

**Table A.38.** Yam (*D. alata*) commonly grown cultivars from Solomon Islands.<sup>a</sup>

Sample designation	Yield (t/ha) total weight	Acceptance rating	Moisture %	Energy (kJ/100 g)		Protein %	Starch %	Sugar %	Dietary fibre %	Fat %	Ash %	Calcium (mg/100 g)	Iron (mg/100 g)	Total oxalate (mg/100 g)	Mole ratio Ox/Ca
				$E_a$	$E_b$										
			<i>a</i>			<i>b</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>c</i>	<i>d</i>				
WSH 9a <sup>b</sup>	24.0	NT <sup>c</sup>	69.6	464	489	2.75	22.7	1.74	2.72	0.10	0.94	15.0	0.75	39.0	1.18
UL 5 <sup>b</sup>	16.6	good	74.2	396	409	3.13	19.1	0.94	2.83	0.08	0.89	6.8	0.35	—	—
K	10.2	good	79.2	322	322	2.38	15.3	1.19	1.75	0.06	0.77	7.1	0.54	—	—
GU 144 <sup>b</sup>	10.2	excellent	75.3	376	390	2.66	17.6	1.73	3.33	0.12	0.82	8.0	0.36	—	—
GU 147 <sup>b</sup>	13.6	NT	79.1	309	324	2.38	14.5	1.12	1.53	0.11	0.69	5.0	0.56	20.9	1.90
A 172	46.9	NT	80.3	320	303	4.19	13.4	1.03	2.13	0.11	0.88	5.6	0.63	—	—
V 7 <sup>b</sup>	14.8	excellent	72.7	415	435	3.56	19.2	1.53	2.37	0.10	0.87	9.0	0.53	6.5	0.33
Toki	3.3	excellent	73.9	400	414	3.38	18.3	1.80	2.22	0.09	1.16	10.1	0.39	14.5	0.65
Mean <sup>d</sup>	—	—	75.5	375	386	3.05	17.5	1.39	2.36	0.10	0.88	8.3	0.51	20.2	1.02
SD	—	—	3.7	56	65	0.63	3.1	0.35	0.59	0.02	0.14	3.2	0.14	13.8	0.69

<sup>a</sup> Three tubers of local cultivars of each type bulked for analysis. Planted 9 November 1983, harvested 2 July 1984 at Tenaru Research Station. Fertilizer, single dressing at emergence: 100 kg/ha of ammonium sulphate and 150 kg/ha potash. Mean results for organic acid anions in Table 3.10.

<sup>b</sup> These yams are considered to be some of the best in Solomon Islands, because of resistance to anthracnose disease.

<sup>c</sup> NT = not tested.

<sup>d</sup> Sum of  $a + b + c + d + e + f + g = 100.8$ .

**Table A.39.** Yam (*D. alata*) most popular cultivars from Western Samoa.<sup>a</sup>

		<i>Da 10</i> <i>cv</i>	<i>Da 20</i> <i>cv</i>	<i>Mean</i> <sup>b</sup>	<i>SD</i>
Moisture %	a	76.6 (1.2)	78.7 (3.6)	77.7	1.5
Energy (kJ/100 g)					
E <sub>a</sub>		386	303	345	64
E <sub>b</sub>		368	331	350	26
Protein %	b	1.78 (0.39)	2.29 (0.40)	2.04	0.36
Starch %	e	18.6 (2.1)	14.7 (2.7)	16.7	3.0
Sugar %	f	1.01 (0.27)	0.82 (0.39)	0.94	0.17
Dietary fibre %	g	1.56 (0.44)	2.57 (0.96)	2.07	0.71
Fat %	c	0.06 (0.05)	0.05 (0.01)	0.06	0.01
Ash %	d	0.75 (0.03)	0.66 (0.09)	0.71	0.06
Calcium (mg/100 g)		6.0 (1.2)	15.4 (6.0)	10.7	6.7
Iron (mg/100 g)		0.65 (0.39)	1.64 (0.84)	1.15	0.70

<sup>a</sup> Grown at University of South Pacific School of Agriculture, Alafua, in same plot, 1 × 1 m spacing, staked, fertilised 11 November 1985 with 60 ml of 12-5-20 per plant, rainfall ~ 3000 mm/year, planted 20 October 1985, harvested 10 July 1986; results are the mean from analysis of five tubers of each cultivar; full mineral analyses in Table 3.10.

