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Taking the pith

The impact of the production and consumption of oranges and orange juice on people and the environment

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Taking the pith

The impact of the production and consumption of oranges and orange juice on people and the environment

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Introduction

The orange is a common name for the citrus fruit of several trees. Different varieties include the sweet orange (*Citrus sinensis*), the Seville or sour orange (*Citrus aurantium*), the bergamot orange (*Citrus bergamia*) and the mandarin or tangerine orange (*Citrus reticulata*). Sweet oranges are the most commonly grown and include varieties such as the common (e.g. Valencia), navel and blood orange. These oranges are mostly cultivated for orange juice and fresh fruit. Seville oranges, in contrast, have a bitter taste and are cultivated for marmalade and to provide rootstock for less vigorous strains. Most commercial orange trees are grown by grafting the desired fruit bearing variety to the trunk of a rootstock that is most suitable for the local soil structure and water balance of the grove. After three or four years the first harvest can be made and output reaches a peak after about eight years. An orange tree can produce fruit for up to 50 years, though yields are low by this stage and trees are usually replaced after 25 years.[2]

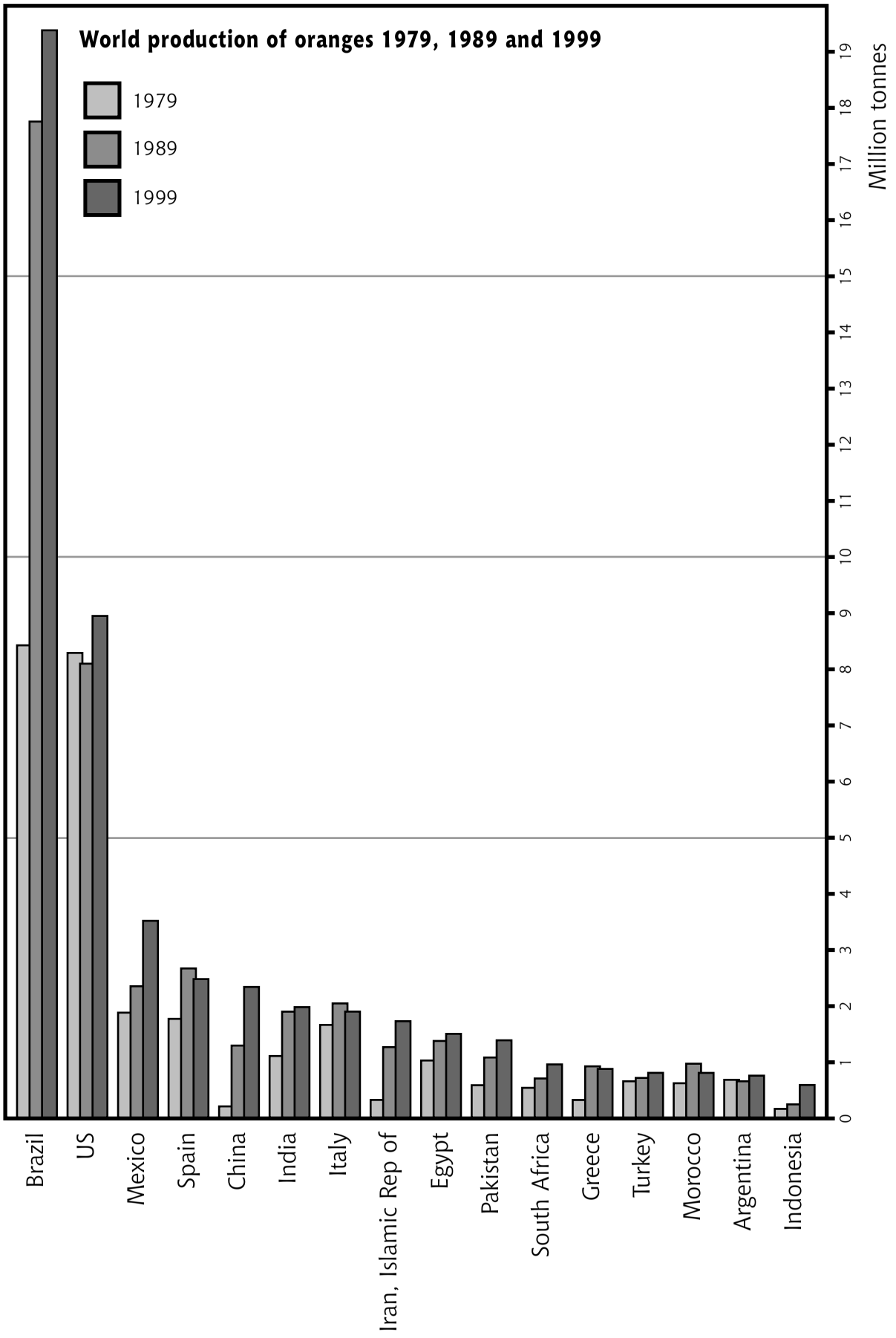
Nearly all citrus fruit varieties originated in the Himalayan region and have now expanded to most of the world's tropical and subtropical areas. Citrus first spread from its origins to the Mediterranean in the middle ages and Columbus introduced citrus to the Americas in 1493, planting the first seeds on the island of Haiti.

