

## Feasibility of Marketing Soft Avocado Fruit

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Avocado fruit are normally marketed when they are hard, unripe, and inedible because in this state they are less susceptible to injury and are more easily transported. However, it takes 5-15 days for hard avocados to soften, if left in air at room temperature (approx. 20-25°C), and the ripening time for individual fruits varies. It is possible that the uncertainty caused by this variation and the inconvenience of having to wait several days for ripening lessen the consumer's willingness to purchase avocado fruit. Therefore, the purpose of this study was to obtain consumer preferences regarding the feasibility of selling soft fruit.

### Materials and Methods

Boxes of Hass fruit from a local Alpha Beta supermarket (769 West Blaine Street, Riverside, CA 92507) were taken to the lab where they were ripened with ethylene. The ripe fruit were then returned to the supermarket where they were made available for sale along with a group of unripe (hard) fruit. During the week of May 2, 1982, a continuous supply of both ripened and hard avocados was maintained, and the number of each was monitored every day. In addition, a short questionnaire was provided near fruit so that consumers could communicate their preferences if they so desired.

### Results and Discussion

During the 6-day period, more than twice as many soft avocados were sold than hard avocados (*Table 1*). Responses to the questionnaire also indicated that consumers definitely preferred buying soft fruit (*Table 2*). The respondents bought as many as five times more soft fruit than hard fruit. Surprisingly, 38% of them answered that they buy avocados every week. An overwhelming 88% of the people indicated that they would buy more avocados if both soft and hard fruit were available. One hundred percent of those people who wrote additional comments mentioned that they liked having ripe fruit available. Their primary concern was that hard avocado fruit are bothersome due to the waiting period required for ripening. The actual comments from the questionnaire appear below.

"People need to be able to have avocado when they need it, not have to plan ahead."

"I prefer soft ones. I like to eat as soon as I buy."

"I hate hard avocados. When I'm buying them I want to eat them now, not 4 days later."

"How come these can be purchased soft?"

"Impulse purchase."

"I would buy more if they were soft and not bruised."

"I never plan ahead so it's great to find soft ones."

"They're o.k. It is nice to have them ready to eat."

"Good idea because it's more convenient."

"We usually shop for soft avos. since we want to use them right away."

"I often shop for 'fresh' salad items on day of dinner and need soft ones — other times I buy several hard ones for the weekend."

"Usually they are all hard or all soft (mush)."

"I appreciate the choice."

"I'd rather buy soft avocados."

"One cannot always predict when avocados will be ripe, so sometimes it is more convenient to buy ripe ones."

"I usually buy at the time I want to use them. If they are all hard, I'm out of luck."

"I shop the day I want to use it."

"Good idea for immediate use."

"Very good idea to have soft avocados. I would definitely buy more of them if they were soft."

"Better when they are soft."

"Sell only the kind you are selling now."

"Sometimes I need them immediately."

"I don't like to wait for avocados to ripen."

"Sometimes you want an avocado now, not in 3 or 4 days."

"I often run out of edible avocados and would love to have soft ones available."

"The best idea is to have a choice of avocados. A couple of soft ones for dinner and two or three hard ones for the weekend."

"It would be nice to be able to plan a meal ahead of time and know the avocado will be ready to use. Often I want to have avocado but it's rock-hard and takes almost a week to ripen."

"I would buy more if soft were available. Frequently I have purchased soft avocados only to find they were soft from customer squeezing."

"They are a spontaneous purchase for dips, etc..."

"This is great, it's about time."

"The problem is forgetting or not knowing one will need avocados a week in advance."

"It is a good 'spur of the moment' food, but if it is hard there is no point in buying it."

"Me and my family like soft ones, and hate hard ones."

"Sometimes you need an avocado now and not in 3 days. Thanks for having these available."

"I tend to buy them as I need them."

"Soft avocados are usable at the time of purchase. Good for unexpected guests, etc."

It seems obvious that the consumer and the avocado industry would benefit from the routine marketing of ripe avocados.