<sup>b</sup> Sum of a + b + c + d + e + f + g = 100.2.

**Table A.40.** Amino acid analyses (mg amino acid/g N sample) and amino acid scores for yam (*D. alata*) from PNG and Solomon Islands.

Amino acid	PNG (Table A.37)				Solomon Islands (Table A.38)				Mean	SD
	Takua Kupmi	Kpmora	Du Kupmi	Tolai	A172	GUI47	V7	Toki		
Alanine	351	244	342	499	184	235	238	259	—	—
Arginine	356	444	494	445	694	488	530	731	—	—
Aspartic acid	830	985	969	1146	612	755	637	666	—	—
Cystine (Cys)	155	130	98	115	62	109	91	66	—	—
Glutamic acid	1104	1261	1156	1246	699	1075	1172	828	—	—
Glycine	243	214	274	362	163	232	193	233	—	—
Histidine	123	147	163	169	95	—	144	127	—	—
Isoleucine	227	183	294	252	158	196	199	240	—	—
Leucine	490	284	572	576	315	395	390	483	—	—
Lysine	231	257	317	297	205	276	256	221	—	—
Methionine (Met)	95	63	84	65	43	45	63	77	—	—
Phenylalanine (Phe)	369	304	389	455	220	284	279	230	—	—
Proline	276	239	294	261	164	227	191	239	—	—
Serine	303	353	395	483	236	256	288	316	—	—
Threonine	181	310	258	240	148	175	147	189	—	—
Tryptophan	69	—	89	—	46	84	79	—	—	—
Tyrosine (Tyr)	294	199	207	164	105	101	108	125	—	—
Valine	284	226	323	360	194	229	241	260	—	—
<b>Amino Acid Scores</b>										
Histidine	103	124	137	142	80	—	121	107	116	21
S-containing (Cys + Met)	160	124	117	115	67	99	99	92	109	27
Isoleucine	130	105	168	144	90	112	114	137	125	25
Leucine	119	69	138	139	76	67	62	54	91	35
Lysine	64	71	87	82	56	76	71	61	71	11
Aromatic (Phe + Tyr)	168	128	151	157	82	98	98	90	122	34
Threonine	85	146	121	113	69	82	69	89	97	27
Tryptophan	115	—	148	—	77	140	132	—	122	28
Valine	130	103	147	164	89	105	110	119	121	25
% Recovery of N	78	77	88	93	65	68	70	79	77	10

