TURUNÇGİLLER - CITRUS

- **PORTAKAL**
- **MANDARİN**
- **LİMON**
- **ALTINTOP**
- **LİME**
- **KAMKAT**
- **BERGAMOT**
- **ŞADOK**
- **AĞAÇ KAVUNU**

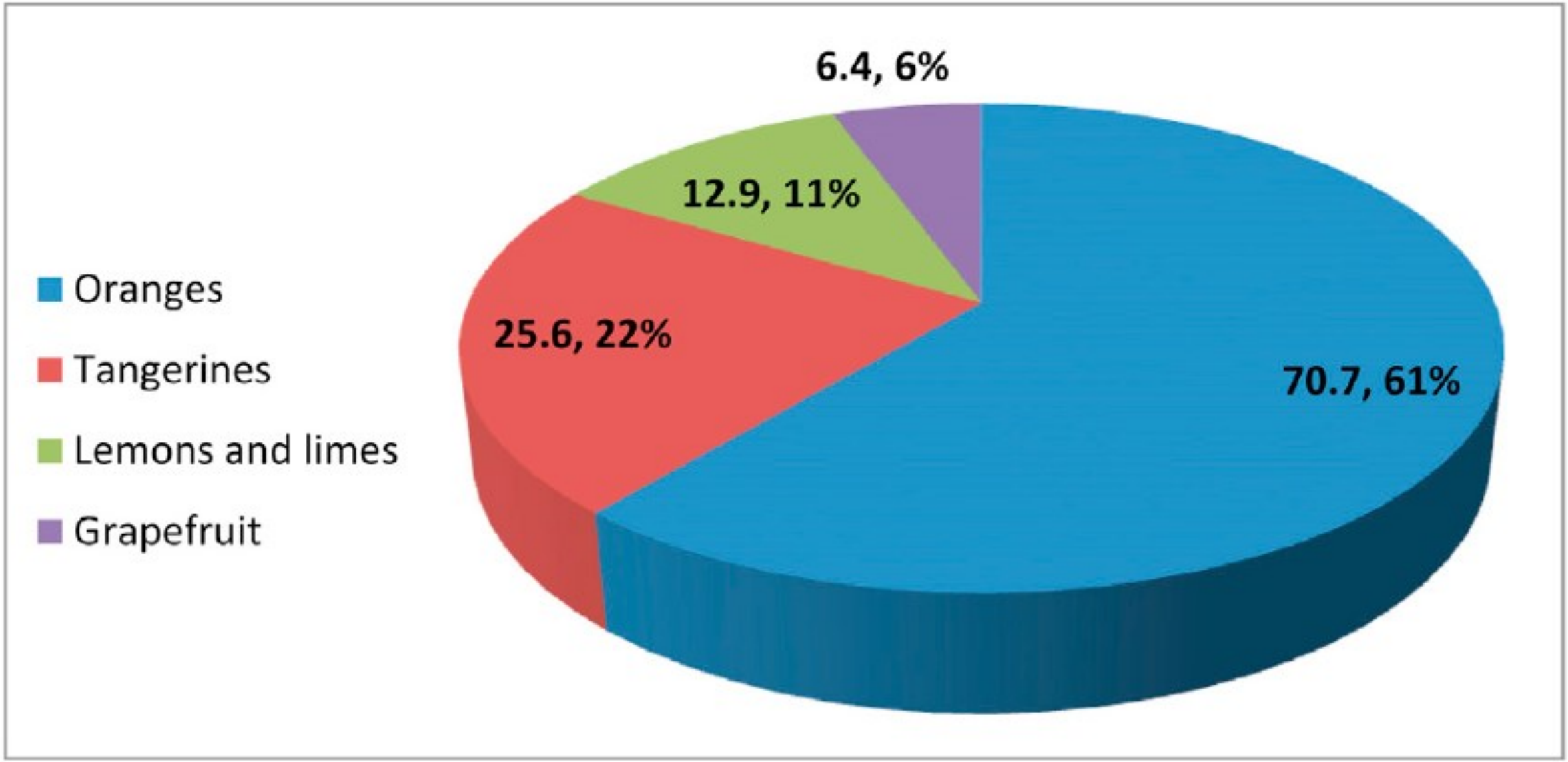


FIGURE 1.1 Total world production of citrus fruits, by variety (2010/2011 season). *(FAO, 2013)*

