'Pocahontas' has special significance for long-term cold storage of plants of other cultivars that do not keep well in storage. Since no substantial differences in effectiveness were detected among times of treatment of plants stored at 1°C, this allows the grower at least 4-6 weeks latitude during which fungicide applications may be made. Fall application can be late enough to cover the last developing runner plants, but not so late that it is applied after plants become dormant.

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Quality of Canned 'Babygold 7' Peaches as Affected by Maturity and Processing Time[1]

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Abstract. **Heat penetration data showed that a 3 minute process at 104°C (220°F) with an FMC Steriotort reel speed of 5 rev/min was an adequate process for a high acid food product with an average pH of 3.9. Shear force, succulometer values, and Hunter "b" values were significantly related to maturity, but not to processing time.**

Process time can be varied to produce a canned immature, medium-ripe, and ripe 'Babygold 7' peach [*Prunus persica* (L.) Batsch] with characteristics similiar to a commercial product. The most acceptable process for the immature, medium-ripe, and ripe fruit was 7, 9, and 5 minutes, respectively at 104°C with a reel speed of 5 rev/min in the Steriotort. Panelists preferred the ripe and medium-ripe fruit.

Most of the peaches produced in the Eastern United States are freestone. However, several studies in recent years have pointed to increasing interest in the Southeast (1, 2) in the production of clingstone peaches for processing. The purpose of this study was to evaluate 'Babygold 7' peaches for canning.

Processing methods. 'Babygold 7' peaches were mechanically harvested in South Carolina and taken to the U.S.D.A. Research Center in Athens, Georgia. The peaches were separated into immature, medium-ripe, and ripe lots using the FMC Spectrasort (a peach color sorter). The 3 maturity categories were based on the differences in optical densities (OD) between 700 and 730 nm measured with an Internal Quality Analyzer designed by Neotec Corporation: immature = OD > 0.8, medium ripe = OD from 0.4 - 0.8, and ripe = OD < 0.4. A small no. of fruits were first checked on the Neotec instrument to determine the densities. These same fruit were then used to calibrate the color sorter. The morning following sorting, the peaches were transported via air to Mississippi State University and they were canned that day.

Heat penetration studies were conducted by placing thermocouples in the geometric center of the cans and processing the peaches in a FMC Steriotort operating at 5 rev/min reel speed. The temp in the center of the can was recorded each min and the slowest heating and most rapid cooling curve of the 9 heat penetration studies was used to determine subsequently used processes. An initial temp of 60°C (140°F) was used for all heat penetration studies.

Percent soluble solids and pH of the raw fruit was determined for each of the 3 levels of maturity using a Bausch and Lomb Hand Refractometer and a Beckman Expandomatic pH meter, respectively.

After the peaches had been split and pitted, they were peeled in 3% boiling sodium hydroxide for 2-3 min, spray rinsed, filled into plain 303 x 406 tin cans (5 halves per can), and covered with a boiling 30% sucrose syrup. The cans were closed and processed in an FMC Steriotort (Model 600-10) at 104°C with a reel speed of 5 rev/min. Six cans of peaches from each maturity level were processed for 3, 5, 7, 9 or 11 min with an initial temp of 60°C.

After holding the canned samples for 4 weeks at room temp, peach quality was evaluated by measuring Hunter color (L, a, b), visual color, shear force, taste panel, succulometer, and syrup pH values. For comparison similar evaluations were also obtained on clingstone peaches canned by 3 commercial food companies.

Hunter color values were obtained by placing the peach halves "cup down" on the sample platform of the Hunter Lab Color Difference Meter (model D-25). A white plate (#2165) was used as the reference standard.

Visual color observations were reported as the no. of halves per can with U.S.D.A. Grade A or Grade B color. U.S.D.A. Peach Color Guides manufactured by Magnuson Engineers were used in this evaluation.

Shear values were reported as kg of force required to shear 1 peach half placed "cup down" in the shear cell. Food Technology Corporation's Texturepress (model TP-1) with a standard shear compression cell was used. High shear values indicate a firm product.

