

Effects of Buffering on Ethephon for Pear Fruit Maturation

R. A. Van Steenwyk

Dept. E.S.P.M.
University of California
Berkeley, CA 94720

Methods - Ethephon Treatment

- ◆ Four treatments of 4 pt ethephon/ac in pH of 2.6 (unbuffered), 4.6, 6.9 and untreated check were replicated 4 times in RCB.
- ◆ Treatments buffered using NaHCO_3

Methods - Ethephon Treatment

- ◆ Applied post-harvest (Aug 13) using hand-held orchard sprayer delivering 150 gal/acre.
- ◆ Each replicate was an individual tree with at least one buffer tree between treatments.

Methods - Fruit Maturity

- ◆ Color and pressure was determined on 10 normal and 10 rattail fruit before application.
- ◆ Color and pressure was determined on 10 normal and 5 rattail fruit per replicate weekly for 4 weeks after application.

Methods - Fruit Maturity

- ◆ Fruit drop determined by flagging 10 normal and 5 rattail fruit before application and then counting dropped flagged fruit for 4 weeks.

Results - Normal Fruit Pressure

- ◆ 11.5 kg/cm² before application
- ◆ One week after application:
little change

Results- Normal Fruit Pressure

- ◆ Two weeks after application: significant reduction for pH 2.6 and 4.6 compared to untreated check.
- ◆ Three and four weeks after application: no statistical difference from untreated.

Mean Pressure of Normal Fruit

Treatment	Mean ^a pressure (kg/cm ²)			
	8/20/08	8/28/08	9/5/08	9/12/08
1. Ethephon pH 2.6 (unbuffered)	9.8 a	5.0 a	6.1 ab	4.8 a
2. Ethephon pH 4.6	9.7 a	4.6 a	4.6 a	3.6 a
3. Ethephon pH 6.9	11.2 a	6.8 ab	7.7 b	5.3 a
4. Untreated	11.9 a	8.8 b	6.4 ab	6.3 a

^a Means followed by the same letter within a column and fruit type are not significantly different (Fisher's protected LSD, $P \leq 0.05$).

Results - Rattail Pressure

- ◆ 16.0 kg/cm² before application
- ◆ One week after: no significant change.
- ◆ Two and three weeks after: significant decrease for pH 2.6 compared to untreated.

Mean Pressure of Rattail Fruit

Treatment	Mean ^a pressure (kg/cm ²)			
	8/20/08	8/28/08	9/5/08	9/12/08
1. Ethephon pH 2.6 (unbuffered)	13.3 a	4.4 a	3.9 a	2.0 a
2. Ethephon pH 4.6	13.7 a	8.0 ab	4.4 ab	1.3 a
3. Ethephon pH 6.9	14.0 a	10.5 ab	5.5 ab	3.8 a
4. Untreated	16.6 a	14.1 b	10.1 b	10.5 b

^a Means followed by the same letter within a column and fruit type are not significantly different (Fisher's protected LSD, $P \leq 0.05$).

Results - Normal Fruit Drop

- ◆ One week: significant drop in pH 4.6 compared to untreated.
- ◆ Two, three and four weeks: significant drop in the pH 2.6 and 4.6 compared to untreated.
- ◆ No significant drop in the pH 6.9 compared to untreated.

Mean Percent Dropped Normal Fruit

Treatment	Mean ^a percent drop			
	8/20/08	8/28/08	9/5/08	9/12/08
1. Ethephon pH 2.6 (unbuffered)	10 ab	47 bc	70 bc	78 bc
2. Ethephon pH 4.6	16 b	59 c	86 c	90 c
3. Ethephon pH 6.9	10 ab	30 ab	54 ab	68 ab
4. Untreated	3 a	19 a	43 a	54 a

^a Means followed by the same letter within a column and fruit type are not significantly different (Fisher's protected LSD, $P \leq 0.05$).

Results - Rattail Fruit Drop

- ◆ Only significant drop was four weeks after application in pH 4.6 and 6.9 compared to untreated.
- ◆ Ethephon, regardless of pH, had minor impact on rattail fruit drop.

Mean Percent Dropped Rattail Fruit

Treatment	Mean ^a percent drop			
	8/20/08	8/28/08	9/5/08	9/12/08
1. Ethephon pH 2.6 (unbuffered)	0 a	4 a	4 a	4 a
2. Ethephon pH 4.6	0 a	0 a	12 a	20 b
3. Ethephon pH 6.9	0 a	0 a	20 a	28 b
4. Untreated	4 a	4 a	4 a	4 a

^a Means followed by the same letter within a column and fruit type are not significantly different (Fisher's protected LSD, $P \leq 0.05$).

Conclusions

- ◆ Buffered solutions at pH of 7 should not use Ethephon.
- ◆ Ethephon is most effective at pH of 4.6 or less.