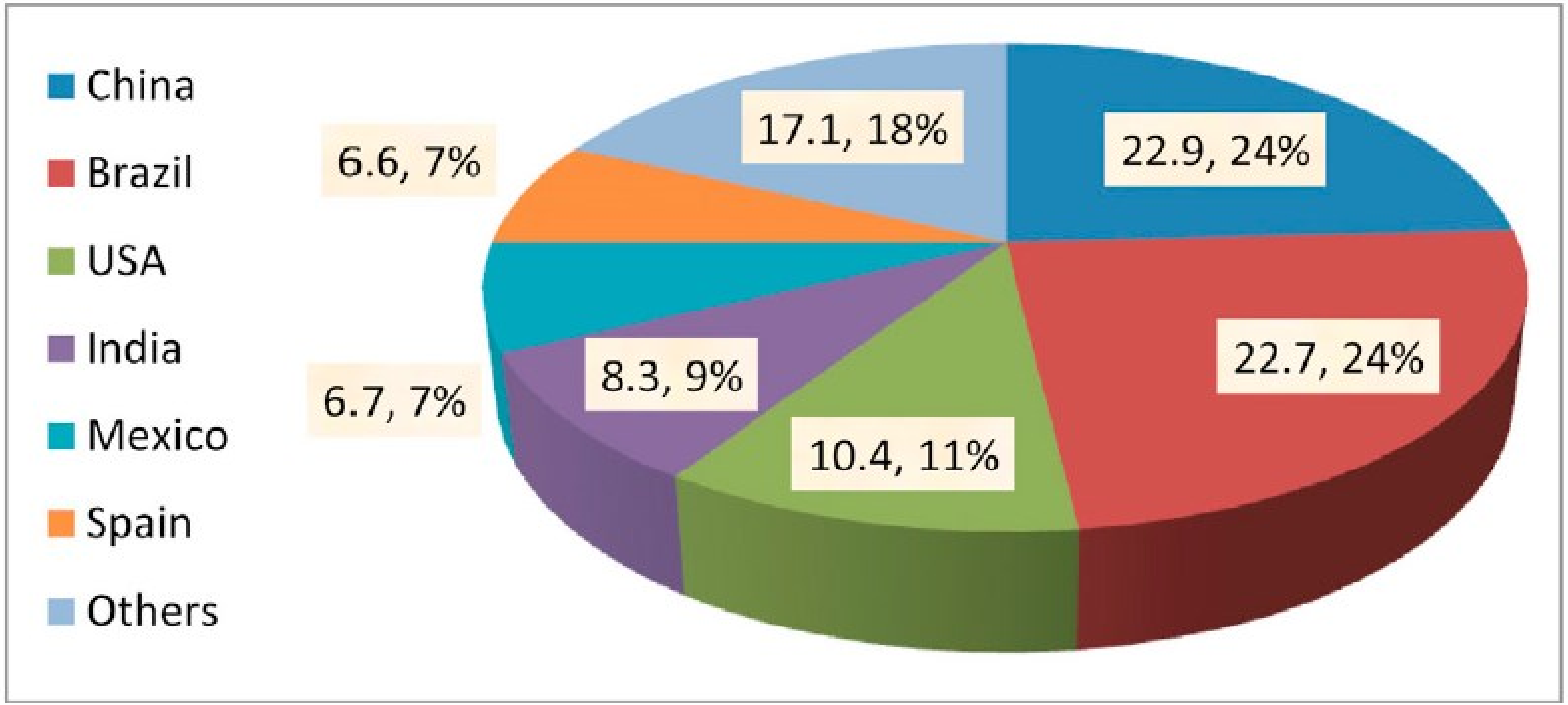


FIGURE 1.2 Total citrus fruits production, by countries (2010/2011 season).

(FAO, 2013)

