

## INVESTIGATIONS ON AVOCADO DEHYDRATION

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The increasing production of avocados in California necessitates a thorough consideration of all methods of profitably disposing of the crop. California's great distance from her principal markets and the perishable nature of avocados will always restrict the marketing of the fresh fruit. The lack of familiarity of retailers and consumers with the proper maturing and uses of this fruit further restricts its distribution.

The marketing of the more cheaply grown, yet excellent Mexican varieties and the utilization of second grade or cull Guatemalan varieties, both of which are unsuitable for fresh shipment, adds to the problems of profitable production. As with many other California fruits, the manufacture of part of the crop into an imperishable form would not only greatly increase the market for avocados throughout the year, but would tend to stabilize the seasonal fresh market. Printed directions on a container of preserved avocados would do much to acquaint the consumer with the merits of this particular fruit.

The recent phenomenal success of dehydration in California as a method of preserving fruits very naturally directed attention to the possibility of dehydrating avocados. Despite the optimism of its most enthusiastic supporters, dehydration is not a universal method of food preservation and while successful with many products is not adapted to all.

The commercial development of any product should not be attempted until the problems of production and marketing have been thoroughly investigated. The possible success of avocado dehydration hinges on three main questions:

1. Can avocados be economically dehydrated to yield a product which will retain its original color, flavor and texture on refreshing in water?
2. Will dehydrated avocados, if properly packaged, retain their original condition for at least a year?
3. Will the product create a profitable demand?

In order to obtain information on these important questions, preliminary investigations were instituted in the Fruit Products Laboratory in June, 1923.

**Preparation:** Ripe Dickinson avocados were peeled by hand, quartered and pitted. A preliminary test having shown the inadvisability of dehydrating halves or quarters, the fruit was cut into quarter-inch slices or half-inch cubes and spread on wooden slat trays at the rate of two pounds per square foot. Various treatments for the retention of natural color, such as steaming, brine dipping and sulphuring, were tried, a short sulphuring giving perfect preservation of color

**Drying:** Dehydration tests at various temperatures showed the advisability of employing dry air at a relatively high temperature, the resultant case-hardening being advisable to prevent the leakage of oil. The minimum and maximum critical temperatures were found to be 160° and 200°, respectively, the optimum being 180°. The time required for thorough dehydration at this temperature in an air flow of 500 lineal feet per minute varied from five to eight hours. Any good commercial dehydrator is capable of producing these conditions.

**Yields:** The average gross shrinkage was 7.7:1, 23 per cent of the fresh weight being lost in preparation. The actual drying ratio on the trays varied with the composition and ripeness of the fruit from 3:1 to 6:1, averaging 5.4:1.

**Packing:** The dehydrated product was packed for storage in partially vacuumized glass jars, hermetically sealed tin cans and cardboard cartons.

**Conclusions:** The freshly dehydrated product regained its original color, flavor and texture very quickly on being refreshed in water, thus solving the first question of rapid, simple and inexpensive dehydration.

After a storage period of five months all samples had developed a stale, rancid flavor which would prevent their sale. Sulphured samples retained their natural color, while all samples regained their original texture in water.

Since avocados are not favored by the natural preservative action of the sugar and acid, common to most dried fruits, it is evident that the successful preservation of dehydrated avocados depends on finding some treatment or container which will effectually prevent rancidification of the oil. Rancidification requires a certain amount of oxygen and since the jars used in packing were only partially vacuumized it is possible that packing in a high vacuum may prevent or greatly retard deterioration.

Another suggested method consists in making the avocados firm by partial dehydration followed by canning in a dilute brine, with or without the addition of vinegar. The cans would then be hermetically sealed to exclude air and sterilized by heat.

The Fruit Products Laboratory is not unmindful of the problems facing the avocado grower and is desirous of aiding all growers to the limits of its resources in solving the many problems in California horticultural products. Efforts will be made to continue the investigations further in the hope that a successful method of preserving avocados will result.