

9 COMPOSITION AND CHARACTERISTICS OF SELECTED PALM PRODUCTS

This compilation of 28 tables has been assembled to provide technical information on the array of food and industrial products derived from palms. Included is information on domesticated and wild palms; palm products are somewhat similar so that in the absence of any data for a wild palm product some inferences can be made from closely-related domesticated species. The tables are arranged in alphabetical order by scientific name.

Table 9-1 *Chemical Constituents of Arecanut, Areca catechu*

| Constituents ¹ | Green Nut (range) | Ripe Nut (range) |
|-----------------------------------|----------------------|---------------------|
| Moisture content (%) | 69.4-74.1 | 38.9-56.7 |
| Total water extractives (%) | 32.9-56.5 | 23.3-29.9 |
| Polyphenols (%) | 17.2-29.8 | 11.1-17.8 |
| Arecoline (extraction method) (%) | 0.11-0.14 | 0.12-0.24 |
| Fat (%) | 8.1-12.0 | 0.12-0.24 |
| Crude fiber (%) | 8.2-9.8 | 11.4-15.4 |
| Total polysaccharides (%) | 17.3-23.0 | 17.8-25.7 |
| Crude protein (%) | 6.7-9.4 | 6.2-7.5 |
| Ash (%) | 1.2-2.5 | 1.1-1.5 |

Note:

1. Constituents expressed as percentage values calculated as dry basis (except moisture).

Source: Bavappa et al., 1982.

Table 9-2 *Nutritional Composition of Pejibaye Fruit Mesocarp Pulp, Bactris gasipaes var. gasipaes (per 100 g)*

| | | | |
|------------------|--------|-------------------------|-------|
| Water (%) | 56 | Iron (mg) | 2.76 |
| Calories | 194 | Sodium (mg) | - |
| Protein (%) | 3.01 | Ascorbic Potassium (mg) | - |
| Fat (%) | 6.14 | Carotene (mg) | 1.28 |
| Carbohydrate (%) | 33.05 | Thiamine (mg) | 0.030 |
| Fiber (%) | 1.02 | Acid (mg) | - |
| Ash (%) | 0.88 | Niacin (mg) | 0.455 |
| Calcium (mg) | 44.6 | Riboflavin (mg) | 0.068 |
| Phosphorus (mg) | 101.84 | | |

Source: Pérez Vela, 1985.

Table 9-3 *Nutritional Composition of Pejibaye Flour1, Bactris gasipaes var. gasipaes (fresh basis per 100 g)*

| | | | |
|--------------------------------|-------|-----------------------------|-------|
| Calories | 413.5 | Vitamin B ₂ (mg) | 0.3 |
| Humidity (g) | 12.0 | Vitamin C (mg) | 62.2 |
| Protein (g) | 3.8 | Niacin (mg) | 2.5 |
| Fat (g) | 8.9 | Iron (mg) | 6.1 |
| Ash (g) | 1.3 | Calcium (mg) | 10.9 |
| Crude fiber (g) | 2.1 | Sodium (mg) | 2.7 |
| Carbohydrates (g) ² | 72.1 | Potassium (mg) | 162.8 |
| Vitamin A (ug eq) | 1.2 | Magnesium (mg) | 11.7 |
| Vitamin B ₁ (g) | 0.1 | Zinc (mg) | 2.1 |

Notes:

1. Values calculated from fresh pejibaye fruit mesocarp.
2. Carbohydrates by difference.

Source: Blanco Metzler et al., 1992.

Table 9-4 **Composition of Fibers of *Bactris setosa* and *Borassus flabellifer***
(vascular bundle with sheath of sclerenchymatous fiber).

Results expressed as % of oven-dried material.

| Palm/Common name | Cellulose | Lignin | Total furfur-aldehyde | Cell furfur-aldehyde | Xylan in cellulose | Furfuraldehyde from polyuronides |
|--|-----------|--------|-----------------------|----------------------|--------------------|----------------------------------|
| <i>Bactris setosa</i> Tucum branco | 81.54 | 7.42 | 5.13 | 3.10 | 4.8 | 2.0 |
| <i>Borassus flabellifer</i> Palmyra | 63.50* | 25.01 | 13.80 | 10.16 | 15.7 | 3.6 |

* This figure is less reliable than other cellulose determination.

