Almond Board of California
Annual Report
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Project No.: **Almond Blanchability Study**

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Problem and its Significance:
The last comprehensive study looking at the blanchability of the almond varieties commonly in use was done in 1985. A number of new varieties have been commonly planted since the previous study was conducted and there is a need for a new study that compares their blanchability characteristics. This study serves the purpose of determining the suitability of the various almond varieties for use as blanched products.

Objectives

1. Compare the blanchability of approximately 20 established and new almond varieties under standardized conditions.

2. Summarize and analyze data and publish and otherwise disseminate this information as appropriate.

Plans and Procedures:

Approximately 20 standard and new varieties were studied for their blanchability characteristics. The previous work on blanchability, done in 1985 by the UC Davis Department of Pomology, was used as a reference to develop procedures to assess blanchability under standardized conditions. This includes standard water temperatures and dwell times and a constant sample weight of almonds. Since the energy costs for blanching increase with increasing water temperature and with increasing blanching times, a variety of blanching times and two temperatures were used in the present study.

All almonds were at a moisture content of 4.5 to 5.5 percent at the time of blanching. Tests were performed at water temperatures of 185°F and 207°F for durations of 1, 3 and 5 minutes. These temperatures were chosen because they are in the range of temperatures used in commercial blanching operations. Initially, separate replicates

were run for the Sacramento and San Joaquin Valleys but due to lack of differences between sites, data from both sites were pooled.

All almonds were first hand sorted to assure that all nuts in the blanching sample were true to variety. Then water temperature in a stainless steel container was brought to the correct temperature for the test by heating on an electric hot plate. Water temperature was monitored with a digital thermometer placed in the water. Data collected included moisture content of nuts at initiation of blanching, nut count, nut weight, percentage doubles, percentage mosaics, number of splits, weight of splits, blanching percentage, blanching weight, and attached skin percentage.

Varieties in the test include Aldrich, Butte, Carmel, Fritz, Le Grand, Mission, Monterey, Neplus, Nonpareil, Padre, Peerless, Price, Sauret, Savana, Sonora, Ruby, and Wood Colony. In addition, a separate test was done for Avalon (Burchell Nursery) and Winters (selection 13-1).

Results

Whole blanching percentage for 1 minute immersion at 207°F ranged from 56% for Mission to 96% for Nonpareil (Fig. 1). Nonpareil, Savana, Sonora, Sauret, Peerless and Price all had whole blanching percentages above 90% in this test. The percentage splits was under 10% for all varieties and there was a tendency for higher split percentages in varieties with lower blanching percentages (Fig. 1)

For 3 minutes immersion at 207°F, blanching percentages went up with 15 varieties having whole blanching percentages above 90% (Fig. 2). Only Mission (85.5%), Fritz (85.2%) and Le Grand (75.9%) were below 90% blanching percentage for this test. With the increase in time from 1 to 3 minutes, split percentage generally increased for all varieties and the increase was particularly strong in those varieties with low blanching percentages (Fig. 2).

Results were similar for blanching for 5 minutes at 207°F with 13 varieties having whole blanching percentages above 90% (Fig. 3). In this test, Padre (89.3%), Mission (88.5%), Le Grand (87.2%), Neplus (86.6%) and Fritz (83.6%) had whole blanching percentages below 90%. Of those blanching below 90%, 3 of the 4 were also low percentage blanchers for 3 minutes at 207°F. Neplus was an exception in that it went from 97.2% blanching at 3 minutes at 207°F to 86.6% blanching for 5 minutes at 207°F. The split percentage tended to increase again with the increase in dwell time.

Since the cost of blanching varies directly with the temperature of blanching, tests were also done for 3 minutes at 185°F to see if costs could be reduced (Fig. 4). Most varieties blanched well in this test with only Padre (89.7%), Mission (89.6%), Fritz (89.3% and Le Grand (84.7%) blanching below 90%. Another advantage of the lower temperature was that split percentage tended to be lower as well (Fig. 4).

Avalon (Burchell Nursery) and Winters (selection 13-1) were blanched at 207°F for 3 minutes after the main part of this project was completed. The blanching percentage for Avalon was 98.7% and for Winters it was 99.4%.

Most varieties tended to blanch well in this test. The percentage of splits tended to increase with increasing temperature. In general, varieties that had lower blanching percentages had higher split percentages. Mission, Fritz and Le Grand did not blanch above 90% at any temperature, and tended to have high split percentages suggesting they may not be ideal varieties for blanching. Since many varieties blanched nearly as well at 185°F as at 207°F (with lower split percentages), it would be worthwhile for processors to test their desired varieties at lower temperatures to see if blanching could be accomplished with lower energy costs without compromising blanchability. Temperature of blanching might also influence appearance although this was not looked at in the present study.

Figure 1. Blanchability for immersion at 207°F for 1 minutes. Data is sorted by whole blanching percentage.