Production

Strong world-wide demand for oranges and orange products has resulted in a 66% increase in world production in the last twenty years with over 58 million tonnes of oranges produced in 1999. Brazil produces a third of all oranges in the world, the US 15.4%, Mexico 6.1% and Spain 4.3%.[4] Orange juice is the most important commodity in Brazil and Florida (US) with 95% of all oranges in Florida and 85% in Brazil (see *Oranges in Brazil*) processed into orange juice.[5] The state of Sao Paulo (Brazil) alone accounts for nearly half the world's supply of orange juice.

Did you know?

The term 'limey' is an expression used by north Americans to refer to British people. The term originates from the large amounts of citrus fruit British sailors would consume. Citrus fruits, including oranges, were known to prevent scurvy, a disease caused by lack of vitamin C.[3]


World production of oranges 1979, 1989 and 1999
1979
1989
1999
Million tonnes
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
Brazil
US
Mexico
Spain
China
India
Italy
Iran, Islamic Rep of
Egypt
Pakistan
South Africa
Greece
Turkey
Morocco
Argentina
Indonesia

Oranges in Spain

The first orange orchards in Spain were planted in 1781 in the fertile flat plain of the Valencia region.[6] Since then, there has been a steady increase in production over the years, from an area of 2,765 hectares of orange trees in 1873 to 280,000 in production today.[7]

Spain is one of the main orange producing and exporting countries in Europe, and the fourth biggest producer in the world. The main areas of production are Valencia, Castellon, Alicante, Andalucia and Murcia (see the table *Producing areas of Spain*). Unlike Brazil, Israel and Florida in the US, oranges in Spain are mainly grown for the fresh fruit market. Spain also dominates the relatively small market for canned orange segments.

In the first half of the 20th century Spain's main market for exports was the UK, but recently the number of importing countries has diversified. However the vast majority of exports are still to countries within Europe; in 1998 83.5% of orange exports went to countries within the EU (see the table *Spainish exports,1997 / 98*).[8]

At the beginning of the 20th century most of the exported oranges were transported by ship. Around the middle of the century, there had been a shift towards the use of railways and today, over 90% of all Spanish oranges are now transported by road (see the table *Orange road miles*).[9 10]

Until very recently, the majority of orange groves were cultivated in relatively extensive systems which were based on traditional methods. For example trees were grown close together and all work such as pruning, weeding, and harvesting was done manually. In many smaller orchards, it is still possible to see traditional flood irrigation techniques used, and a rich weed flora beneath the orange trees, where weeds have not been removed. Sometimes oranges are still intercropped with other produce such as broad beans.[15] Even on large scale plantations, the older trees are still often watered by flood irrigation methods, though today many trees are now watered using drip feed irrigation.[16]

In the early 1980s around 80% of all orange orchards were less than 3 hectares in size.[17] In the Levante region of Valencia, half the orchards are under one hectare in size. Traditional fertilisation techniques are used in the area, with two to three applications per year, and a herbicide application in the spring. Often the vegetation ground cover is left in the winter and cleared in the summer.[18]

Despite the vast range of orange varieties and cultivars in existence, orange production has concentrated on a few popular varieties, namely

Spainish exports, 1997/98 [12]