Source: Norman, 1937.

Table 9-5 *Nutritional Composition of Palmyra Sweet Sap, Borassus flabellifer*

| | | | |
|---------------------------|---------|-----------------------------|-----------------|
| Specific gravity | 1.07 | Calcium | Trace |
| pH | 6.7-6.9 | Phosphorus (g/100 cc) | 0.14 |
| Nitrogen (g/100 cc) | 0.056 | Iron (g/100 cc) | 0.4 |
| Protein (g/100 cc) | 0.35 | Vitamin C (mg/100 cc) | 13.25 |
| Total sugar (g/100 cc) | 10.93 | Vitamin B ₁ (IU) | 3.9 |
| Reduced sugar (g/100 cc) | 0.96 | Vitamin B complex | Negli- gible |
| Minerals as ash (g/100cc) | 0.54 | | |

Source: Davis & Johnson, 1987.

Table 9-6 *Nutritional Composition of Palmyra Sugar (Jaggery), Borassus flabellifer*

| | | | |
|--------------------------------------|-------|--|-------|
| Moisture | Nil | Phosphorus (%) | 0.064 |
| Protein (%) | 0.24 | Iron (mg/100 g) | 30.0 |
| Fat (%; ether extract) | 0.37 | Nicotinic acid (μ mg/100 g) | 4.02 |
| Mineral matter (%) | 0.50 | Vitamin B ₁ (μ mg/100 g) | Nil |
| Carbohydrate (% by difference) | 98.89 | Riboflavin (μ mg/100 g) | 229 |
| Carbohydrate (%; direct polarimetry) | 98.4 | Caloric value (/100 g) | 398 |
| Calcium (%) | 0.08 | | |

Source: Davis & Johnson, 1987

Table 9-7 Quantitative Anatomical Features of *Calamus* spp. (mean values; maximum values in parenthesis)