### **Ripening procedures**

To minimize mechanical injury during transportation, fruit should be ripened by the ultimate retailer's produce agent rather than by the avocado marketing organization. To ripen avocados, mature fruit should be placed into an ethylene treatment room for 36 hours. The ethylene concentration should be between 10 and 1000 ppm (2). Normally, after 36 hours the fruit produce ethylene, and no further benefit is obtained from further treatment. Upon removal from the treatment room, fruit will be firm. At this stage, they should be taken to the ultimate retailer where fruit should be held at room temperature until they are ripe.

Once the fruit are fully ripe, they are no longer subject to chilling injury and can be best stored at 2°C (3, 5). If ripe fruit are to be held for several days or weeks, they should be protected from desiccation by wrapping them in a polyethylene film containing a few holes (4).

For presentation in the market, it is best to hold fruit at 2°C. However, most markets have produce display space at about 7°C. This is adequate if fruit will remain on the display shelf for no more than 3 days. Fruit should be presented on trays similar to those in standard lug boxes rather than in a pile.

The fruit should be prominently labeled for the consumer as "Fully Ripe" with instructions that they should be refrigerated. It may be necessary to place the fruit in some sort of package in order to prevent the consumer from squeezing the fruit excessively.

### **Precautions**

Ethylene treatment should be carried out in properly equipped ripening rooms. Ethylene concentrations above 3% (30,000 ppm) are highly explosive, and care must be taken to insure that such concentrations cannot possibly build up.

Also, ventilation should be sufficient to prevent carbon dioxide levels from exceeding 2% because carbon dioxide concentrations above 2% delay fruit ripening.

The thick-skinned cultivar such as *Hass* is more tolerable to handling when it is fully

ripe. The thin-skinned fruit such as *Zutano* and *Bacon* may not tolerate handling hi the ripe state.

Fruit must be fully mature in order for ripening to be induced within the 36-hour treatment period. Less mature fruit will require a longer ethylene treatment than fully mature fruit.

**Table 1.** Comparison of the number of hard and soft fruit sold each day.

<u>Date</u>	<u>Hard Fruit</u>	<u>Soft Fruit</u>
May 3 (M)	28	79
May 4 (Tu)	21	48
May 5 (W)	18	38
May 6 (Th)	10	20
May 7 (F)	40	65
May 8 (S)	<u>30</u>	<u>60</u>
<b>Total</b>	<b>147</b>	<b>310</b>

**Table 2.** Responses to the questionnaire.

1. What kind and how many avocados are you buying today?

<u>Date</u>	<u>Hard Fruit</u>	<u>Soft Fruit</u>
May 3 (M)	10	57
May 4 (Tu)	5	34
May 5 (W)	12	36
May 6 (Th)	2	15
May 7 (F)	9	34
May 8 (S)	<u>3</u>	<u>52</u>
<b>Total</b>	<b>41</b>	<b>228</b>

2. How often do you buy avocados?

<u>Date</u>	<u>Every Week</u>	<u>Every 2 Weeks</u>	<u>Every 4 Weeks</u>	<u>Less Often</u>
May 3 (M)	17	12	7	7
May 4 (Tu)	9	7	4	2
May 5 (W)	12	10	2	9
May 6 (Th)	4	0	1	3
May 7 (F)	7	9	7	3
May 8 (S)	<u>11</u>	<u>4</u>	<u>5</u>	<u>5</u>
<b>Total</b>	<b>60</b>	<b>42</b>	<b>26</b>	<b>29</b>

3. Would you buy more avocados if both soft and hard fruit were available?

<u>Date</u>	<u>Yes</u>	<u>No</u>
May 3 (M)	36	6
May 4 (Tu)	19	3
May 5 (W)	29	3
May 6 (Th)	6	2
May 7 (F)	21	1
May 8 (S)	<u>22</u>	<u>3</u>
<b>Total</b>	<b>133</b>	<b>18</b>

### The future

Because success can be assured for the routine marketing of ripe avocados, considerable experience is needed with respect to transit, warehouse, and market fruit-handling procedures.

A number of films, which can prevent water loss and allow proper permeability to carbon dioxide and oxygen for sufficient respiration, should be tested for packaging individual fruit (1).

## **Conclusion**

We believe that it is feasible to supply markets with uniformly ripe fruit and that sales can be markedly increased by having fully ripe fruit on display in refrigerated space.

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