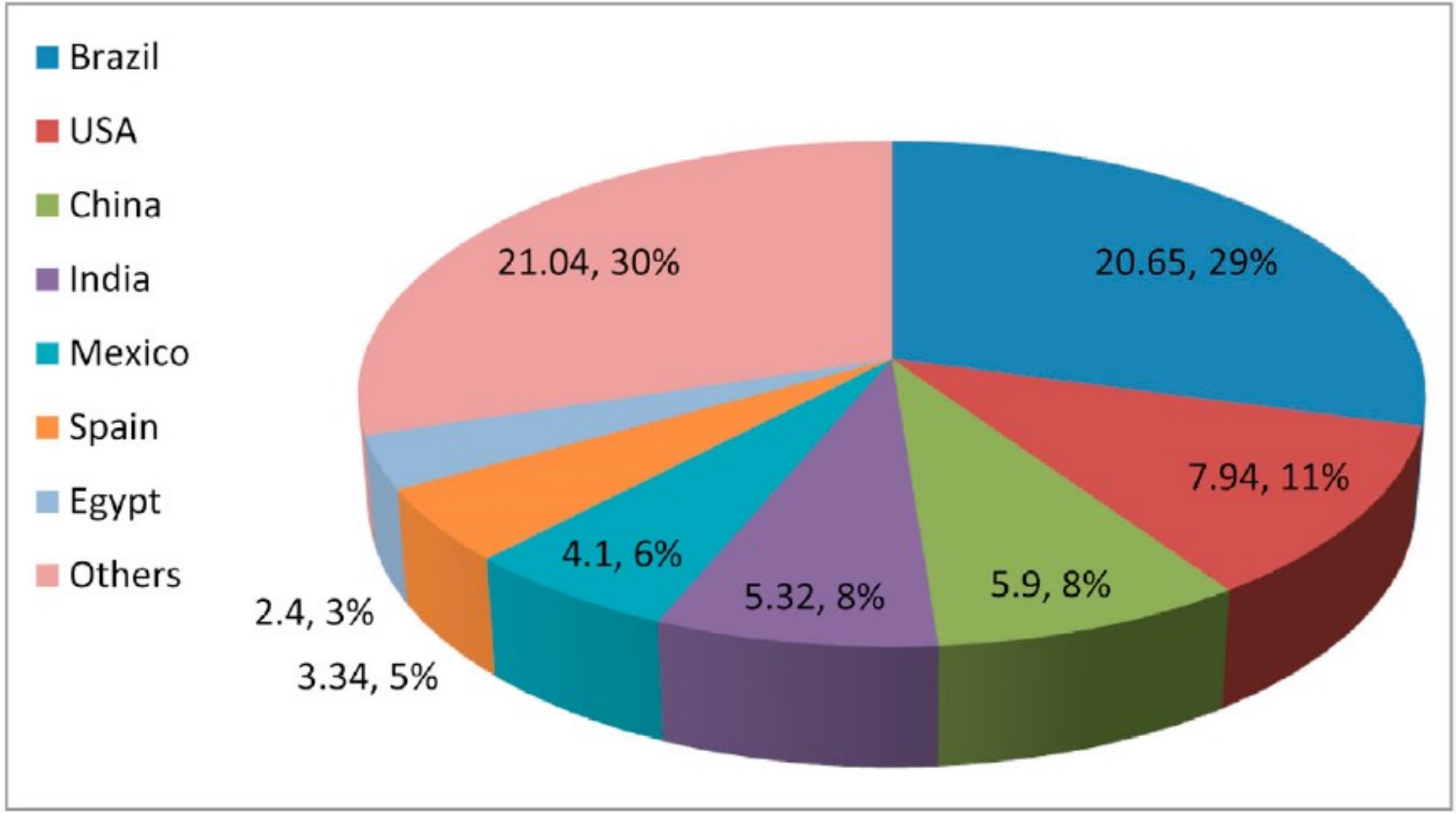


FIGURE 1.3 Oranges production, by countries (2010/2011 season). *(FAO, 2013)*

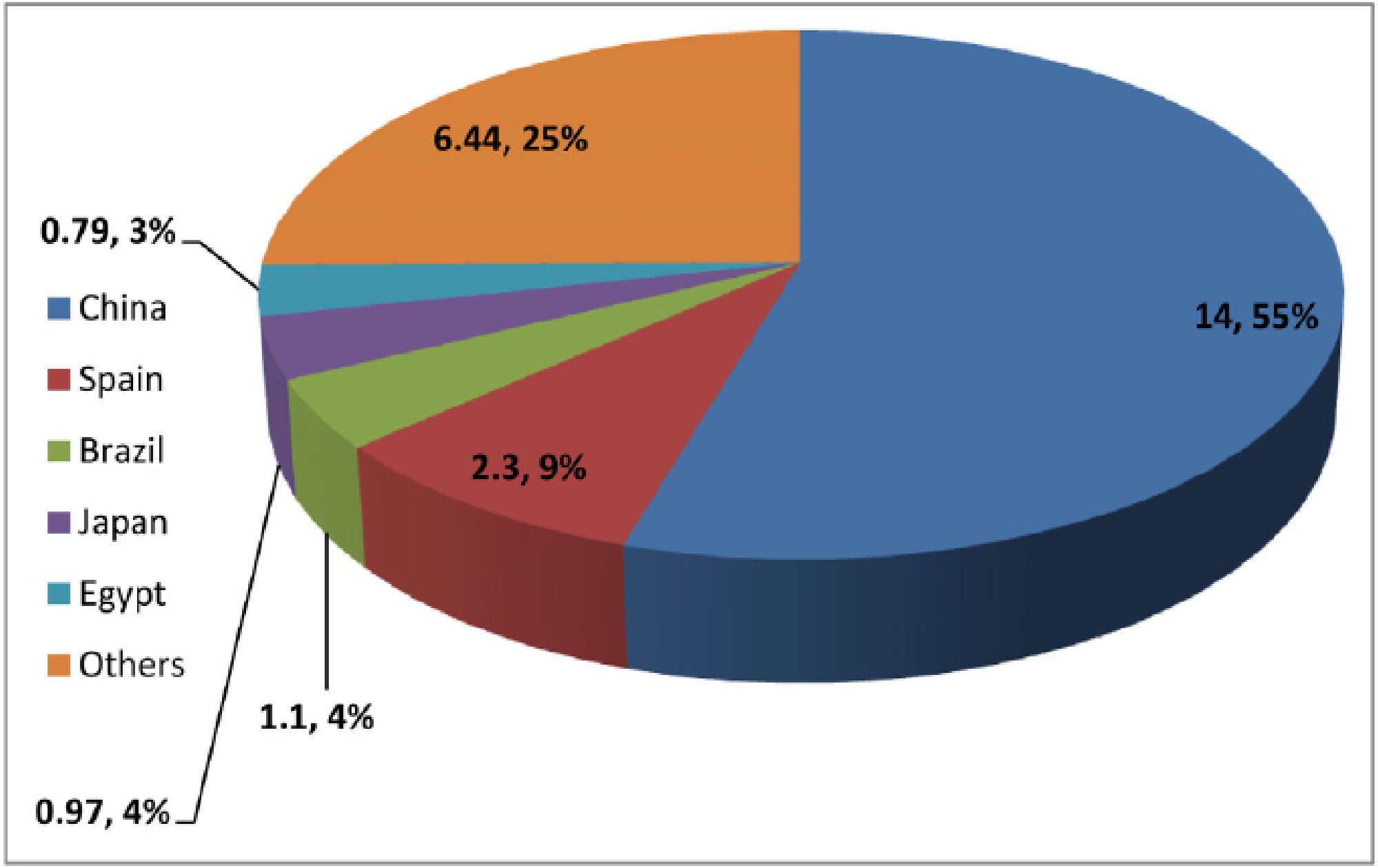


FIGURE 1.4 Tangerines production, by countries (2010/2011 season). *(FAO, 2013)*

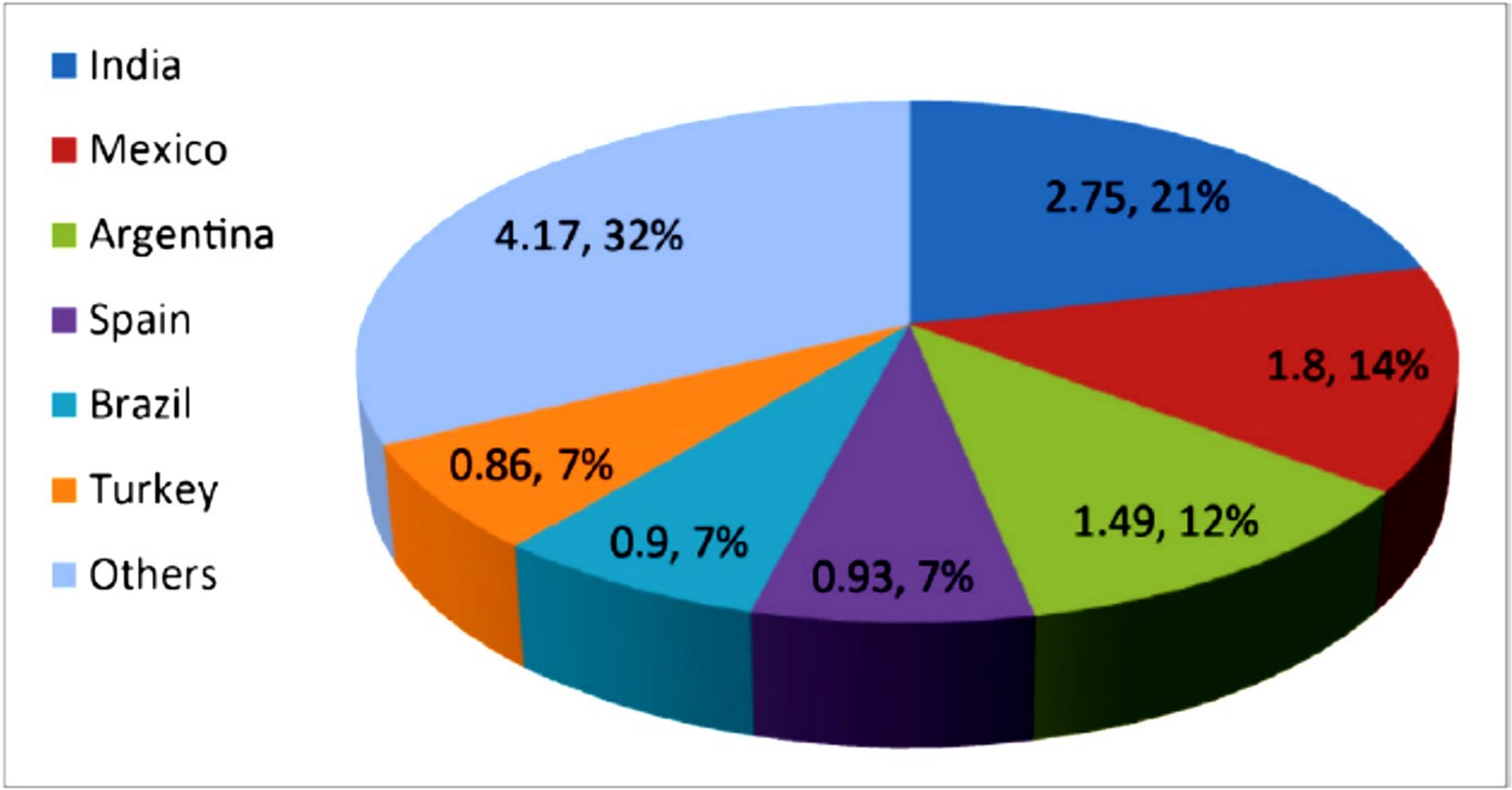


FIGURE 1.5 Lemons production, by countries (2010/2011 season). *(FAO, 2013)*

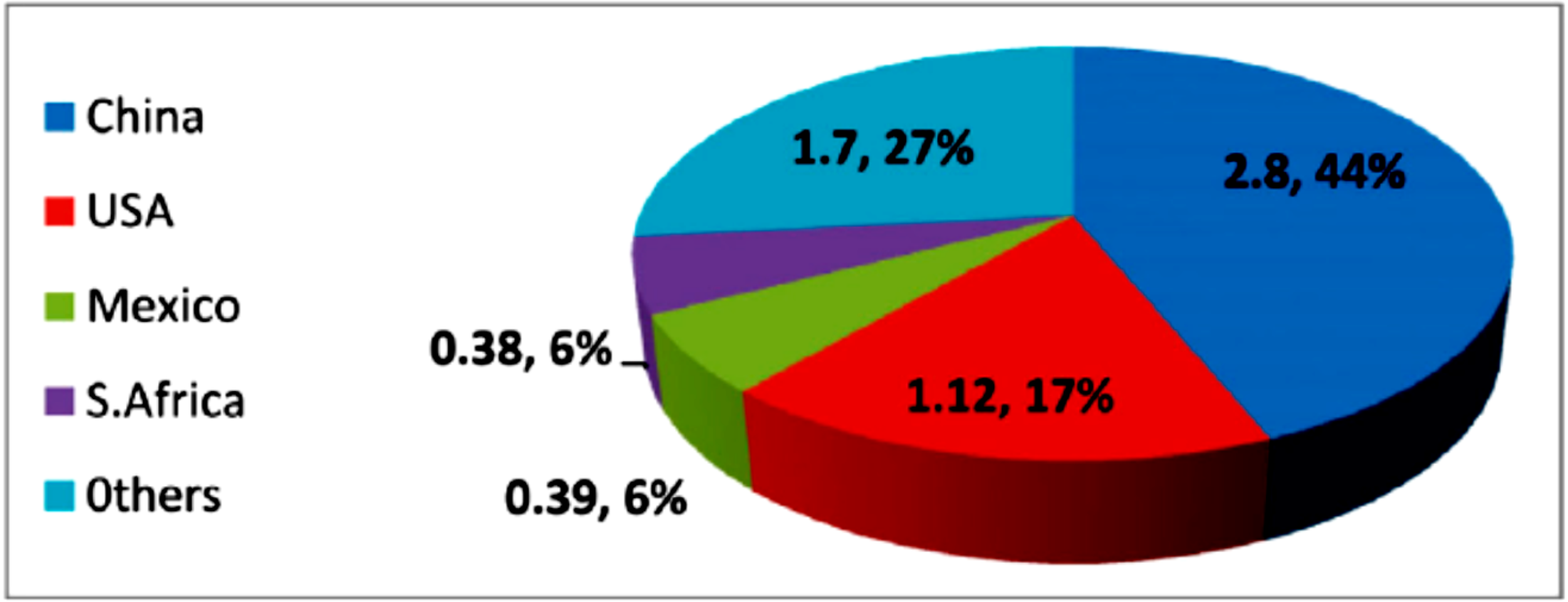


FIGURE 1.6 Grapefruit production, by countries (2010/2011 season). *(FAO, 2013)*