Country total	Thousands of tonnes	% o exports
Germany	344.1	26.9%
France	329.9	25.7%
Holland	143.7	11.2%
Belgium- Luxembourg	76.1	5.9%
UK-Ireland	62.1	4.8%
Italy	36.8	2.9%
Austria	24.8	1.9%
Switzerland	24.6	1.9%
Sweden	17.9	1.4%
Norway	17.3	1.4%
Denmark	14.3	1.1%
Finland	3.4	0.3%
Other	18.0	1.4%
Total Western Europe	**1,113.00**	**86.9%**
Eastern Europe	164	12.8%
Total Europe	**1,277.00**	**99.7%**
Outside Europe	4.3	0.3%
Total exports	**1,281.30**	**100.0%**

Producing areas of Spain [11]

	Area (ha)	Production (tons) / year
Valencia	106,000	2,475,000
Andalucia	48,000	800,000
Castellón	43,000	930,000
Alicante	39,000	670,000
Murcia	32,000	345,000

Orange road miles[13 14]

Transportation Method (%)

Season	Ship	Rail	Road
1919/20	94	6	-
1950/51	59	40	1
1960/61	49	45	6
1970/71	8	58	34
1975/76	3	47	51
1987/88	2	18	79
1993/94	1.5	(	98.5)

Variety of exports[20]

Variety	% of total exports
Sweet varieties	
Navel and Navelina	65%
Salustiana l	7%
Late varieties (mainly Valencia Late)	27%
Bitter varieties:	
Améres	less than 1%
Verna	less than 1%
Other Sanguines	1%

Navels and Navelinas (see the table *Variety of exports*). There is a growing realisation that this lack of variety has been causing problems. For example the market is flooded with the same varieties between November to January and prices for the farmers are very low.[19]

Water is the main limiting factor in citrus production. Modern methods now use drip feed irrigation which reduces the amount of labour and water used compared to flood irrigation. It also allows for the water supply to be adjusted to provide the recommended amount of water needed, which is 6000 - 9000 m^3 per hectare each year.[21]

Oranges ready for harvest in Spain

Fertiliser is the second most limiting factor in orange production. It is estimated that in the Valencia region more than 11,000 million pesetas worth of fertilisers were used in 1997.[22] The problems of excess fertiliser are well documented and there has been a growing realisation in Spain that in the last few decades farmers have overused fertilisers. In 1988 a six year study of nutrient levels in 300 plantations (parcelas) in the Valencia region found:[23]

- Over 70% of groves had excessive levels of phosphate (P) and potassium (K) in the soil - more than was needed by the plants
- 92% of leaves contained excessive levels of P
- 72% of leaves contained excessive levels of K
- 70% - 80% of leaves contained excessive levels of nitrogen (N)
- 62% of aquifers contained concentrations of N higher than 50ppm and 32% higher than 100ppm. The maximum amount permitted for drinking water under European Commission regulations is 50ppm.

The annual sales of pesticides in 1997 came to a total of 90,000 million pesetas, 34% of which was for insecticides, 21% for fungicides, 31% for herbicides and 14% for other types of pesticide.[24] Pesticide inputs are the main variable cost in the production of oranges.[25]

The development of integrated pest management (IPM) systems has been encouraged in Spain over recent years in recognition of the problems associated with agrochemical use. IPM is the practice whereby techniques are used to minimise water, fertiliser and pesticide use and provide more protection for the environment. Part of the move towards IPM came from legislation in importing countries who have placed limits on the levels of pesticide residues that may be found on imported products.[29] However, the box *Every orange contaminated* shows that there is still a problem with excessive pesticide use from all the countries exporting oranges into the UK. Although none of the samples taken by MAFF were over the Maximum Residue Level (MRL), all of the oranges contained a combination of several pesticide residues. The first IPM regulations in Cataluña, Spain, appeared in 1996. However, the IPM programme has not been centralised or well defined and development has been slow. This is a result of a number of factors including the need for paperwork, the lack of uniformity in regulations between countries and regions, and underdeveloped marketing and publicity strategies. To date 703 producers with a total of 1,429 orchards have subscribed to the IPM programme.[30]

