June 1944 marks the end of the second year of cooperative research on citrus byproducts by the Florida Citrus Commission and the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration at the U. S. Citrus Products Station, Winter Haven, Florida. Three Florida Citrus Commission research fellows, in cooperation with Federal chemists, have dealt with research on citrus byproducts and the problems of the canning and concentrating industries.

Wartime emergencies have increased the demand for immediate and reliable information on such problems as the suitability of glass containers as a substitute for tin containers in packing citrus juices, the storage life of these cannot goods, and the prevention of limes from spoilage of canned citrus products. Special projects planned to meet these needs, along with the other important work on utilization of citrus byproducts, have made up the research program.

Concentrates and Powdered Juices

Before the war, Florida was producing 8 percent of the U. S. total of concentrated citrus juices; in 1942 its four commercial plants turned out over 35 percent of the total purchased by the Government for Red-Letter shipment to our Allies.* Such concentrated products will likely have greater popularity after the war when similar quantities may be made available to hospitals, institutions, hotels, and restaurants throughout the country; and citrus concentrates from Florida will probably help in post-war feeding problems in Europe.

With a view to improvement of the flavor and keeping qualities of Florida winter grapefruit juice concentrate, these Florida growers during the past season have furnished samples of concentrate for bacteriological, color and flavor examinations, and chemical analysis. Tests are being made regularly on the concentrates kept at various storage temperatures.

Work is in progress on comparison of orange juice concentrates made at the temperatures and pressures used in commercial plants, with those made at lower temperatures and pressures. Some of the latter concentrates have been distributed with various amounts of fresh orange juice before canning, and a public service patent is being applied for in order to protect this process for public use. Some of these products have been kept fresh for 20 F. storage, and some are being held in cold storage at 40° F. The reconstituted juices are being compared at intervals for color, flavor, and vitamin C content. A double-drum dryer with facilities for producing a high vacuum has been installed for the purpose of studying its suitability for drying citrus juices, and several promising dry products have been made from orange juice by the addition of stabilizing materials. Experiments are being continued with the aim of producing a good quality, pure dry orange powder at a moderate cost. It is also planned to attempt the preparation of other powdered citrus juices by this method.

Glass and Tin-Packaged Products

Investigations were made of the changes occurring in smashed orange juice and granulated juice during commercial processing and subsequent storage for 6 months of products packaged in glass and tin containers. Processors studies made at the canning plant indicated high vitamin C retention in the juices (99 to 99.5 per cent). Samples were stored at room temperatures (average 80° F.) and in cold storage (40° F.). It was found that bottled juices lost slightly more vitamin C during 6 months of storage than did juices in tin containers, but at the end of the 6 months' storage period all juices, regardless of type of container, could still be considered excellent sources of vitamin C. During the storage period all bottled

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* Figures taken from Western Canner and Packers, Vol. 33, No. 13, P. 29.
and canned juices retained their color well with the exception of the frozen grapefruit juice held at room temperature, which at the end of 5 months showed definite browning. In general, all orange samples of juice showed little change in flavor.

Citrus Industry

Citrus Industries

and, after removal of the cold storage, a rack of grapefruit juice in glass containers was put up by the research fellows at the U. S. Citrus Products Station, Winter Haven, Fla. This experimental park was being stored in the cold room (40° F.) and samples removed to room temperature at intervals, to be held at room temperature for varying periods of time before testing. Canned samples were being stored at 40° F. and at room temperature. Periodic examinations were being made for retention of vitamin C, color, and flavor.

Citrus Jams

In cooperation with the Florida Citrus Commission, 1 survey was made of the vitamin C retention in Florida grapefruit juice during commercial canning. Twelve central Florida canning plants which packed over half of the commercial grapefruit juice canned in the state, cooperated in this survey. Equipment for sampling and testing of the juice was taken to the plants and analyses were made of the plants on an unprocessed, uncrushed, juice. Samples were taken at various points in the canning operation so that the grapefruit juice. Results of this study on juices will be published in the near future.

In order to answer requests for information on how rapidly vitamin C is lost from freshly extracted orange juice and grapefruit juice, a controlled experiment was carried out, using thin-walled glass and rubber-bonding for examination of the juice, which were then stored in covered and uncovered glass jars at room temperature and in a cold room (40° F.). This investigation indicated that fresh grapefruit juice and orange juice retained over 97 percent of their vitamin C retention even after 6 days at room temperature, at the end of which time many of the samples had started to ferment. A complete report on these studies is being submitted for publication.

Citrus Byproducts

A process was developed (Moore, Moore, and Field) in which it is be lieved will benefit growers greatly in the profitable disposal of surplus mandarins, thus helping to stabilize Florida production and marketing. Besides recovery of cold-pressed seed oil, the method provides for either

Titration of Vitamin C in Citrus

Jui ces – E. L. Moore

during storage. At the end of the 6 months' storage period at room temperature, however, the juice samples in glass and tin containers were somewhat off-flavored; the hot-

Bacteriological Control of Citrus Products – E. Wiedenhaofd
Is increased interest in the quantity of oil from this fruit which may be recovered by various methods. Lime oil is extensively used by manufacturers of perfumery and flavoring extracts and has demanded higher prices than most other volatile citrus fruit oils. Preliminary text: (A-

Determination of Gas Content in Canned Citrus Juices — C. D. Atkins, Winstead, and Hild, 4) indicated that by the use of a vacuum-steam process about one-third of the oil present in the whole fruit could be recovered as cold-pressed lime oil in a laboratory model centrifuge. Work on this project will be continued this season, and also some experimental work will be done on the preparation of powdered lime juice.

A process was developed (Pulley, Monroe, and Atkins, 5) for the preparation of crude dried citrus peels from waste grapefruit peels. The everglades, or refined peels, is produced by baking properly treated grapefruit peel with water and then drying and grinding the baked peel. The grapefruit can be used, in whole or in part, as a source of fruit flavor, natural vitamin, and color.

Publications


Price Fixed for Fruit In Bushel Containers

Maximum prices for oranges and grapefruit produced in Florida and Texas, and packed in bushel containers shall be five-eighths of the prices of the same fruit packed in standard containers, the Office of Price Administration has announced. The bushel baskets will hold five-eighths as much as the standard boxes.

This basket outline was established because Florida and Texas citrus producers have been using more and more bushel baskets. They found is increasingly difficult to obtain enough standard containers. The use of the baskets, however, made it necessary for each to be weighed and marked. The new prices on a bushel basket would eliminate the need for this extra work.

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