

# cherries: a little bruising doesn't have to hurt

by R. T. WHITTENBERGER,  
Eastern Utilization Research and De-  
velopment Division, ARS, USDA,  
J. H. LEVIN and M. F. GASTON,  
Agricultural Engineering Research Di-  
vision, ARS, USDA at Michigan  
State University

Foremost in the thoughts of processors who must pack machine-harvested fruit is the question of bruising. How does harvest bruising, and the delay period between harvesting and processing, affect processed quality and yield? In the case of tart cherries, excessive bruising and long delay periods cause serious losses.

Mechanization of the sweet cherry harvest in Michigan is proceeding rapidly. From a beginning of about one percent in 1966, the proportion of the crop harvested by machine increased to ten percent in 1968. The trend to mechanization is certain to continue.

In 1968 our research group took a close look at the bruising of Schmidt cherries, the chief variety among the 25 percent of Michigan sweet cherries canned in syrup. Cherries were bruised to various degrees, stored and heat processed, and changes in the properties that mean profit or loss to processors were measured.

## Loss in Weight

After harvest, Schmidt cherries stored in lugs lose weight. The rate of loss, which is a matter of prime importance to buyers and sellers, depends partly on the degree of bruising (Table 1).

Severely bruised cherries (dropped

6 times from 3 feet) lost 3.1 percent of their weight, which was 55 percent more weight than unbruised fruit lost during storage for 25 hours at prevailing temperatures (avg. 72°F.). Thus, a grower who harvests and handles cherries in a rough manner can expect to be penalized when the fruit is weighed in at a cannery. Significant shrinkage (2.0 percent) occurred also in unbruised fruit that was held for a relatively long time (25 hours).

## Bruising and Drained Weight

Tests showed that Schmidt cherries are relatively resistant to bruise damage (Table 2).

Severe bruising (6X), plus delays of 10 to 12 hours at warm temperatures that would be most harmful to red tart cherries or to Windsor and Napoleon sweet cherries, caused no significant lowering of drained weight (expressed as percent of original orchard weight). Moderate bruising (3X), or bruising roughly equivalent to that produced by mechanical harvest, gave slight, although not significant, increases. However, when severely bruised fruit was held for a relatively long time at 72°F., deterioration began. Drained weight dropped from 82.9 percent for the 6-hour delay

Table 1

Effect of bruising on shrinkage of fresh Schmidt cherries held in lugs

Bruise level (no. of drops)	Percent Loss in weight* (25 hrs. at 72°F)
0 (no bruise)	2.0
3 (medium bruise)	2.3
6 (severe bruise)	3.1

\*Difference required for significance (5% level) is 0.4%

Table 2

Effect of bruising and delay on drained weight of canned Schmidt cherries

Delay after harvest, hrs. at 72°F	Percent drained weight *for Bruise level (no. of drops)		
	0	3	6
0	79.6	80.9	80.4
6	80.4	81.8	82.9
25	80.2	80.0	79.6
Average	80.1	81.1	81.0

\*Difference required for significance is 1.4%

to 79.6 percent for the 25-hour delay.

It should be made clear that results apply specifically to cherries bruised at harvest time and held at warm (72°F.) temperatures (common commercial practice). The effects of repeated bruising such as would occur during rehandling of fruit, or of storing at cool temperatures, were not determined. On occasion, some processors have successfully stored Schmidt cherries (without rehandling) at about 38°F. for several days prior to processing.

#### Bruising and Quality

Processed cherries were graded independently by three USDA inspectors. In no case was bruising responsible for down-grading.

Both bruised and unbruised lots were similar in texture, color, and skin markings, and received similar grade scores. There was a slight tendency for the most bruised and longest-stored samples to be somewhat darker than other samples.

#### Holding Period and Yield

The length of the holding period affected both pitted yield of fresh cherries and drained weight of cooked cherries.

The data of Table 3 are averages

**Table 3**

Effect of delay after harvest on pitted yield and drained weight<sup>1</sup>

Delay after harvest, hrs. at 72°F.	Percent yield, fresh pitted <sup>2</sup>	Percent drained wt., cooked <sup>3</sup>
0	84.5	80.3
2	84.8	81.7
6	84.1	81.7
25	82.8	80.1

<sup>1</sup> Both bruised (16 samples) and unbruised (8 samples) were used in these tests.

<sup>2</sup> Difference required for significance is 0.9%.

<sup>3</sup> Difference required for significance is 1.1%.

obtained from both bruised and unbruised samples that were held at about 72°F. for varying periods. Pitted yield was relatively high at 0, 2, and 6 hours after harvest and relatively low at 25 hours. In contrast, the drained weight of cherries cooked immediately after harvest was low. A low value was obtained also with samples held for 25 hours. Grade scores of the various samples were not affected significantly by length of the holding periods.

The data indicate that the length of the holding period should depend partly on the intended use of cherries. If cherries are to be hot-packed, they should be held for at least 2 hours after harvest before being pitted. If they are to be frozen, a 2-hour holding period would not be necessary. For both hot and cold packs, maximum yields should be obtained with a holding period of 12 to 15 hours. A holding period of 25 hours was too long when the holding temperature was warm.

#### Maturity and Drained Weight

In commercial practice Schmidt cherries normally are picked before the tart cherry harvest begins. It is widely believed that permitting the cherries to remain on the tree for a week

longer than normal would result in deterioration of quality and processed yield.

Tests were conducted on Schmidt cherries harvested and processed on July 24 and on July 30. The latter date was about one week past the close of the normal harvest period. No cracking of cherries on the tree occurred. Tests showed (Table 4) that harvesting on July 30 instead of July 24 had several advantages: (1) both fresh-pitted yield and drained weight increased slightly; (2) quality improved slightly, since cherries were darker, and minor skin blemishes were not visible; and (3) the grower obtained an increase of 11 percent in tonnage of fruit.

#### Summary and Conclusions

1. Schmidt cherries resist bruising and are well suited for mechanical harvest.

2. Moderate to severe bruising caused no losses in quality, pitted yield, or drained weight, providing cherries were not held for a relatively long time (25 hours) at a warm temperature (72°F.) before processing.

3. Data indicate that the cherries should be processed within 12 to 15 hours after harvest for maximum drained weight.

4. Bruising increased (from 2.0 to 3.1 percent) the rate of weight loss of fresh cherries held in lugs at prevailing temperatures.

5. Cherries harvested about one week after normal harvest gave high processed quality and yield. Tonnage of fruit increased by 11 percent.

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**Table 4**

Effect of delaying the harvest on processed quality and yield of Schmidt cherries

Factor	Date of harvest	
	July 24	July 30
Percent fresh pitted yield <sup>1</sup>	83.4	84.6
Percent drained weight (cooked) <sup>2</sup>	80.7	81.3
Grade	A	A

<sup>1</sup> Difference required for significance is 0.9%.

<sup>2</sup> Difference required for significance is 0.8%.