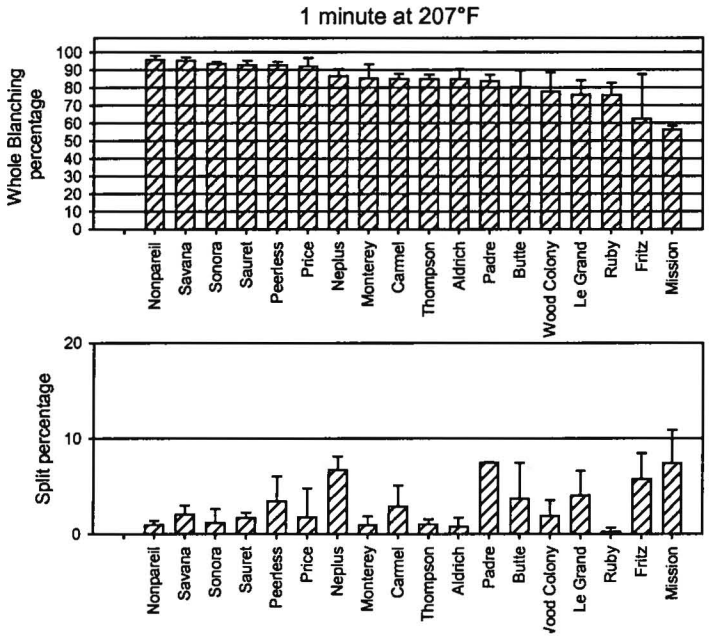

Figure 2. Blanchability for immersion at 207°F for 3 minutes. Data is sorted by whole blanching percentage.

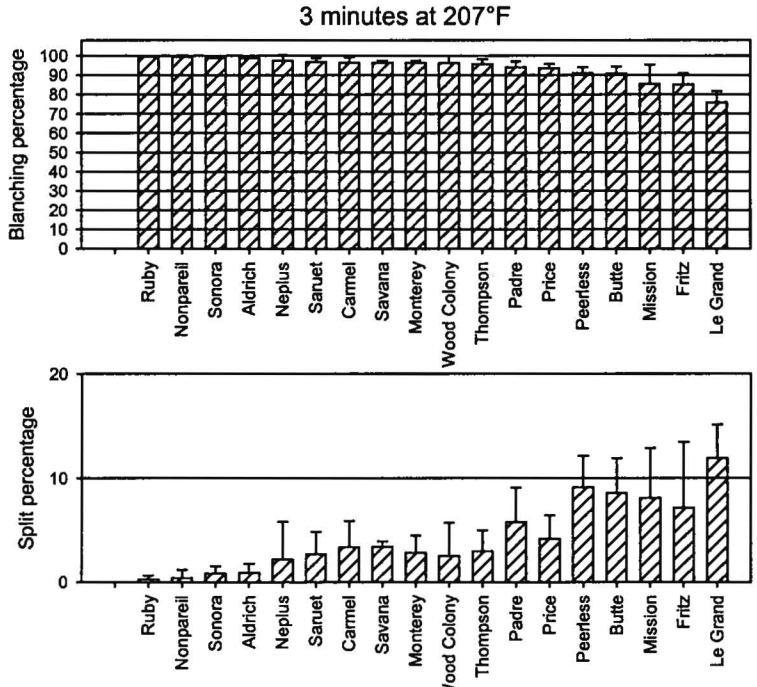

Figure 3. Blanchability for immersion at 207°F for 5 minutes. Data is sorted by whole blanching percentage

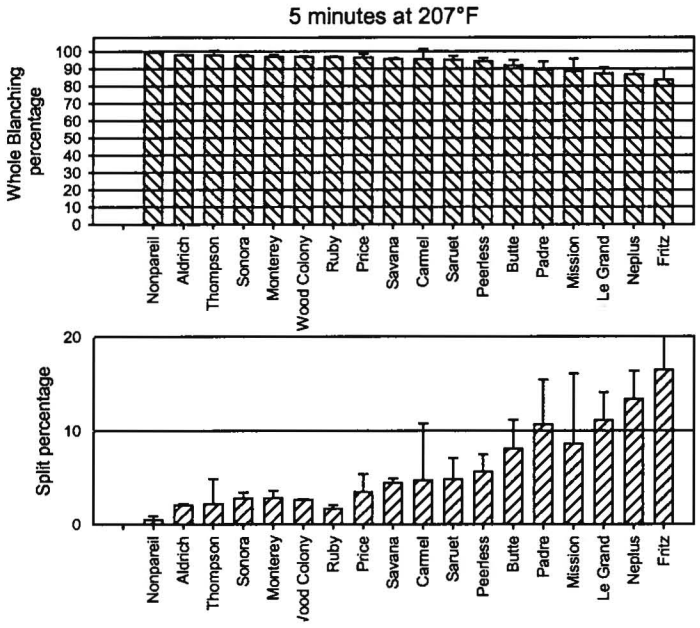

Figure 4. Blanchability test for immersion at 185°F for 3 minutes. Data is sorted by whole blanching percentage.