Every orange contaminated

In 1999 the UK Working Party on Pesticide Residues (WPPR) published their results of pesticide residues found in common foods. Sixty-six samples of oranges from various countries (Australia, Cyprus, Israel, Italy, Morocco, South Africa, Spain, Uruguay, Zimbabwe, and unknown) were tested. Pesticide residues were found in all samples but none had residues above the Maximum Residue Level (MRL). Two fungicides, Imazalil and Thiabendazole, were found in the majority of oranges tested, though neither were considered a hazard to consumers. Of more concern, both for the environment and consumer health is the amount of 2,4-D found. Over 57% of all oranges contained the herbicide 2,4-D which is known to be toxic to humans. Links have also been shown between 2,4-D and cancer and reproductive problems. 2,4-D will also cause environmental pollution, in that it is easily leached from soils into groundwater and is highly toxic to fish. These results indicate that farmers have been over-spraying with 2,4-D and, as with all herbicides, excess applications of 2,4-D would inevitably lead to reduced biodiversity of the local wildlife, in particular weeds, small mammals and birds.[26 27 28]

Oranges in Brazil

The majority of the oranges produced in Brazil are processed into orange juice, most of which comes from the Brazilian state of Sao Paulo. The table *Brazilian oranges*, however, shows that the proportion of oranges grown for the fresh produce market has been increasing during the 1990s. There are approximately 18,000 independent growers in Brazil[31] though the majority of growers sell their produce to four large companies that control over 50% of the world supply of orange juice. A few co-operatives, formed by growers, have built their own processing plants but these are generally small in size and find it difficult to compete with the multinational companies.

Brazilian oranges[32]

Season	Production	Fresh	Processed
1992-1993	12.8	1.6	11.2
1993-1994	12.5	2.3	10.2
1994-1995	12.7	2.6	10.1
1995-1996	14.1	4.1	10.0

figures in millions of tonnes

Harvesting children

It is acknowledged that thousands of children pick oranges in Mexico and Brazil.[33] These oranges are mainly picked for the international orange concentrate market. Orange juice from concentrate is rarely labelled with the country of origin, so shoppers often unknowingly purchase juice made from oranges which are picked and packed by Brazilian children earning as little as US$3.00 for working a 14 hour day, or 21 cents per hour. The majority (approximately 90%) of farms in these countries are relatively small and due, to traditional or economic reasons, the farmer's own children may be required to work on the farm. Working conditions for these children are often unsafe and unsanitary; they are regularly exposed to pesticides, and sometimes dangerous parasites and bacteria which can contaminate the fruit.

Changes are being made to improve the conditions for child workers. In 1996, Abecitrus, the Brazilian Association of Citrus Exporters, collaborated with the Government of Sao Paulo State and with the Abrinq Foundation for Children's Rights in a campaign for the eradication of children's work in farming activities and a subsequent increase in school attendance. They have signed a 'public commitment' for the eradication of child work in the whole productive chain of frozen concentrated orange juice.[34] However, it may be many years before the broader social and economic changes required to eliminate the 'need' for child labour are achieved.

Energetic oranges

In 1991 the Wuppertal Institut in Germany looked at the energy efficiency of producing and consuming orange juice.[35] Brazilian orange juice was found to be 8000 times less material intensive than US orange juice as shown in the table *Energy use in Brazil* and the US. It is not known if, ten years later, this is still the case as Brazilian orange groves now are often irrigated. The study also found: that for every glass of orange juice drunk, 22 glasses of processing water were needed to produce the orange juice; 1000 glasses of water for irrigation; and for every tonne of orange juice produced, one hundred kilograms of fuel (crude oil and diesel) were needed.

Energy use in Brazil and the US [36]

1990 (kg per tonne equivalent juice)	Brazil	US
Fuel - concentration process	8	75
Fuel - agriculture	109	1,910
Irrigation water	0	958,610
Total	117	960,595

Alternative oranges

The fair trade alternative

Fairtrade Labelling Organizations International has been established to assist growers and their communities who may be disadvantaged by the current processing system. Fairtrade organisations aim to help growers gain control over their own lives with a fair and just return for their work, and decent conditions to live and work in. For orange juice traders, importers and producers to participate in fairtrade, they must comply with a number of conditions. Traders and importers must buy oranges as directly as possible from accepted sources and at a price that has been fixed by the fair trade organisation. Producers (co-operatives and associations) must:[37]

- be independent and democratically controlled by their members (assists minimising risk of fraud)
- have a philosophy based on the concept and practice of solidarity
- not accept any form of political, racial, religious or sexual discrimination
- have a responsible attitude against child labour
- have smallholders as the majority of their members
- accept minimal labour and environmental standards (see below)

If these and other conditions are complied with, a producer can use a fairtrade label on the product, and will be eligible for a premium price. It is illegal to purchase oranges or concentrate from outside sources and re-sell it under a fairtrade label.