| Calamus Species | Hypo-dermis no. of layers | Cortex width, no. of layers | V.B., diam. μm | V.B., no/mm ² | Meta-xylem vessel diam. | Fiber dimensions | | | Silica body diam. μm | Diam. Secretary Cavity μm | |
|-------------------------|---------------------------|-----------------------------|---------------------------|--------------------------|-------------------------|------------------|---------------------|---------------------------|---------------------------------|--------------------------------------|---------------------------------|
| | | | | | | Length mm | Width μm | Lumen Diam. μm | | | 2X wall thickness μm |
| Large-diameter canes | | | | | | | | | | | |
| <i>C. dransfeldii</i> | 1-2 | 25-28 | 780 (1000) | 3.4 (6) | 90 (320) | 1.800 (2.200) | 20 (28) | 12 (18) | 8 (10) | 13 (16) | (100) |
| <i>C. nagbettai</i> | 1-2 | 30-40 | 798 (1000) | 3 (7) | 383 (465) | 1.980 (2.900) | 21 (32) | 10 (22) | 11 (22) | 11 (14) | 58 (59) |
| <i>C. thwaitesii</i> | 1-2 | 35-40 | 760 (1000) | 3.3 (9) | 352 (448) | 1.700 (2.900) | 19 (34) | 8 (20) | 11 (14) | 12 (15) | (100) |
| Medium-diameter canes | | | | | | | | | | | |
| <i>C. gamblei</i> | 1-2 | 14 | 800 (1010) | 5.5 (8) | 294 (340) | 1.680 (2.166) | 20 (34) | 10 (18) | 10 (16) | (10) | (92) |
| <i>C. hookerianus</i> | 1-2 | 25 | 520 (630) | 10.9 | 245 (290) | 1.560 (2.052) | 22 (28) | 14 (17) | 8 (11) | (16) | |
| <i>C. karnatakensis</i> | 1 | 12 | 668 (800) | 5 | 293 (350) | 1.900 (2.920) | 21 (32) | 10 (18) | 11 (22) | 10 (12) | 53 (63) |
| <i>C. lacciferus</i> | 1 | 25 | 670 (800) | 4.6 | 299 (360) | 2.123 (3.028) | 20 (24) | 11 (19) | 9 (12) | 10 (12) | 93 (102) |
| <i>C. pseudotenius</i> | 1 | 8 | 410 (650) | 14.6 | 200 (240) | 1.811 (2.318) | (26) | (16) | 9 (10) | (10) | (60) |
| <i>C. stoloniferus</i> | 1-2 | 9 | 493 (680) | 5.0 | 172 (200) | 1.778 (2.640) | 17 (24) | 9 (16) | 8 (14) | 8 (9) | 68 (70) |
| <i>C. vattayila</i> | 1 | 30 | 700 (920) | 6.0 | 240 (260) | 1.900 (3.620) | 21 (32) | 15 (24) | 6 (8) | | |
| Small-diameter canes | | | | | | | | | | | |
| <i>C. brandisii</i> | 1-2 | 6-7 | 380 (418) | 12.0 | 202 (222) | 1.656 (2.420) | 16 (28) | 9 (16) | 7 (16) | 7.5 (8) | 44 (50) |
| <i>C. lakshamanae</i> | 1-2 | 8 | 415 (540) | 14.9 | 204 (250) | 1.523 (2.260) | 15 (20) | 7 (16) | 8 (12) | m (8) | 55 (60) |
| <i>C. metzianus</i> | 1 | 12 | 516 (610) | 11.1 | 280 (320) | 1.670 (2.090) | (30) | (24) | 3.6 (6) | (8) | (80) |
| <i>C. rotang</i> | 1 | 8 | 365 | 14.4 | 220 (230) | 1.921 (2.622) | 16 (24) | 9 (14) | 7 (10) | (6) | (88) |
| <i>C. travancoricus</i> | 1 | 8 | 310 (460) | 19.5 (23) | 130 (260) | 1.4 (2.800) | 17 (28) | 7 (20) | 10 | 7 (10) | (50) |

Source: Modified after Bhat, 1992.

Table 9-8 *Nutritional Composition of Limuran Fruit, Calamus ornatus var. ornatus (per 100 g)*

| | | | |
|------------------|------|-------------------------|------|
| Water (%) | 0 | Iron (mg) | 8.1 |
| Calories | 376 | Sodium (mg) | - |
| Protein (%) | 2.9 | Ascorbic Potassium (mg) | - |
| Fat (%) | 5.7 | Carotene (<i>ug</i>) | - |
| Carbohydrate (%) | 88.6 | Thiamine (mg) | 0.29 |
| Fiber (%) | 2.4 | Acid (mg) | 23.8 |
| Ash (%) | 2.9 | Niacin (mg) | 4.29 |
| Calcium (mg) | 90.5 | Riboflavin (mg) | 0.05 |
| Phosphorus (mg) | 47.6 | | |

Source: Atchley, 1984.

Table 9-9 *Nutritional Composition of Palm Inflorescence, Pacaya, Chamaedorea tepejilote (10 g edible portion)*

| | | | |
|--------------------|------|--------------------|-------|
| Energy value (cal) | 45 | Phosphorus (mg) | 106.0 |
| Water (%) | 85 | Iron (mg) | 1.4 |
| Protein (g) | 4.0 | Vitamin A (mcg) | 5.0 |
| Carbohydrates (g) | 8.3 | Thiamine (mg) | 0.08 |
| Fiber (g) | 1.2 | Riboflavin (mg) | 0.10 |
| Ash (g) | 2.0 | Niacin (mg) | 0.9 |
| Calcium (mg) | 3.69 | Ascorbic acid (mg) | 14.0 |

Source: Castillo Mont et al., 1994.

