy to reduce the percent SBFS on apples. Nevertheless, these two times differed from the 60 sec treatments. In addition, increasing brushing time from 30 or 60 sec to 90 sec increased SBFS removal by 13 and 6%, respectively. Generally, increasing brushing time improved the efficiency to remove SBFS from test apples.

Table 2. % Removal by Brushing, Wisconsin and Iowa

Brush Time (sec)	% Removal
15	71 a
30	72 a
60	79 b
90	85 c
<i>LSD (P<0.05)</i>	5

Effect of six dipping treatments over SBFS sings on Honey Gold apples

While KleenUp soap tended to be the most effective treatment at removing SBFS from Bohl's orchard (Wisconsin) apples, no significant differences were observed when this treatment was compared to the other chemical removal treatments for SBFS (Table 3). This tendency was also observed in the Wilson's orchard (Iowa) apples, with the exception that the KleenUp soap was different from the 200 ppm NaOCl treatment (Table 4).

Table.3. Percentage removal of SBFS by dipping treatments: Wisconsin-Bohl's Orchard

Dipping Treatment	% Removal
Soap	86 a
5 ppm ClO ₂	82 a
1 ppm ClO ₂	79 a
500 ppm NaOCl	79 a
200 ppm NaOCl	82 a
No Dip	58 b
<i>LSD (P<0.05)</i>	11

Table 4. percentage Removal of SBFS by Dipping Treatments: Iowa-Wilson's Orchard

Dipping Treatment	% Removal
Soap	85 a
5 ppm ClO ₂	82 ab
1 ppm ClO ₂	78 ab
500 ppm NaOCl	78 ab
200 ppm NaOCl	72 b
No Dip	61 c
<i>LSD (P<0.05)</i>	11

In general, KleenUp soap and 5 ppm ClO₂ were most effective, regardless of brushing time. The most effective treatment was KleenUp soap followed by 90 seconds of brushing (93% removal).