■ FIGURE 1.7 Kumquat fruits.

Table 1.1 Changes in the Proportion of World Citrus Production Used for Processing

Year	Total Production (Million Tons)	Processed Million Tons	Processed % of Total
1980–1989 ave.	57.8	19.8	34.3
1990–1999 ave.	81.1	26.9	33.2
2005	97.4	27.4	28.1
2006	102.6	29.2	28.5
2007	105.6	29.6	28.0
2008	109.6	29.5	26.9
2009	109.7	27.7	25.2
2010	109.3	23.7	21.7
2011	115.5	29.0	25.1

Source: Food and Agriculture Organization of the United Nations (FAO). (2013). The Citrus Bulletin, 2012. Rome.

Table 1.2 Citrus Utilization for Processing by Countries—2010–2011 Season

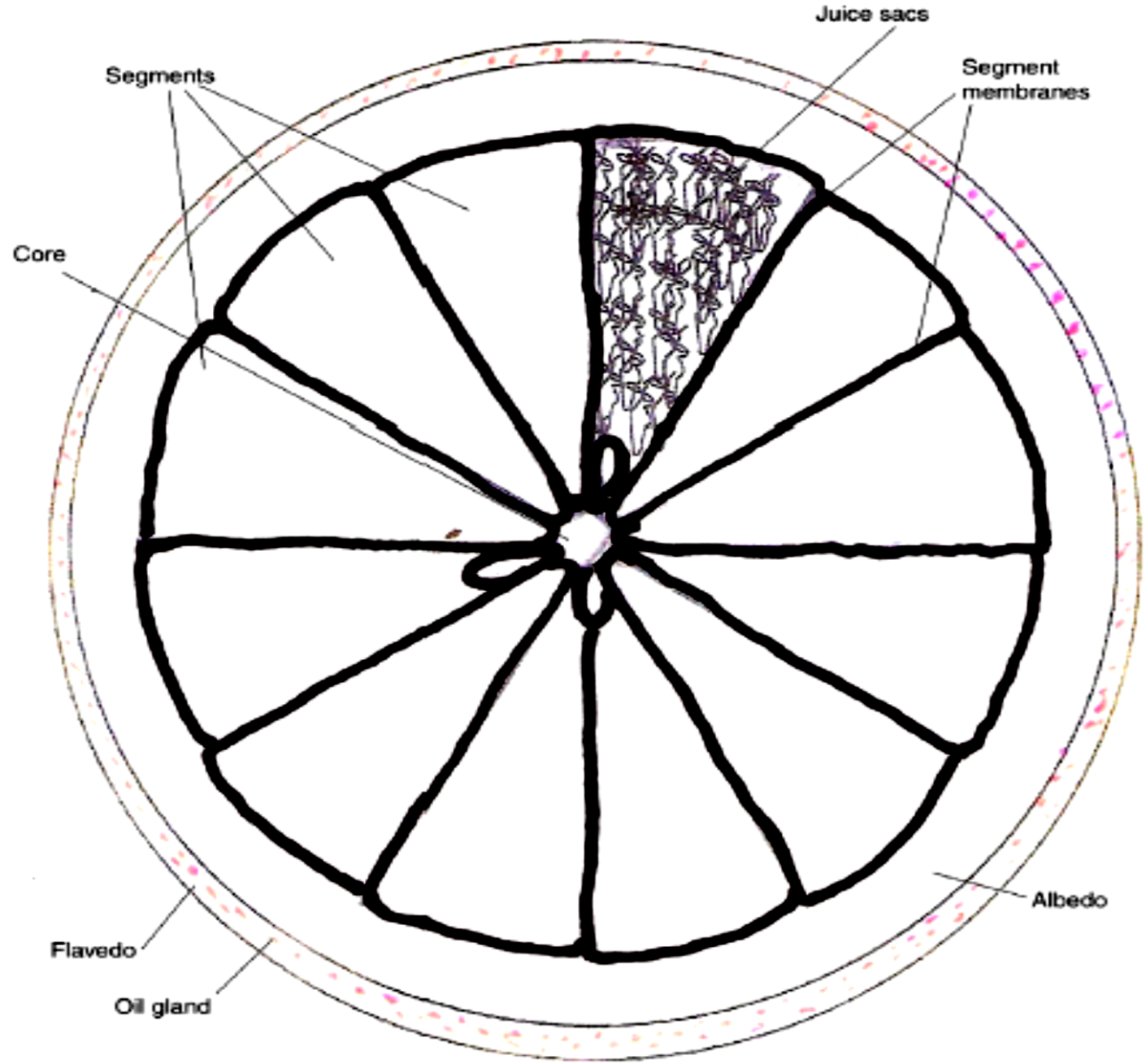
Country	Total Production Thousand Tons	Processed Thousand Tons	Processed % of Total
The Unites States	10,445	6,939	66.4
Brazil	22,704	14,861	65.5
Argentina	2,490	1,336	53.6
Mexico	6,744	1,500	22.2
Spain	6,627	1,217	18.4
China	22,940	660	2.9
Others	43,575	2,510	5.8