Table 9-10 *Components of Whole Coconut, Cocos nucifera (wet basis)*

| | | | |
|-------|-----|------------------|-----|
| Husk | 35% | Meat (endosperm) | 28% |
| Shell | 12% | Water | 25% |

Source: Phil. Coco. Auth., 1979.

Table 9-11 *Characteristics of Coconut Oil from Copra, Cocos nucifera (usual range)*

| | |
|--|-------------|
| Fat, % of part, dry basis | 65-72 |
| Characteristics of fat | |
| Acid value | 1-10 |
| Saponification value | 251-264 |
| Iodine value | 7-10 |
| Thiocyanogen value | 6.1-7.0 |
| R-M value | 6-8 |
| Polenske value | 12-18 |
| Unsaponifiable (%) | 0.15-0.6 |
| Refr. index, <i>n</i> _p , 40° C | 1.448-1.450 |
| Sp. gr., 40°/25° | 0.908-0.913 |
| Melting point (° C) | 23-26 |
| Titer (° C) | 20-24 |
| Composition of fatty acids, wt. % of total fatty acids | |
| <u>Saturated</u> acids | 0-0.8 |
| Capric | |
| Caprylic | 5.5-9.5 |
| Capric | 4.5-9.5 |
| Lauric | 44-52 |
| Myristic | 13-19 |
| Palmitic | 7.5-10.5 |
| Stearic | 1-3 |
| Arachidic | 0-0.4 |
| <u>Unsaturated</u> acids | 0-1.3 |
| Hexadecenoic | |

| | |
|----------|---------|
| Oleic | 5-8 |
| Linoleic | 1.5-2.5 |

Source: Eckey, 1954.

Table 9-12 *Composition of Coconut Shell, Cocos nucifera (dry basis)*

| | | | |
|-----------|-----|-----|------|
| Lignin | 36% | Ash | 0.6% |
| Cellulose | 53% | | |

Source: Ohler, 1984.

Table 9-13 *Nutritional Composition of Coconut Water, Cocos nucifera*

| | | | |
|--------------------|------|-------------------|-------|
| Water (%) | 95.5 | Carbohydrates (%) | 4.0 |
| Protein (%) | 0.1 | Calcium (%) | 0.02 |
| Fat (%) | 0.1 | Phosphorous (%) | 0.001 |
| Mineral matter (%) | 0.4 | Iron (mg/100 g) | 0.5 |

Source: Thampan, 1975.

Table 9-14 Mechanical Properties of Coconut Wood, *Cocos nucifera*

| Basic density kg/m ³ | Av.MC % | M o E Mpa | M o R MPa | Stress at limit of propor- tionality MPa | Impact Bending mN | Compre- sion parallel grain MPa | Compression perpendi- cular grain /1 Mpa | Shear radial ² MPa | Cleavage maximum ³ N/mm ² |
|------------------------------------|------------|------------------------|------------------------|--|-----------------------------|---|--|---|---|
| 600 + | 57 | 10857 | 86 | 52 | 20 | 49 | 8 | 10 | 12 |
| | 12 | 11414 | 104 | 62 | 20 | 57 | 9 | 13 | 11 |
| 400- 599 | 107 | 6880 | 53 | 30 | 18 | 31 | 3 | 6 | 9 |
| | 12 | 7116 | 63 | 38 | 10 | 38 | 3 | 8 | 8 |
| 250- 399 | 240 | 3100 | 26 | 13 | 8 | 15 | 1 | 4 | 4 |
| | 12 | 3633 | 33 | 15 | 9 | 19 | 2 | n.a. | 4 |

Notes:

1. Compressive stress at limit of proportionality.
2. Radial and tangential values differ insignificantly.
3. Combined maximum values of radial and tangential cleavage.

Source: Killmann, 1988.

