



Vitamin and Mineral Content of Tropical Fruit Cultivars Grown in Hawaii

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Tropical fruit vitamin and mineral content

Previous reports limited or incomplete:



- Unknown cultivar
- Unknown location
- Low sample number
- Composite sample
- Old methodology

Harvest Locations



- Banana:** 7 orchards, Hawaii, Maui, Oahu, & Kauai
- Papaya:** 8 orchards, Hawaii, Maui, Oahu, & Kauai
- Longan:** 3 orchards, Hawaii & Kauai
- Lychee:** 5 orchards, Hawaii & Kauai
- Rambutan:** 3 orchards, Hawaii

Banana Cultivars

- **Dwarf Brazilian (“apple”)**
- **Williams (Cavendish)**



Papaya Cultivars

- **Rainbow**
- **Kapoho Solo**
- **Laie Gold**
- **Sunrise**
- **SunUp**





Longan Cultivars

- **Biew Kiew**
- **Sri Chompo**



Rambutan Cultivars

- **R9**
- **R132**
- **R164**
- **Jitlee**
- **Rongrien**
- **Silengkeng**



Lychee Cultivars

- **Kaimana**
- **Bosworth**
- **Groff**

Vitamin and Mineral Analyses



HPLC analysis at PBARC for ascorbic acid and carotenoids.

Fruit mineral and soil analyses at Univ. of Hawaii's Agric. Diagnostics Center.

Provitamin A carotenoids

- β -carotene
- α -carotene
- β -cryptoxanthin



RAE = retinol activity equivalents

μg β -carotene + μg α -carotene + μg β -cryptoxanthin

12

24

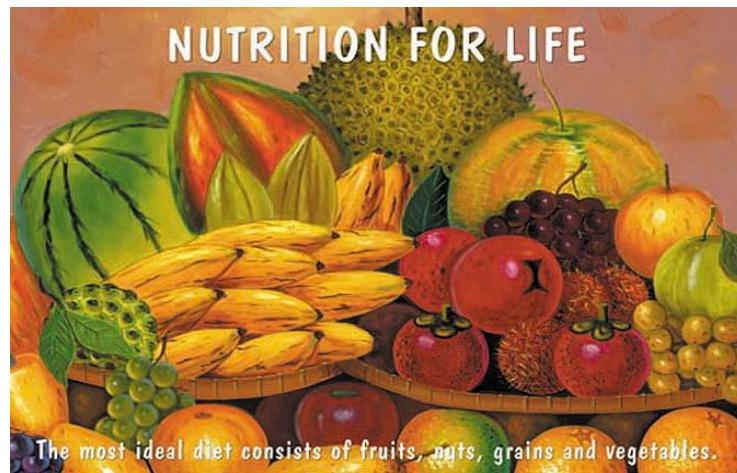
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Dietary Reference Intakes (DRI)

[Adult females and males, ages 19-50 years]

Vitamin C 75, 90 mg

Vitamin A 700, 900 ug RAE



Vitamin Content of Banana Cultivars

Cultivar	Vitamin C (mg/100 g)	Vitamin A (ug RAE/100 g)
Dwarf Braz.	12.7 (\pm 0.7)	12.4 (\pm 1.0)
Williams	4.5 (\pm 0.3)	8.2 (\pm 0.6)
Mean	9.7 (\pm 0.7)	10.9 (\pm 0.7)



Vitamin Content of Papaya Cultivars

Cultivar	Vitamin C (mg/100 g)	Vitamin A (ug RAE/100 g)
Kapoho	45.38 (± 2.03)	29.92 (± 2.35)
Laie Gold	51.28 (± 1.54)	48.22 (± 3.05)
Rainbow	51.82 (± 1.22)	50.28 (± 2.95)
Sunrise	55.62 (± 2.78)	45.63 (± 8.69)
SunUp	45.29 (± 1.27)	20.40 (± 1.43)
Mean	51.23 (± 0.95)	44.12 (± 2.60)



Banana and Papaya – Vitamins

- **Bananas (100 g) can provide 11-12% of the DRI for vitamin C and 2% of the DRI for vitamin A.**
- **Papayas (100 g) can provide 57- 68% of the DRI for vitamin C and 2-10% of the DRI for vitamin A.**
- **Papayas compare favorably to oranges (53.2 mg/100 g) for vitamin C and tomatoes (42 mg RAE/100 g) for vitamin A.**