Source: Food and Agriculture Organization of the United Nations (FAO). (2013). The Citrus Bulletin, 2012. Rome.

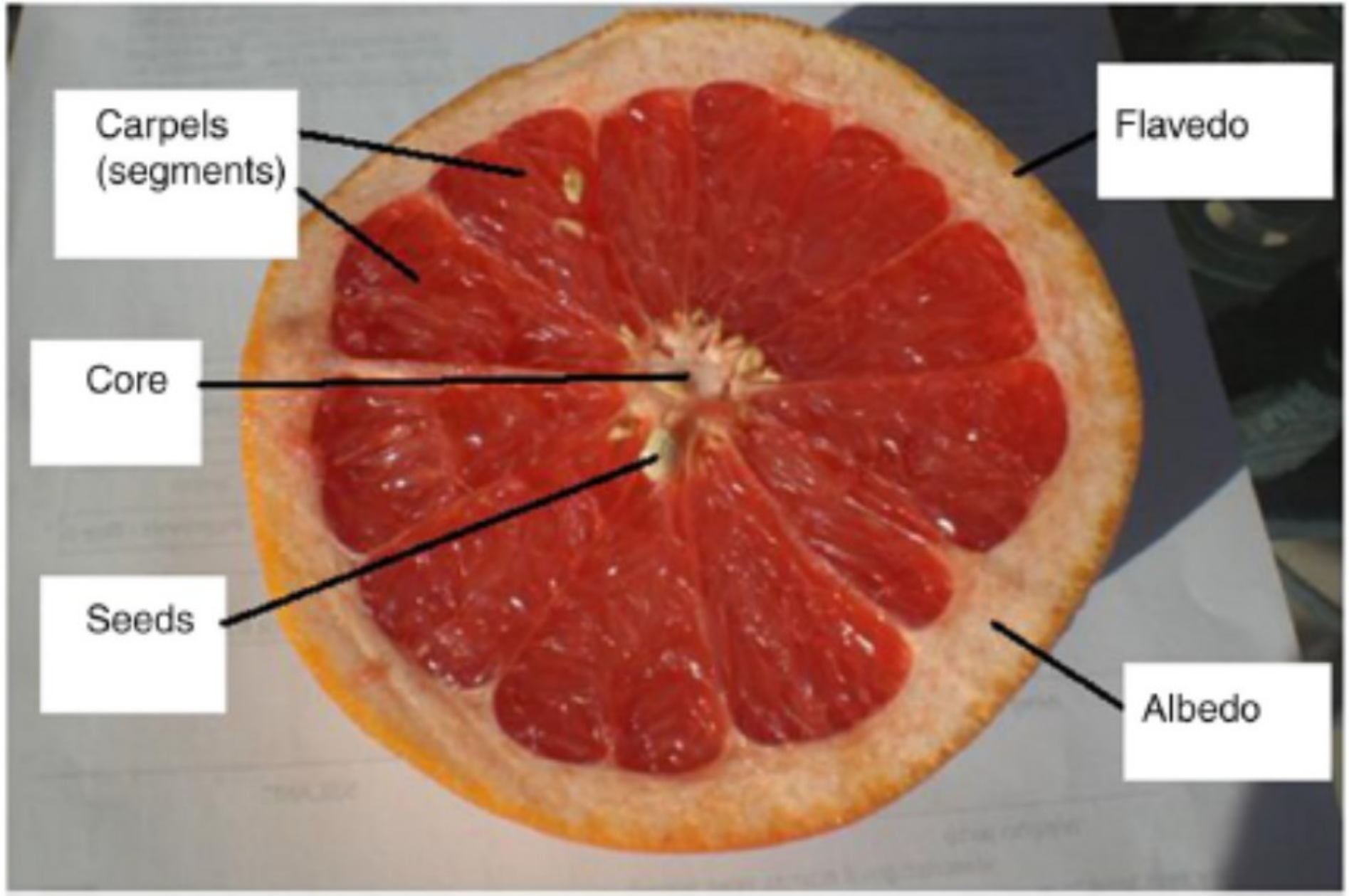
Table 1.3 Utilization of Citrus for Processing, by Variety, 2010–2011 Season