Fair trade oranges also help protect the environment as well as the workers

Minimum labour standards

Fairtrade standards cover a number of labour standards such as the following:

- All employees must be legally covered by binding contracts of employment, and sickness or injury provision to cover loss of earnings
- All employees must receive basic wages that are above average within the locality for similar occupations and in line with or exceeding national laws and agreements on minimum wages.
- Working juveniles must get free access to further education and work must not conflict with attending school. The minimum age for working is fourteen.
- There must be no danger of physical or mental damage to the adolescent workers
- The application of leaf-residual or human-toxic pesticides must take place in such a way as to guarantee that contamination of workers is avoided

FAIRTRADE LABELLING ORGANIZATIONS INTERNATIONAL

Minimum environmental standards

Protection of the environment is also an important consideration for fairtrade products. For example regulations include the following restrictions:

- The use of agrochemicals and uncomposted manure is not allowed within a 20 metre buffer zone from rivers, swamps, lagoons or potable water sources. Many pesticides are banned such as 2,4,5-T, aldicarb, aldrin, campheclor, DDT, dieldrin, heptachlor, lindane, and penthachlorophenol.
- Where irrigation is applied, care must be taken in the maintenance of the ground water levels. For example water saving devices should be used and irrigation should take place in a way that minimises any waste or pollution.
- A 20 metre buffer strip should be maintained between areas of natural vegetation and cultivation. The planting or cultivation of other plant species to enhance biodiversity is encouraged.
- Wherever possible organic farming practices should be used (see below).

Processing oranges can also be polluting and therefore a number of standards have been implemented such as: the use of a recycling system to use the same water for cleaning fruit, proper treatment of waste water, and energy saving devices to be used wherever possible.

Available in Europe

Fairtrade orange juice is now available in Switzerland, Germany, Italy and the Netherlands, though it is not yet sold in the UK. The oranges used in the fairtrade orange juice are grown in Brazil, Costa Rica and Mexico.

Growing oranges organically

An alternative to intensive orange orchards is to use organic production techniques. The main cost associated with organic orange groves is the transition from conventional to organic, as new equipment and materials are often required and it may take time for production levels to become profitable. However, once fully established an organic orchard has many financial advantages over conventional, such as the savings from not buying pesticides and fertilisers and the premium received for organic oranges. For example, prices received for fairtrade conventional orange juice concentrate (OJC) is US$ 1,300 per tonne, whereas the fairtrade organic OJC is US$1,600 per tonne.

Some of the production practices for organically grown oranges, such as pruning, irrigation and harvesting, are similar to those of a conventionally grown oranges. Differences principally lie in the types of pesticides and fertilisers used.

Fertilisers

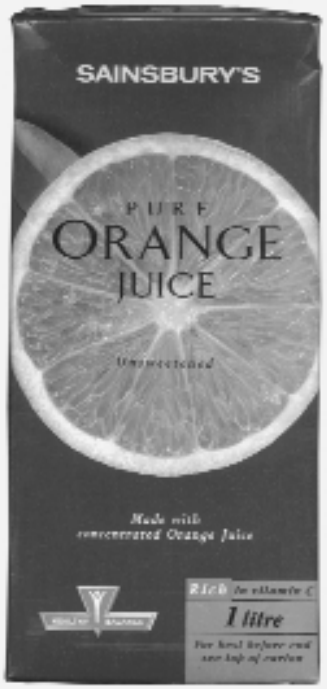
Instead of conventional synthetic fertilisers, organic growers can apply a mixture of fish and kelp products to provide adequate quantities of nitrogen, phosphorous, potassium and micronutrients to the trees. Application of such fertilisers generally coincide with the grove's growth flushes, though the total number of applications depend on the nutrient requirements of each grove. Soil conditions on organic

