

Fruit Juice Industry

significant development in American food business

S. W. Shear

More than a billion gallons of fruit and vegetable juices are consumed each year in the United States which produces about 75% of the world's total juice supply, now more than seven times the pre-war average.

Since 1925, the commercial output of fruit and vegetable juices in the United States has soared from almost nothing to approximately 900 million gallons. By 1945 the national commercial juice pack had jumped to 370 million gallons, practically all canned in pasteurized single strength form, and very largely tomato, citrus and pineapple juices. Since then pasteurized juice has averaged only slightly above the 1945 figure because of the rising tide of frozen concentrated orange juice. Because of its fresh fruit flavor, the frozen product has replaced much of the pasteurized citrus juice. The total hot-pack of all juices has been maintained by further expansion of the pack of tomato and deciduous fruit juices in the past 15 years. Swollen by the flood of concentrated orange juice after 1945, the total pack of all juices surged to 870 million gallons by 1959, an increase of 235% in 15 years. Almost all of the phenomenal rise—500 million gallons—after 1945 was in concentrated form and nearly all frozen Florida orange juice. In addition to this total, the pack of diluted fruit juice drinks rose rapidly during the last five years to account for the equivalent of perhaps 50 million gallons of pure single strength fruit juice by 1959-60.

The total pack of non-citrus juices changed little during the decade ending in 1959-60 and was almost all single strength heat processed, except grape which was the only deciduous fruit juice packed as frozen concentrate in large quantities, and hot pack pineapple concentrate from Hawaii and the Philippines. By 1958-59 the non-citrus juice pack of fruit and vegetable juices was over 300 million gallons or about 35% of a total of 870 million gallons of all juices. Roughly, 50 million gallons or

6% of the grand total was frozen concentrated grape juice and pasteurized pineapple concentrate, leaving 29% as single strength hot pack.

Pasteurized citrus juice declined so much in the decade ending in 1958-59 that its contribution to the total hot pack of all single strength fruit juices fell from 48% to 29%. However, the combined pasteurized and frozen citrus juice pack of 570 million gallons accounted for 65% of the output of all juices, the decrease in the hot pack of citrus juices being more than counterbalanced by the marked growth in frozen citrus juices since 1945.

Frozen Citrus Juice

By 1958-59, the frozen citrus juice pack totalled 415 million gallons or 71% of all citrus juice packed and 97% of all frozen juices. The great increase in non-pasteurized citrus juice has been very largely frozen orange concentrate and a much smaller quantity of chilled orange juice. Together, the two products totalled 375 million gallons in 1958-59, accounting for more than 85% of the 440 million gallon total of all frozen fruit juices. The balance of this total consisted of the following frozen fruit juices, practically all concentrate except lemonade—which is only about two-thirds pure juice—comprising approximately: grapefruit 5%, lemon 3%, lemonade 2%, tangerine 1%, blend citrus 1%, and grape 4%.

Although the hot pack of every kind of canned single strength non-citrus has increased considerably since 1945-46, the relative importance in 1958-59 of each of the packs of all kinds and forms of fruit and vegetable juices was smaller for all but nectar and apple juice, because of the enormous growth of frozen citrus concentrate during the last 15 years.

The hot pack of non-citrus single strength juices in the national commercial pack of 1958-59—870 million gallons of all fruit juices—amounted, ap-

proximately, to: tomato 15%, pineapple, 5%, nectar 3.2%, prune 2.5%, grape 2.2%, and apple 2.1%.

Consumption Trends

Comparison of per capita consumption of pasteurized and frozen juices in the United States during 1956-1958 with 1946 reveals great changes in their importance in a little over a decade. Per capita consumption of pasteurized single strength juices decreased from a peak of 21.5 pounds to about 17.0 pounds while concentrated citrus juice rose from about 1.0 pound—nearly all heat processed in 1946—to almost 17 pounds, about 95% of which is frozen.

In 1946 per capita consumption of all canned fruit and vegetable juices on a single strength basis was 22.5 pounds, all hot pack with 95% single strength and 5%, concentrate. By 1956-1958 the total had risen to about 36.0 pounds a year of which about 47% was pasteurized single strength juice while about one half of the total was concentrated fruit juice, mostly citrus. About 1.5 pounds or 4% was chilled single strength citrus juice. In addition, perhaps the same amount was drunk in diluted non-carbonated fruit drinks. By 1958-59 the

CALIFORNIA AGRICULTURE

Progress Reports of Agricultural Research, published monthly by the University of California Division of Agricultural Sciences.