Table 9-15 *Composition and Properties of Carnaúba Wax, Copernicia prunifera*

| | Types ¹ 1,2,2A | Types 3,4 | Type 5 |
|--|------------------------------|--------------|-----------|
| Melting point - minimum (°C) | 83 | 82.5 | 82.5 |
| Flash point - minimum (°C) | 310 | 299 | 299 |
| Volatile matter (including moisture) maximum % | 2 | 1.5 | 6 |
| Insoluble impurities - maximum % | 1 | 2 | 1.5 |

Note:

1. Carnaúba wax is graded in terms of quality on a scale from 1-5; Type 1 is the highest quality.

Source: Johnson, 1970.

Table 9-16 *Nutritional Composition of Buri Palm Fruit, Corypha utan (per 100 g)*

| | | | |
|------------------|------|-------------------------|------|
| Water (%) | 0 | Iron (mg) | 1.1 |
| Calories | 326 | Sodium (mg) | - |
| Protein (%) | 3.7 | Ascorbic Potassium (mg) | - |
| Fat (%) | 0.5 | Carotene (<i>ug</i>) | - |
| Carbohydrate (%) | 93.7 | Thiamine (mg) | 0.05 |
| Fiber (%) | 6.8 | Acid (mg) | 57.9 |
| Ash (%) | 2.1 | Niacin (mg) | 3.16 |
| Calcium (mg) | 73.7 | Riboflavin (mg) | 0.11 |
| Phosphorus (mg) | 89.5 | | |

Source: Atchley, 1984.

Table 9-17 *Nutritional Composition of African Oil Palm Fruit, *Elaeis guineensis* (per 100 g)*

| | | | |
|------------------|-------|-------------------------|----------|
| Water (%) | 0 | Iron (mg) | 5.6 |
| Calories | 746 | Sodium (mg) | - |
| Protein (%) | 2.2 | Ascorbic Potassium (mg) | - |
| Fat (%) | 81.9 | Carotene (<i>ug</i>) | 50,680.6 |
| Carbohydrate (%) | 14.6 | Thiamine (mg) | 0.35 |
| Fiber (%) | 3.8 | Acid (mg) | 12.5 |
| Ash (%) | 1.3 | Niacin (mg) | 1.81 |
| Calcium (mg) | 136.1 | Riboflavin (mg) | 0.17 |
| Phosphorus (mg) | 61.1 | | |

Source: Atchley, 1984.

Table 9-18 *Nutritional Composition of African Oil Palm Oil1 Elaeis guineensis (per 100 g)*

| | | | |
|------------------|------|-------------------------|----------|
| Water (%) | 0 | Iron (mg) | 5.5 |
| Calories | 882 | Sodium (mg) | - |
| Protein (%) | 0.0 | Ascorbic Potassium (mg) | - |
| Fat (%) | 99.6 | Carotene (<i>ug</i>) | 27,417.1 |
| Carbohydrate (%) | 0.4 | Thiamine (mg) | 0.00 |
| Fiber (%) | 0.0 | Acid (mg) | - |
| Ash (%) | 0.0 | Niacin (mg) | 0.00 |
| Calcium (mg) | 7.0 | Riboflavin (mg) | 0.03 |
| Phosphorus (mg) | 8.0 | | |

Note:

1. Source does not indicate whether mesocarp oil or kernel oil.

Source: Atchley, 1984.

Table 9-19 *Nutritional Composition of Palm Heart, Euterpe spp.*

| Component | <i>Euterpe edulis</i> | <i>Euterpe oleracea</i> |
|----------------------|-----------------------|-------------------------|
| Protein (%) | 2.42 | 1.72 |
| Ash (%) | 1.43 | 0.83 |
| Crude fiber (%) | 0.89 | 0.27 |
| Fat (%) | 0.33 | 0.08 |
| Total sugars (%) | 0.86 | 0.70 |
| Reducing sugars (%) | 0.49 | 0.30 |
| Tannins (%) | 0.06 | 0.06 |
| Vitamin C (mg/100 g) | 1.8 | 1.4 |

Source: Quast & Bernhardt, 1978.