Israeli Organic Orange Exports

Haim Katzir became Israel's first organic citrus producer in 1980 after 10 years of being a conventional farmer. He described his reasons for converting: "Every two or three years, we had to change the pesticides we used. I felt that instead of being involved in agriculture, I was in a battle, changing every time to a bigger cannon". He also found that pest species frequently developed resistance to a pesticide after repeated applications and consequently, there was a need to apply a different and sometimes more toxic chemical. The oranges are grown on a 1,000 hectare kibbutz of which 46 hectare has been converted to organic citrus with a further 40 hectare in conversion. He is the largest organic producer in Israel, and demand for his product is increasing. In 1999, he sold 2,200 tonnes of citrus and is expected to sell 3,000 tonnes in 2000. The increase is partly due to the continued demand from UK consumers for organic produce.[39]

Orange juice

Orange juice dominates the global production of oranges. Before the 1800s nearly all oranges were grown for the fresh fruit market. The development of the orange processing industry began in the US following an excess production of oranges, which expanded in the 1900s by using the orange residue wastes for such by-products as cattle feed.[40] The development of the flash pasteurisation process (which prolonged the shelf-life of orange juice) in the 1940s ensured that orange juice could be transported longer distances. The resulting increase in demand saw orange production in Florida grow rapidly. The industry was soon considered economically significant to the region and to promote further development the Florida Department of Citrus (FDC) was formed.[41] One initiative of the FDC was to start a citrus industry in Brazil in order to ensure continuous supply when Florida yields have been damaged by frost. Following a further freeze in Florida in the 1983-84 season, Brazil became the largest producer of orange juice in the world.



This orange juice has been concentrated and then reconstituted with water and orange oils, and pasteurised for long life.

Processing

Once harvested, the oranges are transported to the processing plant where each lorry is weighed to determine the amount paid to each grower. The fruit is graded, washed, then graded again for bad or damaged fruit. The fruit is then mechanically separated by size and sent to the juice extractors. Inside the extractors, before juicing, the peel is pricked to extract oil. The 'pulpy' juice then goes to a 'finishing' screen where the pulp and seeds are removed. Pulp, seeds and oil are diverted from the production line to be used for by-products (see below). From the finisher the juice can:

- be pasteurised to make Not From Concentrate (NFC) juice (see Marketing orange juice); or
- go to the evaporators where most of the water is removed from the juice by vacuum and heat, then chilled, to yield frozen concentrated orange juice (FCOJ). The juice's water content is reduced from around 90% to 35%.

The concentrated juice is then piped to the tank farm where it is stored at about -12°C. When the concentrate needs to be shipped to a customer such as a juice packager, the concentrate is blended from various tanks to meet the specifications of the customer and to meet the necessary legislative requirements. To enhance the flavour, essences and oils are added back during this phase.

FCOJ is usually put into 55-gallon drums and shipped in a refrigerated truck. Alternatively, it is piped into a special food-grade insulated tanker lorry and delivered to the packaging plant.

Some processing plants have packaging plants at the same site. In the US many dairies also package orange juice using the same equipment used to package milk, which may lead to problems of contamination if inadequate cleaning and sterilisation occurs (see *Dodgy juice?*). At the packaging plant, filtered water is added to reconstitute the concentrate to its approximate original volume and strength and then pasteurised to kill any harmful pathogens. The orange juice is then packaged in either cardboard cartons, glass bottles or plastic bottles.[42]

Marketing orange juice

By the 'market' definition, pure orange juice should contain nothing but fruit juice at the same strength and consistency as when the fruit was squeezed.[44] Freshly squeezed orange juice has a shelf life of only a few days and hence almost all orange juice sold at the retail level is a pasteurised product. The bulk of the orange juice trade is in concentrated form as handling, storage and transportation costs are around 6 times lower than for non-concentrated orange juice.[45]

The main forms of orange juice sold at a retail level in the UK are:

Concentrates
These juices are 100% pure. They are squeezed, concentrated and frozen abroad before shipping to the UK. Upon arrival the juice is reconstituted to its original strength and pasteurised. Depending on the level of pasteurisation, the juice is sold either as 'long-life' or 'chilled'.

Freshly Squeezed
Juice which is 100% pure and unpasteurised. Whole oranges are shipped to the UK, stored in refrigeration, then squeezed and delivered within 24 hours.