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total of national consumption of fruit and vegetable juices, in all forms, appears to have been close to 39.0 pounds on a single strength basis.

Total production and per capita consumption of hot pack and frozen fruit and vegetable juice and fruit juice drinks in the United States may be expected to continue to increase but at a slower rate than from 1952 to 1959. The recent rate of increase in frozen orange, lemon concentrate and lemonade may continue to slow down, partially because of competition from continued expansion of fruit drinks. Whether the rapid growth in the consumption of fruit drinks in recent years actually has increased the total consumption of juices in all forms is uncertain because accurate statistics on consumption of these drinks are not available, and juice drinks include an unknown proportion of added water and an unknown proportion of the drinks purchased is undoubtedly substituted for purchases of pure juices.

Diluted Fruit Drinks

Since 1950 consumption of non-carbonated fruit juice drinks in the United States has risen so rapidly that probably 120 million gallons were drunk in this country in 1959-60 and as much as 50 million gallons of fruit juice used in their manufacture. Non-carbonated fruit juice drinks are generally available, diluted and ready to serve, in canned pasteurized form and also in concentrated pasteurized and frozen form. Recently canners have proposed standards with a minimum juice content of 40% but most of the more popular juice drinks now probably contain at least 50% of fruit juice.

Juice Mixtures

A few fruit drinks contain only one kind of fruit juice but at least ten mixtures of two or more kinds of fruit juices are marketed and the number is increasing. Pineapple-grapefruit juice mixture, introduced about 1953, had become by far the largest seller by 1957, and accounted for over one-third of the total sales of all fruit juice drinks in 1959-60. Consumption of orange drink, introduced about 1950, rose until 1956, then declined but was still second to the pineapple-grapefruit mixture in 1959-60, accounting for about one-sixth of all fruit juice drinks consumed during that year.

Concord grape juice drinks and tropi-

cal punch have risen to about equal importance with orange drinks in recent years.

No estimates are available on national consumption of home prepared juices but the total is known to be large because a big majority of fresh lemon shipments and a very substantial part of fresh orange shipments are used for juice purposes. A commercial survey of summer servings of juices by urban families in the United States in 1959 revealed that about one fourth of the number of household servings of all fruit and vegetable juices was home prepared, compared with about three-fourths commercially packed. During the summer, nearly all of the home servings were of fresh juice. Citrus, by far the most popular, particularly for breakfast, accounted for 88% of the total number of all these summer servings of the home prepared fruit juice drinks.

Orange

Approximately 99% of commercially processed oranges in the United States have been utilized for making juice products in recent years and less than 1% for canned segments. As a result of the phenomenal growth of pasteurized single strength orange juice after 1929, at least 30% of the national orange crop was utilized for the commercial pack of juice by 1945-1947. By 1959 about 3.5 million tons of oranges were processed or 64% of the national crop of more than 5.6 million tons.

After World War II the orange juice pack grew very slowly in California but it increased spectacularly in Florida. By 1959 Florida's total production of oranges and the quantity processed had risen so greatly that the state used 77% of its total orange crop to supply 90% of the nation's orange juice. In contrast, California accounted for less than 10% of the orange juice pack and utilized only 27% of its total 1959 crop for juice and 37% of its Valencia crop. Florida contributes nearly all of the national pack of all forms of orange juice except of the small output of pasteurized concentrate of which California packs the big majority.

The frozen concentrated orange juice industry now returns at least \$100 million a year to Florida growers and the retail value of the concentrate is over \$3 million a year. United States per capita consumption of orange juice in 1958-59 totalled about 20 pounds, processed weight, or little over 50% of all fruit

and vegetable juices. Of the orange juice total about 75% was frozen concentrate, 10% chilled, 5% pasteurized concentrate and 10% pasteurized single strength juice.