Table 9-20 Nutritional Composition of Açaí Fruit Pulp and Skin, *Euterpe oleracea*

| <i>Constituents¹</i> | <i>Percent by dry weight based on two analyses</i> |
|--|--|
| <i>Lipids</i> | <i>33.1; 49.4</i> |
| <i>Proteins</i> | <i>9.3; 13.8</i> |
| <i>Ash</i> | <i>2.2; 5.2</i> |
| <i>Total dietary fiber</i> | <i>18.0; 27.3</i> |
| | |
| <i>Freeze Dried Fruit and Skin²</i> | |
| <i>Total content of anthocyanins</i> | <i>3.1919 mg/g dry weight</i> |
| <i>Concentration of total roanthocyanidins</i> | <i>12.89 mg/g dry weight</i> |
| <i>Total polyunsaturated fatty acids</i> | <i>11.1 % of total fatty acid</i> |
| <i>Total monounsaturated fatty acid</i> | <i>60.2 % of total fatty acid</i> |
| <i>Total saturated fatty acid</i> | <i>28.7 % of total fatty acid</i> |
| <i>Total amino acid content</i> | <i>7.59 % of total weight</i> |
| <i>Total sterols</i> | <i>0.048 % of total weight</i> |

Sources:

1. Neida & Elba, 2007.
2. Schauss et al., 2006.

Table 9-21 *Nutritional Composition of African Doum Palm Fruit Mesocarp, Hyphaene compressa*

| | | | |
|------------------|------|-----------------|------|
| Moisture (%) | 4 | Calcium (mg) | 34 |
| Energy (Kcal) | 390 | Phosphorus (mg) | 110 |
| Protein (g) | 3.8 | Thiamin (mg) | 0.05 |
| Fat (g) | 0.8 | Riboflavin (mg) | 0.10 |
| Carbohydrate (g) | 84.1 | Niacin (mg) | 3.4 |
| Ash (g) | 7.3 | | |

Source: Hoebeke, 1989.

Table 9-22 *Nutritional Composition of Palm Wine from Sap of Hyphaene coriacea (per 100 g)*

| | | | |
|------------------|----------|-----------------|-------|
| Moisture (%) | 98.8 | Potassium (mg) | 152 |
| Ash (g) | 0.4 | Copper (mg) | 0.04 |
| Protein (g) | 0.1 | Zinc (mg) | 0.01 |
| Fat (g) | - | Manganese (mg) | trace |
| Fiber (g) | - | Phosphorus (mg) | 1.37 |
| Carbohydrate (g) | 0.7 | Thiamin (mg) | 0.01 |
| Energy value | 13 + 109 | Riboflavin (mg) | 0.01 |
| Calcium (mg) | 0.13 | Niacin (mg) | 0.22 |
| Magnesium (mg) | 4.18 | Vitamin C (mg) | 6.8 |
| Iron (mg) | 0.07 | Alcohol (% v/v) | 3.6 |
| Sodium (mg) | 9.88 | | |

Source: Cunningham & Wehmeyer, 1988.

Table 9-23 *Nutritional Composition of Indian Doum Palm Mesocarp, Hyphaene dichotoma (young fruit)*

| | | | |
|------------------|-------|----------------------|--------------------|
| Energy Cal/100 g | 406 | Fiber (%) | 50.07 |
| Water (%) | 0 | Ash (%) | 7.69 |
| Protein (%) | 9.26 | Calcium (mg/100g) | 268 |
| Fat (%) | 7.21 | Phosphorus (mg/100g) | 224 |
| Carbohydrate (%) | 75.81 | Iron (mg/100g) | 38.24 ¹ |

Note:

1. High iron value probably due to soil type.

Source: Bonde et al., 1990

Table 9-24 *Nutritional Composition of Moriche Palm Fruit¹, Mauritia flexuosa. (per 100 g)*

| | | | |
|------------------|-------|-------------------------|----------|
| Water (%) | 0 | Iron (mg) | 12.9 |
| Calories | 526 | Sodium (mg) | - |
| Protein (%) | 11.0 | Ascorbic Potassium (mg) | - |
| Fat (%) | 38.6 | Carotene (<i>ug</i>) | 90,992.6 |
| Carbohydrate (%) | 46.0 | Thiamine (mg) | 0.11 |
| Fiber (%) | 41.9 | Acid (mg) | 95.6 |
| Ash (%) | 4.4 | Niacin (mg) | 2.57 |
| Calcium (mg) | 415.4 | Riboflavin (mg) | 0.85 |
| Phosphorus (mg) | 69.9 | | |

Note:

1. Source does not indicate, but assumed to be mesocarp pulp.

Source: Atchley, 1984.