Not From Concentrate (NFC) (or Pure Squeezed)
100% pure juice which has been squeezed and pasteurised abroad to give it a longer shelf life

Orange Juice Drinks
Drinks with less than 100% orange juice and with added ingredients such as water, sweeteners, flavourings, colourings, and vitamins. They must contain a minimum of 2% orange juice (for example see *Delightful and sunny?*).

The first three are sold as 100% 'pure' orange juice. Fruit juices, including orange juice, as defined by the UK Fruit Juices and Fruit Nectars Regulations, are 100% pure fruit juices without preservatives, made from fresh fruit or fruit concentrates. Only the flesh can be used, no pith or peel. It is permissible within the regulations to add some sugar (up to 15 grams per litre for juice labelled 'unsweetened' and up to 100 grams per litre for juice labelled 'sweetened'[46]) and fruit acid (levels vary according to the nature of the juice) when juices from different countries or harvests are blended.[47] However, added juices from other fruits, or acids and sugars above the regulated levels, is considered 'adulteration' and is illegal (see *Dodgy juice?*).

Oranges are also used for orange segments (canned and pasteurised whole segments of orange with added juices or syrups), canned orange juice, and powdered orange juice drinks.

UK loves OJ[54]

Flavour	1995 Millions of litres	%	1997 Millions of litres	%
Orange	660	78	689	77
Apple	76	9	81	9
Grapefruit	26	3	27	3
Pineapple	25	3	26	3
Tomato	17	2	18	2
Other	43	5	54	6
Total	**847**	**100**	**895**	**100**

Orange juice consumers

Orange juice is the most popular pure fruit juice not only in the UK (see *UK loves OJ*), but in the world.[48] Worldwide demand increased during the 1990s at an annual rate of 4% and it is estimated that growth will continue at a similar rate in the future.[49] The United States is the largest consumer of orange juice, drinking approximately 20 litres per person a year, equivalent to about half of the world's total consumption.[50] Within Europe, Germany is the largest consumer (16 litres per capita), followed by the UK (13.9 litres) and France (7.9 litres).[51]

In the UK, orange juice consumption has doubled in the last decade. The British Soft Drink Association estimates that the British population annually drinks 15 litres of pure fruit juice per person of which 80% is orange juice.[52] Pasteurised, long-life juices (such as FCOJ) account for three-quarters of the volume of pure juices consumed. Consumption of non-pasteurised, short-life pure juices (such as freshly squeezed) account for only one fifth of sales. Orange juice drinks (less than 100% pure) have typically made up a small percentage of the juice market, though since the launch of 'Sunny Delight' (see *Delightful and sunny?*), the volume of orange juice drinks grew by approximately 18% (from 368 to 435 millions of litres) between 1995 and 1997.[53]

Healthy orange?

In 1999, the volume of sales of UK manufactured pure fruit juices was forecast at approximately 1,139 million litres (of which orange juice comprises 70-80%). In comparison, the forecast sale of UK manufactured carbonated soft drinks was 4,653 million litres.[55] This indicates that the average UK citizen drinks nearly four times as much nutrient-empty soft drinks than they do nutrient-rich pure fruit juices in a year.

Hundreds of studies have been conducted on the nutrients found in oranges and orange juice and their main conclusions are that both oranges and orange juice can be part of a healthy balanced diet. It should be noted, though, that the UK government recommends that regardless of the number of glasses (minimum of 150 millilitres) drunk, juices (including orange juice) can only be counted as one portion, of the five portions of fruit and vegetables we should eat each day.[56]

The United Nation's Food and Agriculture Organisation (FAO) met in Valencia in 1998 and concluded that in order to help improve the world's human health, people should increase their consumption of citrus fruits and juices as this could "*contribute to reduced risk of cardiovascular disease, some cancers, and neural tube defects*". The FAO suggested that steps should be taken to encourage cooperation between the public health, nutrition and citrus communities to "*forge a consensus at the national level about the important contributions citrus could make to health and nutrition*". They recommended that communities assist in up-dating national dietary guidelines and nutrition education programs, and support the promotion of increased citrus consumption to improve dietary intake, particularly among nutritionally at-risk groups.[57]

Delightful and sunny?