Grapefruit

Commercial processing of grapefruit, first as segments, and then as juice, started in the late 1920's as a means of expanding market outlets for the rapidly increasing production in Florida and Texas, which produced well over 90% of the total world crop of grapefruit until disastrous freezes in 1949 and 1951 temporarily destroyed most of Texas' citrus groves. California and Arizona have always been quite unimportant producers of grapefruit. Since 1951 Texas grapefruit plantings and production have been increasing gradually but production has increased more slowly than acreage. Texas' crop is approaching 15% of the national crop as compared with an average of 40% just before the destructive freezes. Since 1950 Florida has determined very largely the statistical trends and annual variations in the grapefruit industry. Of the national totals, Florida now produces more than 75% of all fresh shipments and over 90% of the processed tonnage. Although the loss of nearly all of the Texas grapefruit crop in the early 1950's accelerated the growth of Florida production, it stopped the previous rapid growth in grapefruit processing in the state because market demand forced the diversion of a large part of its increasing production into the fresh market to maintain national consumption of fresh grapefruit at about the same level as in the 1940's.

A little less than one half of the national crop of grapefruit is usually processed now and a little more than one half of the Florida crop. Since 1945 about 80% of the processed tonnage has been used for juice and 20% for canned segments. The total pack of juice has fluctuated considerably more than the pack of segments from year to year and has shown a fairly flat trend since 1945, averaging about 20 million cases in recent years. Pasteurized single strength grapefruit juice has not declined nearly as much relatively as orange juice, since frozen concentrate was introduced. However the frozen concentrate pack has increased steadily since 1949 to more than six million cases in 1958 or about 30% of the total pack of grapefruit juice. About 70% is pasteurized, practically all

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single strength. Considerable quantities are used in juice blends with orange and in fruit drink blends with pineapple. Since World War II there has been a decline in both the per capita consumption and market demand for grapefruit juice. The national per capita consumption of canned hot pack single strength grapefruit juice, including blends, now averages about 2.0 pounds processed weight or about 12% of the consumption of all pasteurized canned single strength fruit and vegetable juices.

Exports of all forms of grapefruit juice have increased since 1950. Of the United States totals of the different packs during 1955-58, exports took about 14% of the single strength hot pack, 20% of the blend, 35% of the hot pack concentrate and 4% of frozen concentrate. Canada is by far the chief export outlet for all but the concentrated hot pack. Europe as a whole is the second most important export outlet.

Several blended fruit juice drinks have become popular in recent years, but only the orange-grapefruit blend of pure fruit juice has become important. Florida started packing the blend in 1935-36, but the pack grew very slowly until World War II and reached a peak in 1947-48 of more than 40 million gallons with per capita consumption of 2.3 pounds. Thereafter it declined steadily to an average of about 17 million gallons during 1956-58 and consumption of only 0.60 pound.

Lemon

The lemon is the only important fruit which is nearly all utilized for juice purposes either in fresh or processed form. The United States and Italy, which produce a large majority of the world lemon crop, each utilizes about one third of its lemon crop for processed juice products. However, California and Arizona together pack about four fifths of the world total and Italy only about one fifth. Italy has exported more pasteurized lemon concentrate to foreign countries than the United States in recent years and this country has been one of Italy's chief markets.

Pressure of increasing acreage and production of lemons has greatly depressed unit returns to growers since 1956 and resulted in a phenomenal growth in the national pack of lemon juice and marked changes in its composition. Unless unexpectedly great changes

occur, economic prospects for fresh lemons and lemon juice products are likely to be no better than supply, demand and prices prevailing since 1956.

The annual lemon juice pack of California and Arizona during 1956-1958 of more than 28 million gallons on a single strength basis was 65% greater than during the preceding five years, as compared with 117% increase for orange juice and a 5% decrease for grapefruit juice. In 25 years United States consumption of commercially processed lemon juice jumped from almost nothing to 1.20 pounds. In addition, most of the great increase in lemons marketed fresh has also been consumed as juice. Sales of commercial lemon juice to consumers are largely in the form of frozen lemonade base—about two thirds pure juice—and frozen concentrate. In 1958-59, single strength juice, mostly hot pack, accounted for about 15% of all lemon juice consumption, frozen lemonade base about 30%, frozen concentrate over 40% and concentrated hot pack about 15%. United States exports of lemon juice have increased greatly in recent years reaching a peak in 1959-60 of 2.25 million gallons on a single strength base or 8% of the national pack. Canada and Western Europe are the chief export markets.