The taste panel was composed of 5 members. Samples from each lot of peaches were placed next to commercial samples, and the panelist was asked to indicate his preference on a score sheet. Results were reported as the % of panelists preferring the experimental sample over the commercial sample. The panelists also ranked the samples, based on preference, across the maturity variables (1 = best, 3 = worst), and across the cook time variables (1 = best, 5 = worst).

Hunter color and shear press variations among the various treatment means for the 'Babygold 7' peaches were analyzed for significance by analysis of variance.

Fresh product pH and soluble solids. The average pH values by maturity level were 3.7, 3.8, and 4.0 for the immature, medium-ripe, and ripe lots, respectively. Soluble solids in the fresh fruit ranged from 4.4% in the immature lot to 7.3% in the ripe lot. The average soluble solids contents by maturity level were 4.7, 5.2, and 7.2% for the immature, medium-ripe, and ripe fruits, respectively. These data indicate that the Spectrasort did an acceptable job of sorting the fruit by maturity level.

Heat penetration. At the end of the shortest cook time (3 min), the center temp (CT) of all cans was above 100°C (212°F) (Fig. 1). By the time the

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Steriotort reached the processing temp of 104°C, when process timing was started, the CT of all cans was 88°C (190°F) or higher. The CT of all cans reached 104°C within 5 min from the start of timing and within 7 min from opening of the steam inlet valve. The slope of the heat penetration curve (fh) was 3.5 min.

Shear press data. The average force required to shear canned peach halves decreased as cook time increased; the average values were 33.5, 23.0, 17.0, 15.0 and 12.0 kg for the 3, 5, 7, 9 and 11 min cooks, respectively. Force required to shear the peaches were highly significantly influenced by cook times (F = 41.96**). The average shear force values for the 3 maturity levels were 16.0, 23.5 and 21.0 kg for the immature, medium-ripe, and ripe lots, respectively. The force required to shear the peaches was highly significantly influenced by maturity (F = 14.47**). Immature canned 'Babygold 7' peaches exhibited the lowest shear force values in each of the 5 cooking times, while the canned medium-ripe peaches exhibited the highest shear force values in each of the cooking times, except for the 11 min cook.

The 'Babygold 7' peaches had an overall average shear value of 20.5 kg compared to the 17.0 for the 3 commercial samples (Table 1). The shear values of the commercial samples ranged from 13.5 to 21.0 kg (Table 1). The wider range for the experimental peaches (11.0 to 39.0 kg) was attributed to the variations in cook time more than to the variations in maturity level. If normal commercial processing times are considered to be 7 to 9 min, the shear value range for the experimental peaches was somewhat closer to the range for the commercial peaches. The firmer 'Babygold 7' samples were highly acceptable when compared to commercial samples by a taste panel.

Hunter "b" values. An increase in positive "b" values was indicative of a higher degree of yellowness. The average "b" values by maturity of the canned 'Babygold 7' peaches were 30, 31 and 32 for the immature, medium-ripe, and ripe lots, respectively. The "b" values were found to be significantly influenced by the 3 levels of maturity studied (F = 6.29*) and by cook time (F = 3.15*), but the differences due to the latter were too small to be of practical interest.

The average "b" values for all the experimental 'Babygold 7' peaches was higher than the average "b" value for the 3 commercial packs. The overall average "b" value for the experimental samples was 31.3 compared to an average of 29.5 for the commercial samples, thus indicating a higher degree of yellowness for the 'Babygold 7' samples.

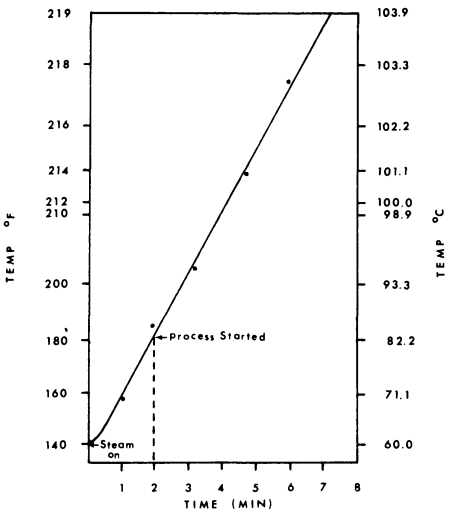

Fig. 1. The slowest heating of 9 heat penetration curves for 'Babygold 7' peaches canned in 303 x 406 tin cans with the retort at 104°C, an initial temp of 60°C, and a reel speed of 5 rev/min. The slope of the curve (f_h) in terms of the time required for it to go through one log cycle was 3.5 min.