'Sunny Delight' is a fruit drink which contains 5% juice with added water, sugars, preservatives, nutrients, colourings and flavourings. In many retail stores it sells for a price comparable to pure orange juice and in 1999 was one of the top 10 best-selling brands in Britain with sales worth £150 million. This is equivalent to a 211% increase on 1998 sales.[58] Much of 'Sunny Delight's' success has been attributed to the large amount of advertising spent on promoting the drink as a fruit juice, even though oranges only make up 5% of the drink. Many of the ingredients in 'Sunny Delight' may have adverse effects on its primarily young drinkers (for example see the box *Turning orange*). The damage to health that can be caused by added sugars have been investigated in Food Facts Number 10 *Sweet and sour*.[59]

The producers of 'Sunny Delight', Procter and Gamble, have recently joined forces with the United Nations Children's Fund (UNICEF) to distribute a cheap new product called 'NutriDelight' to nutritionally-deprived children in the Philippines. 'NutriDelight' is an orange-flavoured powdered drink made to a patented formula which is fortified with iodine, iron and vitamin A. It is packed to look like 'Sunny Delight', but with the additional endorsement

Turning orange

In December 1999 a child's face and hands turned an orange colour after drinking 1.5 litres of Sunny Delight a day. The yellowing of the skin occurred from the added beta carotene which contains the vitamin A in the drink.[60]

of UNICEF.[61] By making the drink available to sites such as child-care and health clinics in developing nations, UNICEF sees it as an opportunity to improve the health and future for a whole generation of children who, instead of drinking expensive nutrient-less soft drinks, will be able to drink cheap nutrient-enhanced soft drink. This initiative seems to contradict the UN FAO's stance on encouraging the consumption of fresh fruit and vegetables, particularly citrus fruits, as a cost-effective measure to improve health. Moreover, in the case of 'NutriDelight', UNICEF is set to gain from a percentage of the Procter and Gamble's profits from sales of the drink. Health groups are concerned that a "quick fix" is being preferred over longer term policy changes to ensure that poor children can eat a healthy diet.

Dodgy juice?

The American Food and Drug Administration (FDA) describes four basic types of food adulteration:[62]

- filthy, putrid, decomposed or harmful
- unsafe or unsanitary
- statutorily unsafe
- economic

The most common form of adulteration in the orange juice industry is economic. This involves using inferior, cheaper ingredients (which are not labelled) to cheat consumers and undercut competitors.[63 64] Materials which some manufacturers have added to orange juice include: apple, pear, white grape, orange pulp wash, grapefruit juices, corn (maize) syrup, and liquid beet sugar. These are usually sold at lower prices than genuine 'pure' orange juice, and when they are blended into orange juice products, the manufacturer's economic returns are increased. The practice of adulteration has been economically damaging to some manufacturers as the

Not so orange

In 1993, 'Flavour Fresh Foods' of Chicago, USA, pleaded guilty to the charge of defrauding customers of more than US$40 million through the sale of adulterated pure orange juice. The elaborate fraud involved 'Peninsular Products', a Michigan company, shipping juice from Brazil to a Canadian company which added sugar. The juice was then sent to 'Flavour Fresh Foods' who diluted it with pulpwash then added citric acid and amino acids to cover the adulteration. The juice was transported back to 'Peninsular' who added more orange juice, pulpwash, and a preservative. The final product was sold to schools, hospitals, and nursing homes. The owner of 'Flavour Fresh Foods' was fined US$125,000 and sentenced to three years in prison.[67]

In 1988, 'Stirling Winthrop (UK)', the pharmaceutical firm, was fined £800 with £1200 costs for selling "pure" fruit juices, including orange, containing preservatives. Advertisements for the range of 'Delrosa' drinks falsely claimed the product did not contain any added sugar, artificial sweeteners, colourings or flavourings.[68]

Sustain: The alliance for better food and farming

Sustain

The alliance for better food and farming

Our Work

To represent over 100 national public interest organisations working at international, national, regional and local level.

Our Aim

To advocate food and agriculture policies and practices that enhance the health and welfare of people and animals, improve the working and living environment, promote equity and enrich society and culture.

Please note

The views expressed in this publication are not necessarily those of the working party members, of anyone acknowledged, or of Sustain's membership, individually or collectively.

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