Pineapple Juice

The world pack of pineapple juice during the two crop years 1958-59 and 1959-60 averaged nearly 85 million gallons or 25 million cases on a 24 No. 2 can basis. About 9.25 million cases or 37% of the total was hot pack concentrate on a single strength basis, all packed in Hawaii and the Philippine Republic. Those two producers contributed about 23.5 million cases or 95% of the world total of single strength and concentrated juice combined and 14.3 million cases or about 92% of the world pack of single strength juice of about 15.6 million cases. The balance of roughly 1.3 million cases was packed mostly in Puerto Rico, Australia and the Union of South Africa with much smaller quantities in Malaya, Formosa, Jamaica, Cuba and Mexico.

Pineapples were canned in Hawaii for about 30 years before commercial production of juice became economically feasible in 1932 when the process for extracting the juice from the pulp was perfected. In 1934 Hawaiian canners began to ship a substantial gallonage of canned pasteurized juice to the mainland. Thereafter the pack rose so rapidly that by 1940 it reached 43 million gallons with

per capita consumption in the United States of 2.5 pounds or almost 25% of total juice consumption, being exceeded only by tomato and grapefruit juice.

After a temporary setback in the Hawaiian pineapple juice industry during World War II the pack rose again. By 1952-1955 the annual average consumption of pineapple juice in the United States averaged 56 million gallons or 16.4 million cases of single strength juice, including about 2.3 million cases imported from the Philippines which began exporting substantial quantities to the United States in 1947. During 1958-59 and 1959-60 the United States imported about 10 million gallons a year of canned pasteurized single strength pineapple juice from the Philippines, or about 15% of national consumption. During 1956-1958 the Hawaiian-Philippine pack of single strength juice averaged 14.8 million cases. However in recent years a substantial additional hot pack of concentrated juice has been made in both Hawaii and the Philippines and shipped to the mainland. The hot pack of concentrate, on the basis of 24 No. 2 cans of single strength juice, was reported as approximately 9.8 million cases in 1958-59 and 8.7 million in 1959-60, averaging about 39% of the combined packs of single strength and concentrate in those two seasons. In 1960-61 the pack was 4.8 million cases or 25% of the combined packs of concentrated and single strength juice.

Pineapple juice now ranks third among the different kinds of single strength pasteurized juices canned in the United States, being exceeded only by tomato, and orange, with grapefruit juice a close fourth. Pineapple juice accounted for almost 12% of the total national hot pack of single strength juices in 1956-1959 with consumption averaging about 2.5 pounds per capita or nearly 7% of national consumption. Total consumption of pineapple juice, including approximate estimates of concentrate, consumed mostly in blended fruit drinks, appears to have been roughly 4.0 pounds per capita or perhaps 10% of national consumption of all hot pack and frozen juices during 1956-1958. Frozen concentrated Hawaiian pineapple juice was introduced in 1952 but the pack is probably very small as no data are available.

Apple Juice and Cider

Large but unknown quantities of barreled apple cider have been made in this country since early Colonial days by

small farm and local custom mills from surplus and off-grade apples.

Since the commercial pack of clarified pasteurized apple juice under vacuum in sealed containers was first reported in 1939, for the United States and Canada, the annual pack has grown fairly rapidly.

The national hot pack of canned and bottled apple juice rose to a peak of over 22 million gallons in 1959 with sweet cider production estimated as a little larger than the juice pack. About 5% of the commercial apple crop was utilized in juice and cider manufacture.

During 1956-1958 the national pack of canned and bottled apple juice averaged about 15 million gallons or about the same as the grape juice pack and accounted for about 4% of the total hot pack of all single strength fruit and vegetable juices.

In 1959 United States per capita consumption of hot pack apple juice and of sweet cider was each about 1.0 pound totalling about 10% of national consumption of all hot pack fruit and vegetable juices and 6% of all hot and frozen juice.

In several European countries the cheapest and most popular and readily available fruit juice is apple and production and per capita consumption of sweet cider and processed apple juice together have been greater than in the United States for many years.

Grape Juice

Nearly all of the unfermented grape juice made in the United States is consumed as pasteurized juice, in grape drinks, and as fresh frozen concentrate. Almost all is made from Concord grapes grown in New York, Michigan, Washington, Pennsylvania and Ohio. Bottled, heat sterilized Concord grape juice, the first pasteurized unfermented fruit juice made commercially in the United States, was introduced in New Jersey in 1869.