Visual color rating. All samples of canned 'Babygold 7' peaches, regardless of cook time or maturity, had U.S.D.A. Grade B or better color. All the samples in each can of the experimental peaches within the medium-ripe lot exhibited U.S.D.A. Grade A color. Those samples processed 9 min in the immature lot and 5, 7 and 11 min in the ripe lot, were also Grade A for color. For the remainder of the experimental samples, 80% of the halves in each can met U.S.D.A. Grade A color standards. In 2 of the 3 commercial packs all of the halves in each can met Grade A color standards, while in the other commercial pack 80% met this color standard. The 'Babygold 7' samples processed 3, 5, 7, 9 or 11 min had an average of 4.3, 4.7, 4.7, 3.7 and 4.0 Grade A halves per can, respectively. For the immature, medium-ripe, and ripe lots the averages by maturity were 3.8, 5.0 and 4.0, respectively.

Taste panel results. Within the medium-ripe and ripe lots of canned 'Babygold 7' peaches, 80% or more of the taste panel members preferred the experimental samples to commercial samples. Samples processed 3, 5 or 9 min within the medium-ripe lot and those processed 7, 9 or 11 min within the ripe lot were preferred by all of the panel members when compared to commercial samples. 'Babygold 7' peaches processed 5, 7 and 9 min were preferred by an average of 80 to 87% of the panelists. Peaches in the medium-ripe and ripe lots were preferred over commercial samples by an average of 92% of the panelists.

When ranked in order of decreasing maturity, the preference scores were 1.75 for the ripe, 1.95 for the medium-ripe and 2.13 for the immature peaches. The lower score for the ripe fruit indicated a higher degree of preference for these peaches.

When the 'Babygold 7' peaches were ranked by cook time, those processed for 5 min had an average preference value of 1.6, compared to 2.7, 3.1, 3.7 and 3.4 for peaches processed 3, 7, 9 or 11 min, respectively.

As cook time increased, succulometer values increased. By increasing the cook time from 3 to 11 min, the average succulometer values increased from 4.9 ml to 10.0 ml. The average succulometer values for the 5, 7 and 9 min cook times were 7.1, 7.6 and 10.0 ml, respectively.

These data indicated that cook time had a more profound effect on succulometer value than did maturity at harvest. Acceptable succulometer values (based on nearness to commercial values) resulted when 'Babygold 7' peaches were processed from 5 to 11 min.

Syrup pH values: The average pH values for the 3, 5, 7, 9 or 11 min cooks were 3.8, 3.9, 3.9, 3.8 and 3.9, respectively. Thus, cook time had little effect on the pH of the syrup of the canned product. The pH values for the 3 commercial lots were 4.0, 3.8, and 4.0 for an average of 3.9. The overall average pH value for the 'Babygold 7' peaches after processing was 3.9.

Using the commercial products for a standard, it was possible by varying processing time to give immature, medium-ripe and ripe 'Babygold 7' peaches texture characteristics similar to a commercial product, but a preference for the riper peaches persisted.

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Table 1. Quality data for clingstone peaches canned by 3 commercial food companies compared to experimental average.

Sample	Hunter color values L	a	b	Visual color No. halves rated USDA-A	USDA-B	Shear force (kg)	Succulometer values (ml)	Syrup pH
Commercial #1	51.6	10.8	30.6	5	0	21.0	7.5	4.0
" #2	52.5	10.6	29.7	4	1	17.0	8.0	3.8
" #3	49.8	9.2	28.4	5	0	13.5	8.0	4.0
Commercial avg	**51.1**	**10.2**	**29.5**	**5**	**0.3**	**17.0**	**7.8**	**3.9**
Experimental avg	**53.1**	**5.9**	**31.3**	**4**	**0.7**	**20.5**	**7.9**	**3.9**