

SUTTER HARVEST PARAMETERS AND DRYING TRIAL 2008

C.J. DeBuse, S.J. Bradley, S. Rasmussen, and T.M. DeJong

INTRODUCTION

The new prune variety Sutter is in its early years of commercial planting. After Sutter's release in 2000, orchards were planted throughout the prune growing areas of California effectively improving our experience with how the variety performs. The variety has several positive attributes. First, Sutter is a high sugar prune averaging 2 ° Brix higher than French grown at the same location. In addition, Sutter harvests 7-10 days earlier than French allowing growers to spread their harvest. Presently, the oldest orchards will be in their 5th or 6th leaf and just starting to come into full bearing.

Growers have been harvesting Sutter using the same harvest parameters as French, starting harvest when the average fruit internal flesh pressure is 3-4 PSI. In 2006 and 2007, we saw that French harvest parameters do not work for Sutter. Sutter harvested at this pressure was found to slab and bleed on the drying trays making it hard to clean the trays and rendering the final product unsuitable. This is not acceptable and to learn more about Sutter's harvest parameters and correct drying temperature we carried out a trial this year in cooperation with Sunsweet. Our goals were to evaluate different harvesting parameters and drying protocols with the final result being a recommendation for the industry in the harvesting and handling of Sutter.

The trial was separated into two parts to evaluate the two elements in the process that could have led to broken skins and juice running out of fruit during drying. The two issues were internal flesh pressure at harvest or harvest timing and the maximum temperature at the beginning of the drier and duration of drying. The first issue was intuitive. If the fruit was soft at harvest, it was more likely to break open during the shaking and the drying. The goal was to work out what the best flesh pressure to harvest at was that would optimize sugar content while the fruit remained intact throughout the drying process. The second issue was to determine the optimum drying temperature and duration. In the past, a cultivar named Sugar was commonly dried at lower temperature so that the soft skin would not break. This was the idea behind lowering the temperature for drying Sutter.

METHODS AND MATERIALS

The harvest parameter trial included two harvests timings at different internal flesh pressures, 5-6 PSI and 3-4 PSI. The fruit was dried and samples were submitted to DFA for sample analysis to assess dried quality and defects. Data were recorded for internal flesh pressure, soluble solids, and fresh weight. After drying, dried fruit weight and size were recorded for each sample and the ratio between fresh and dry weight was calculated (drying ratio).

Two drying temperature tests were done at two locations; Winters Sunsweet Drier and Marysville Sunsweet Drier. The Winters drier divided a Sutter load into two and ran one half at

175°F for a total of 21 hours and the other half at the normal temperature of 185°F for a total of 18 ¾ hours. The Marysville drier did a similar test; running one drier at 175°F for a total of 19 ¾ hours and another run at the normal temperature and duration. The quality of fruit was evaluated by the Sunsweet drier manager and a sample was sent to DFA to grade defects.

RESULTS AND DISCUSSION

The harvest problems seen in Sutter in 2007 were not repeated in any of the harvesting and drying tests. There was only a small percentage of the fruit harvested this year that looked to be extremely soft and juicy. The visual evaluation by the Sunsweet personnel concluded that the higher pressure fruit (above 5 PSI) resulted in superior dried fruit compared to the fruit harvested at the lower pressures (3-4 PSI). The DFA evaluation showed that the weighted averages of the off grade percentage and the actual scorable off grade are not remarkably different between the two groups (Table 1). The average sugars of both groups were also comparable with the lower pressure group averaging at 26.4°Brix and the higher pressure group averaging 25.1°Brix. The lowest pressure group has the highest sugar at 29.0°Brix but with some slabbing and skin breaks in it and the increased stickiness throughout the bin brought the actual quality down. Though the average off grade percentage was not large and was near or below the allowable off grade of 8% for both pressure groups in this trial, the visual inspections indicated that at higher flesh pressures the overall quality of Sutter improved. The current recommendation by the UC Dried Plum/Prune Cultivar Development Program and Sunsweet Growers Inc. is to harvest Sutter with an internal flesh pressure between 5-7 PSI and avoid dropping below 4 PSI.

The results of the second part of the test where fruit was dried with the different drying temperatures and run times are shown in Table 2. The difference of the percentage of off grade between the two temperatures was not large enough to recommend lowering the drying temperatures for Sutter. The length of time was adequate in both cases. The conclusion of this part of the test was that Sutter can be dried at the regular drying temperature and time duration that was commercially used for Improved French when Sutter is harvested with a flesh pressure above 5 PSI. The test did not include fruit harvested at lower pressures (3-4 PSI) but with the previous test showing that higher flesh pressures were desirable for Sutter prune this may not need to be investigated further.

Table 1. The harvest and drying data for the Sutter from 5 orchards and the percent of off grade prunes evaluated in each sample shown as a weighted average for combined screen size and as actual scorable off grade percent. Allowable off grade for Sunsweet is 8%.

Sutter harvest trial 2008

Drying Location	Orchard	Year planted	PSI group	Average delivered pressure	Ave Brix	Drying Ratio	Weighted Average Off Grade %	Actual Scorable Off Grade %
Marysville	5	2002	3-4 PSI	3.60	29.0	3.16	3.14%	0
Marysville	3	2004	3-4 PSI	4.33	24.3	3.03	5.03%	2.17%
Marysville	2	2002	3-4 PSI	4.50	26.0	2.98	4.48%	0
Average				4.14	26.4	3.06	4.22%	0.72%
Marysville	1	2001/2002	5-6 PSI	5.70	23.7	3.13	4.74%	0
Winters	4	2002	5-6 PSI	5.72	23.5	3.33	5.97%	0.87%
Marysville	5	2002	5-6 PSI	5.86	26.3	3.16	4.05%	0
Average				5.76	24.5	3.20	4.92%	0.29%

Table 2. The drying data and the off grade results of the test drying of Sutter prune at two different temperatures (175°F and 185°F) with extended drying times at the lower temperature.

Dryer temperature and duration trial

Drying location	Starting Temp. (°F)	Pull time (min)	Total hours	Drying ratio	Average delivered pressure	Average Brix	Average Total Off Grade %
Winters	175	140	21.00	2.95	6.2	24.0	4.00
Marysville	175	135	19.45	3.00	5.4	25.0	5.60
Average				2.98	5.8	24.5	4.80
Winters	185	125	18.75	2.89	5.3	23.1	5.67
Marysville	185	125	18.75	2.54	5.3	25.9	6.75
Average				2.72	5.3	24.5	6.21