Variety	Total Production (Thousand Tons)	Processed (Thousand Tons)	Processed % of Total
Oranges	70,689	23,899	33.8
Grapefruit	6,385	1,034	16.2
Lemons and limes	12,884	2,610	20.2
Tangerines	25,567	1,510	5.9
Total citrus	115,525	29,023	25.1

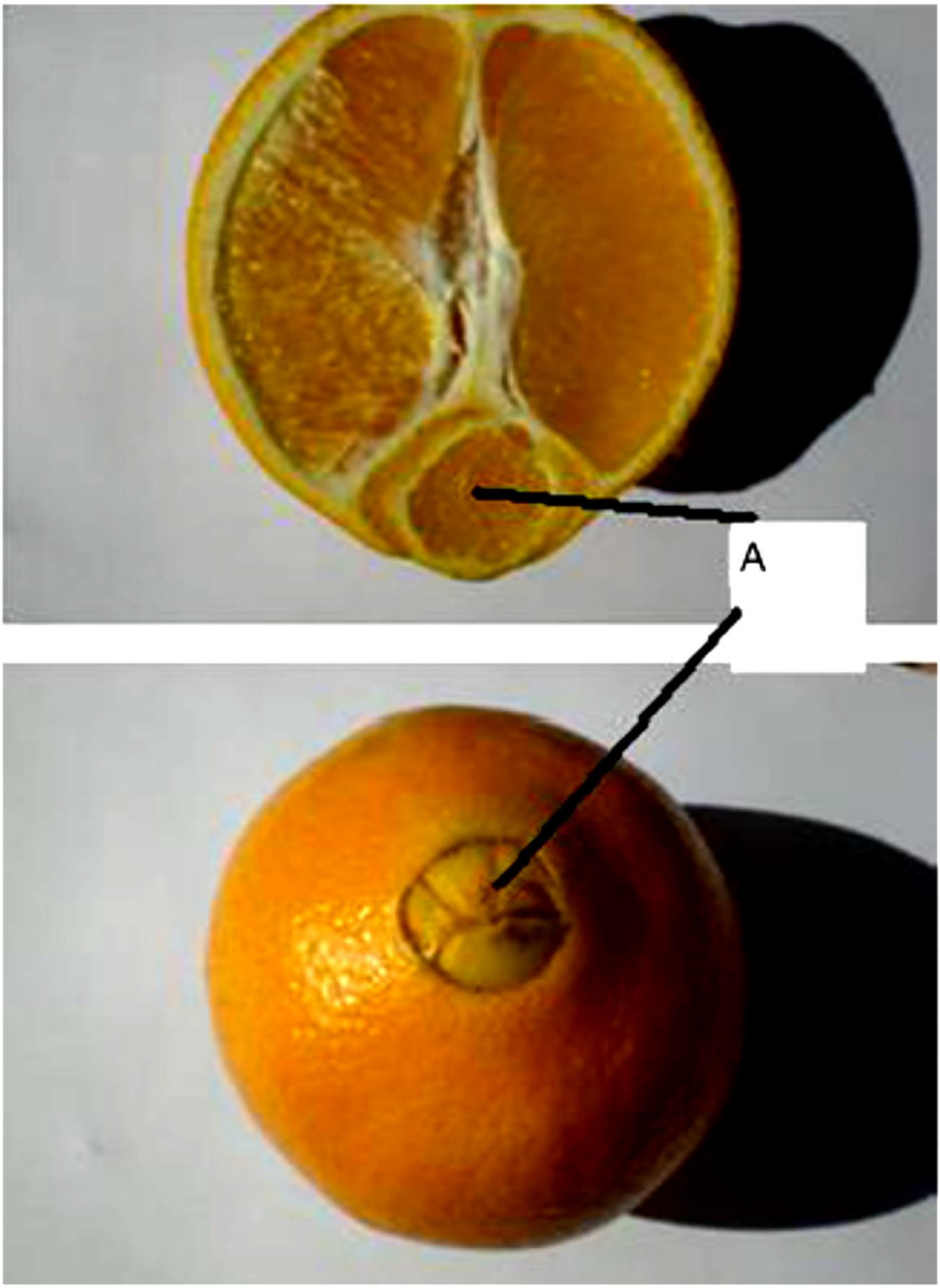
Source: Food and Agriculture Organization of the United Nations (FAO). (2013). The Citrus Bulletin, 2012. Rome.



■ **FIGURE 2.1** Schematic cross section of a citrus fruit.



■ FIGURE 2.2 Cross section of pink grapefruit, showing seeds.



■ FIGURE 2.4 Cross section of Navel orange.

Table 3.1 Characteristics of Some Citrus Rootstocks

Rootstock	Phytophthora Tolerance	Drought Tolerance	Flood Tolerance	Freeze Tolerance	Salinity Tolerance	Citrus Nematode Tolerance	Yield per Tree	Brix	Fruit Size
Rough lemon	S	G	G	P	I	S	H	L	LG
Sour orange	T	I	I	G	I	S	I	H	I
Rangpur lime	S	G	?	P	G	S	H	L	LG
Carrizo citrange	T	G	P	I	P	T	H	I	I
Troyer citrange	R	I	G	G	I	R	I	H	I
Trifoliate orange	R	P	I	G	P	R	H	H	SM
Swingle citrumelo	T	G	?	I	P	T	H	I	I

G, good; H, high; I, intermediate; L, low; LG, large; P, poor; R, resistant; S, susceptible; SM, small; T, tolerant; ?, unknown.