Per capita consumption of grape juice in the United States grew very slowly until after World War II when it rose to an average of about three-fourths of a pint for 1956-1958 with a hot pack of about 16 million gallons, accounting for about 4.5% of the national hot pack of all single strength fruit and vegetable juices and utilizing approximately 100,000 tons or nearly 40% of grapes grown in states other than California and Arizona. About the same additional quantity was packed as frozen concentrated juice in the chief Concord producing states so

that about 90% of their grape crop has been processed in recent years.

Surveys of the utilization of grape crops of New York indicate a substantial majority of the grape crop in the Concord producing states has been used in recent years for unfermented juice—as single strength hot pack, frozen concentrate, and in grape drinks. Frozen concentrated Concord grape juice is the only important concentrated deciduous fruit juice other than citrus consumed in the United States. However a larger hot pack of pineapple concentrate has been made in Hawaii and the Philippines, in very recent years, much of which is used for making blended fruit drinks.

Nectars and Prune Juice

Since 1934 prune juice, made commercially from California dried prunes, has risen to about one pound per capita or 6% of national consumption of canned and bottled pasteurized single strength juices. During 1956-1958 an average of about 42,000 tons of dried prunes was used for single strength juice and concentrate, or enough to make between 8.0 and 9.0 million cases of 24 No. 2 cans of single strength juice. About 28% of the state's total dried prune crops was used for this purpose. Juice is the chief outlet for smaller-size prunes. The juice pack is likely to remain near the present level as long as prune production does not increase much.

The national pack of fruit nectars—almost all produced in California—nearly doubled in the 1950's. However these pulpy fruit juices now account for less than 10% of the hot pack of all single strength fruit and vegetable juices in the United States. The statistics on the nectar pack are approximate estimates including several pulpy fruits for which no data are available separately. The chief nectars are apricot, the most popular, and peach and pear. About one half of the national pack is exported. During 1956-1958 exports of peach and pear juice nectars and concentrate averaged about four million gallons or perhaps one half their total pack which is not known exactly. Latin American countries are the chief export outlets with Cuba the largest until 1958 when Venezuela became the largest.

Vegetable Juices

Nearly all of the national pack of vegetable juices is tomato juice, that is, combinations containing 70% or more

tomato juice. Of the total pack of vegetable juices reported by the United States Census for 1958, only a little over 6% were juices other than tomato or about 7 million gallons, not including the juice packed as baby food. Most of the pack of other vegetables is believed to be tomato-vegetable blends containing less than 70% tomato juice. Since 1930 a few unblended vegetable juices, mostly carrot and sauerkraut, have been available in grocery or health food stores.

No other juice or processed food had as spectacular a growth as tomato juice until after frozen concentrated orange juice was introduced in 1945. Ever since tomato juice was introduced commercially in 1928, it has held first place among the dozen different individual kinds of pasteurized juices. After World War II the pack continued its marked upward trend and normally now substantially exceeds the combined hot pack of all citrus juice, which has decreased greatly since concentrated orange juice became so popular after 1945.

California's tomato juice pack has grown so rapidly that it has been by far the largest of any state for many years and now normally constitutes over 40% of the total national pack. Of the tonnage of all tomatoes processed during 1956-1958, the juice pack utilized nearly 800,000 tons or about 20% of the national total and about 300,000 tons or a little over 10% of California's total.

During those years the pack of tomato juice, of 130 million gallons a year, constituted almost 35% of the total hot pack of all fruit and vegetable juices, equaling the combined hot-pack of all single strength fruit juices other than citrus and exceeding the combined hot pack of citrus juices, which accounted for only 30%.

Per capita consumption of tomato juice in the United States averaged 5.1 pounds during 1956-1958 or slightly more than double the 1934-1938 average. Exports of tomato juice have increased slowly since the last World War, averaging a little over 5% of the pack during 1956-1958. Canada, the chief foreign market, which has also packed tomato juice in recent years, now consumes almost double the national per capita consumption.

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The foregoing article is a summary of a longer paper, published elsewhere, and is based on some 20 tables prepared as part of one phase of Research Project No. 1449.