Table 9-25 *Nutritional Composition of Sago Starch, Metroxylon sagu (per 100 g of raw sago)*

| | | | |
|--|------------|------------------|------|
| Calories | 285.0 | Calcium (mg) | 30.0 |
| Water (g) | 27.0 | Carbohydrate (g) | 71.0 |
| Protein (g) | 0.2 | Iron (mg) | 0.7 |
| Fat, carotene, thiamine, ascorbic acid | negligible | Fiber (g) | 0.3 |

Source: Ruddle et al., 1978.

**Table 9-26 Nutritional Composition of Date1 Fruit, *Phoenix dactylifera*
(100 g, edible portion)**

| | | | |
|-------------------------|------|--------------------|------|
| Water (%) | 22.5 | Iron (mg) | 3.0 |
| Food energy (cal) | 274 | Sodium (mg) | 1 |
| Protein (g) | 2.2 | Potassium (mg) | 648 |
| Fat (g) | 0.5 | Vitamin A (IU) | 50 |
| Carbohydrate (g, total) | 72.9 | Thiamine (mg) | 0.9 |
| Carbohydrate (g, fiber) | 2.3 | Riboflavin (mg) | 0.10 |
| Ash (g) | 1.9 | Niacin (mg) | 2.2 |
| Calcium (mg) | 59 | Ascorbic acid (mg) | 0 |
| Phosphorus (mg) | 63 | | |

Note:

1. Natural, domestic date; not stated but very likely the Deglet Noor variety.

Source: Watt & Merrill, 1963.

Table 9-27 *Nutritional Composition of Palm Wine from Sap of Phoenix reclinata (per 100 g)*

| | | | |
|------------------|----------|-----------------|-------|
| Moisture (%) | 98.3 | Potassium (mg) | 157 |
| Ash (g) | 0.4 | Copper (mg) | 0.05 |
| Protein (g) | 0.2 | Zinc (mg) | 0.02 |
| Fat (g) | - | Manganese (mg) | trace |
| Fiber (g) | - | Phosphorus (mg) | 1.74 |
| Carbohydrate (g) | 1.1 | Thiamin (mg) | 0.01 |
| Energy value | 22 + 109 | Riboflavin (mg) | 0.01 |
| Calcium (mg) | 0.45 | Niacin (mg) | 0.5 |
| Magnesium (mg) | 5.12 | Vitamin C (mg) | 6.5 |
| Iron (mg) | 0.07 | Alcohol (% v/v) | 3.6 |
| Sodium (mg) | 5.85 | | |

Source: Cunningham & Wehmeyer, 1988.

Table 9-28 *Nutritional Composition of Salak Palm Fruit, Salacca zalacca (per 100 g)*

| | | | |
|------------------|-------|-------------------------|------|
| Water (%) | 0 | Iron (mg) | 19.1 |
| Calories | 345 | Sodium (mg) | - |
| Protein (%) | 1.8 | Ascorbic Potassium (mg) | - |
| Fat (%) | 0.0 | Carotene (<i>ug</i>) | 0.00 |
| Carbohydrate (%) | 95.0 | Thiamine (mg) | 0.18 |
| Fiber (%) | - | Acid (mg) | 9.1 |
| Ash (%) | 3.2 | Niacin (mg) | - |
| Calcium (mg) | 127.3 | Riboflavin (mg) | - |
| Phosphorus (mg) | 81.8 | | |

Source: Atchley, 1984.