Source: Adapted from Davies and Albrigo (1994), pp. 84–85.

Table 3.2 Orange Water Requirement Liter/Day.Tree

Canopy Diameter (m)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.8	2.6	3.8	8	11	14	18	20	19	15	9	3.8	2.6
3.0	7.2	10	22	31	39	50	57	53	42	24	10	7.2
4.3	14	20	43	63	75	97	112	105	81	47	20	14
5.5	23	33	70	100	124	160	184	172	134	78	34	23
6.7	34	50	105	150	185	239	276	257	201	121	50	34
Pan evap. mm/d	2.8	4.1	5.3	7.6	9.4	11.4	11.2	10.7	8.1	5.6	4.1	2.5

Source: Based on Publ. AZ 1151 (2000). Cooperative Extension, University of Arizona (converted to metric units).

■ FIGURE 3.1 Citrus branch in bloom.

■ FIGURE 3.2 Structure of a citrus flower.

Table 4.1 Climatic Conditions in Some Citrus Growing Regions

Definition of Climate	Temperature (°C)			Heat Units*	Rain Fall (mm)	Location
	Min.	Max.	Ave.			
Mediterranean cool	12.3	20.8	16.5	1,626	397	Valencia, Spain
Maritime, cool	11.8	21.3	16.6	1,951	1,808	Wakayama, Japan
	9.7	20.2	15.0	896	1,656	Kerikeri, New Zealand
Semiropical	13.7	26.7	20.2	2,607	812	Nelspruit, South Africa
	16.7	28.2	22.4	3,465	1,339	Orlando, Florida
Subtropical cool-dry	7.6	24.2	16.2	1,258	317	Santa Paula, California
Tropical	18.0	29.9	23.9	3,918	1,010	Palmira, Colombia

Based on Spiegel-Roy and Goldschmidt (1996).

** Calculated as the annual sum of the (average monthly temp. − 13) × (no. of days per month).*

Table 4.2 Some Properties of Principal Citrus Rootstocks

Rootstock	Positive Characteristics	Negative Characteristics
Sour orange	Cold tolerant, vigorous, high-quality fruit	Highly sensitive to tristeza
Rough lemon		
Rangpur lime	High early yields, salt tolerance	Mediocre fruit quality, sensitive to Phytophtora
Sweet orange	Tolerant to tristeza, high fruit quality	Highly susceptible to Phytophtora
Cleopatra mandarin	Salt tolerant, cold tolerant, high fruit quality	Small fruit size, slow growth in nursery
Trifoliate orange	Large, high-quality fruit, high tolerance to tristeza and Phytophtora	Low tolerance to salt and high pH, drought sensitive
Carrizo citrange	High yield, good fruit quality, tolerant to burrowing nematode	Susceptible to exocortis
Troyer citrange	Cold tolerant, good fruit quality, high yield	No resistance to burrowing nematode

Based on data from Spiegel-Roy and Goldschmidt (1996).

Table 4.4 Quantity of Mineral Nutrients Removed by One Ton of Crop (Oranges)

Element	Amount (g) Removed
Nitrogen	1,180
Phosphorus	262
Potassium	2,555
Calcium	1,045
Magnesium	190
Zinc	0.65
Copper	0.40
Iron	2.8
Boron	2.6

Based on Spiegel-Roy and Goldschmidt (1996).

Table 13.1 Typical Vitamin C Content of Some Fruits and Vegetables

Fruit/Vegetable	Ascorbic Acid, mg/100 g
Acerola	1,700
Rose hip	425
Chili, green	250
Guava	230
Blackcurrant	200
Red pepper	190
Parsley	130
Kiwi	90
Broccoli	90
Redcurrant	80
Brussels sprouts	80
Lychee	70
Persimmon	65
Papaya	60
Strawberry	60
Orange	53
Lemon	53
Kumquat	50
Pineapple	48
Cauliflower	48
Grapefruit	30
Raspberry	30
Tangerine	30
Potato	20
Tomato	10

Table 13.2 Vitamin C Recommended Daily Intake

	Male	Female
0–6 months	40 mg[a]	40 mg[a]
7–12 months	50 mg[a]	50 mg[a]
1–3 years	15 mg	15 mg
4–8 years	25 mg	25 mg
9–13 years	45 mg	45 mg
14–18 years	75 mg	65 mg
19+ years	90 mg	75 mg
Smokers	Individuals who smoke require 35 mg/day more vitamin C than nonsmokers.	

[a] *Adequate Intake (AI).*

Source: NIH.

Table 13.3 Typical Values of Folic Acid Content in Some Foods

Food	Folic Acid, mcg DFE per 100 g
Orange juice	18
Lemon juice	14
Grapefruit juice	10
Pineapple juice	22
Grape juice	3
Banana	21
Cabbage, raw	45
Spinach, raw	190
Commercial corn flakes[a]	120

[a] *Vitamins added.*

Source: Calculated from data by Health Canada (www.hc-sc.gc.ca).

Table 13.4 Antioxidant Content of Some Fruits and Vegetables

Food	Antioxidant Content (μmol Fe^{+3}/gr)
Blackcurrants	57.2
Blackberries	50.1
Raspberries	20.1
Strawberries	18.3
Cauliflower	9.0
Oranges	8.6
Red pepper	6.8
Mango	6.6
Kiwi	6.5
Red onion	5.5

Source: Based on Haleem et al. (2008).

Citrus Fruit Processing

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