Carotenoids

- **Bananas had higher amounts of lutein than α-carotene and β-carotene.**
- **Papayas had 2-3 times more β-cryptoxanthin than β-carotene.**
- **Lycopene was not detected in Laie Gold, Rainbow, and Kapoho.**
- **Sunrise and SunUp (100 g) averaged 2100 ug lycopene. (Red ripe tomatoes ~ 2800 ug).**

Longan and Lychee - Vitamin C



Longan	Vitamin C (mg/100 g)
Biew Kiew	63.34 (\pm 3.30)
Sri Chompo	55.27 (\pm 1.74)
Mean	60.10 (\pm 2.45)
Lychee	Vitamin C (mg/100 g)
Bosworth	22.50 (\pm 0.46)
Groff	21.18 (\pm 0.77)
Kaimana	33.17 (\pm 1.20)
Mean	27.62 (\pm 1.06)

Rambutan - Vitamin C



Cultivar	Vitamin C (mg/100 g)
R9	22.02 (\pm 2.66)
Jitlee	38.12 (\pm 1.31)
R162	47.83 (\pm 3.28)
Rongrien	38.49 (\pm 2.11)
R134	30.80 (\pm 1.64)
Silengkeng	39.10 (\pm 2.72)
Mean	36.41 (\pm 1.49)

Daily vitamin C requirements for the average adult could be met by consuming:

12 to 14 longans

14 to 17 lychees

10 to 12 rambutans



Longans (60.1 mg/100 g) compare favorably to fresh oranges (53.2 mg/100 g), strawberries (58.9 mg/100 g), and papayas (51.2 mg/100 g) for vitamin C content.

Banana Mineral Content

Mineral	DRI (mg)	Dwarf Braz. (mg/100 gfw)	Williams (mg/100 gfw)
P	700	26.30	21.73
K	4700	342.32	318.94
Ca	1000	7.24	4.91
Mg	320, 420	39.38	30.77
Na	1500	16.11	17.33
Fe	18, 8	0.76	0.83
Mn	1.8, 2.3	0.66	0.21
Zn	8, 11	0.36	0.23
Cu	0.90	0.26	0.25
B	ND	0.16	0.14

Bananas (100 g) can provide:

- **7% of the DRI for K**
- **9-11% of the DRI for Mg**
- **4-10% of the DRI for Fe**
- **29% of the DRI for Cu**
- **29-37% of the DRI for Mn**



Papaya Mineral Content

Mineral	DRI (mg)	mg/100 gfw
P	700	6.37
K	4700	153.86
Ca	1000	16.69
Mg	320, 420	24.79
Na	1500	9.77
Fe	18, 8	0.44
Mn	1.8, 2.3	0.02
Zn	8, 11	0.08
Cu	0.90	0.08
B	ND	0.14

Papayas (100 g) can provide:

- 6-8% of the DRI for Mg
- 9% of the DRI for Cu
- < 3% of the DRI for most other minerals



Mineral content was similar among cultivars.

Longan, Lychee, Rambutan - Minerals

Mineral	Longan (mg/100 gfw)	Lychee (mg/100 gfw)	Rambutan (mg/100 gfw)
P	32.06	27.34	17.91
K	327.14	156.11	179.73
Ca	8.19	3.77	7.92
Mg	13.24	13.98	16.01
Na	11.29	4.85	6.31
Fe	0.52	0.37	0.48
Mn	0.08	0.07	0.19
Zn	0.27	0.23	0.21
Cu	0.27	0.20	0.18

Specialty Fruit - Average DRI Values



Longans (100 g)

- 67- 80% vitamin C
- 7% K, 29% Cu, 3-5% P, Mg, Fe, Mn, Zn

Lychees (100 g)

- 31- 37% vitamin C
- 22% Cu, 2-4% P, K, Mg, Fe, Mn, Zn

Rambutans (100 g)

- 40- 50% vitamin C
- 8-10% Mn, 20% Cu, 2-6% P, K, Mg, Fe, Zn

Mahalo

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