Table A.41. Yam (*D. esculenta*): selections from Solomon Islands.<sup>a</sup>

Sample designation	Yield (t/ha) total	Culinary/taste rating	Moisture %	Energy (kJ/100 g)		Protein %	Starch %	Sugar %	Dietary fibre %	Fat %	Ash %	Calcium (mg/100 g)	Iron (mg/100 g)	Trypsin inhibitor (TIU/g)	Chymotrypsin inhibitor (CIU/g)
				$E_a$	$E_b$										
			<i>a</i>			<i>b</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>c</i>	<i>d</i>				
NGP4	58.7	very good	76.5 (4.4)	354	369	2.18 (0.54)	18.1 (3.2)	0.51 (0.22)	0.85 (0.10)	0.04 (0.02)	0.87 (0.08)	3.0 (1.7)	1.85 (1.9)	0	—
NGP4	—	—	75.6 (4.9)	395	385	2.47 (0.08)	19.4 (1.6)	1.40 (0.26)	0.83 (0.08)	0.04 (0.01)	0.90 (0.08)	7.1 (1.9)	0.49 (0.04)	0	—
RFP1	56.0	fair	72.9 (5.7)	407	432	2.22 (0.28)	20.8 (4.2)	0.94 (0.01)	0.95 (0.32)	0.02 (0.02)	0.90 (0.19)	5.8 (2.0)	0.55 (0.15)	0	0
GUP5	50.8	good/fair	72.5 (0.6)	368	439	2.57 (0.16)	18.3 (5.8)	0.76	1.29	0.04 (0.03)	0.94 (0.08)	13.4 (5.4)	0.51 (0.03)	0	0
GUP5	—	—	69.5 (2.7)	455	491	2.31 (0.13)	23.4 (1.1)	0.94 (0.13)	1.29 (0.24)	0.08 (0.06)	0.95 (0.07)	4.4 (0.2)	1.28 (1.5)	—	—
NGP8	69.1	good/fair	75.7 (3.1)	374	383	2.36 (0.35)	18.9	0.78	1.38	0.02 (0.02)	0.92 (0.02)	12.9 (7.7)	1.67 (2.0)	0	0
GUP4	58.3	poor	74.4 (1.8)	380	406	2.27 (0.14)	19.4 (2.6)	0.59 (0.34)	1.16 (0.26)	0.04 (0.02)	0.83 (0.03)	7.9 (0.3)	0.44 (0.05)	—	—
GUP4	—	—	77.9 (1.9)	334	345	2.02 (0.35)	17.2 (2.2)	0.34 (0.08)	0.96 (0.19)	0.04 (0.01)	0.90 (0.02)	3.9 (0.2)	0.48 (0.09)	—	—
Mean <sup>b</sup>	—	—	74.4	383	406	2.30	19.4	0.78	1.09	0.04	0.90	7.3	0.91	0	0
SD	—	—	2.7	35	46	0.17	2.0	0.32	0.22	0.02	0.04	4.0	0.59	—	—

<sup>a</sup> Five common cultivars obtained from Tenaru Research Station October 1983; results are mean of 3–4 analyses on different tubers from the one plant. The two results included from cultivars GUP4 and GUP5 represent results from two different plants. Mean analyses for vitamins and organic acids given in Table 3.11.

<sup>b</sup> Sum of  $a + b + c + d + e + f + g = 98.9$ .

**Table A.42.** Yam (*D. esculenta*) popular cultivars grown at Dodo Creek (Guadalcanal) and Dala (Malaita), Solomon Islands.<sup>a</sup>

	Sample designation					Mean	SD
	NGP3	Fananiu	GUP5	GUP7	GUP11		
<b>Dodo Creek<sup>b</sup></b>							
Yield (total, t/ha)	31.2	50.0	32.8	50.8	9.4	34.8	17
Culinary rating (taste)	fair	—	good-fair	good-fair	fair	—	—
Moisture %	75.3 (3.1)	78.3 (2.0)	74.7 (1.0)	77.0 (3.3)	73.4 (0.8)	75.7	1.9
Energy (kJ/100 g) Eb	390	338	401	361	423	383	33
Protein %	1.68 (0.35)	1.90 (0.33)	2.12 (0.51)	1.42 (0.22)	1.71 (0.20)	1.77	0.26
Starch %	18.4 (2.5)	15.1 (1.5)	18.5 (1.7)	17.3 (2.6)	20.5 (0.2)	18.0	2.0
Dietary fibre %	1.35 (0.35)	1.11 (0.20)	1.09 (0.05)	1.24 (0.19)	0.95 (0.18)	1.15	0.15
Fat %	0.05 (0.01)	0.03 (0.01)	0.03 (0.01)	0.04 (0.01)	0.04 (0.01)	0.04	0.01
<b>Dala<sup>c</sup></b>							
Moisture %	69.2 (4.3)	73.1 (5.2)	67.9 (4.4)	73.0 (1.9)	70.3 (3.2)	70.7**	2.3
Energy (kJ/100 g) E <sub>b</sub>	496	429	519	430	477	470**	40
Protein %	1.94 (0.38)	2.05 (0.26)	2.42 (0.65)	2.09 (0.58)	1.98 (0.43)	2.10*	0.19
Starch %	23.0 (3.5)	18.9 (3.8)	25.4 (4.5)	21.2 (1.8)	22.4 (2.4)	22.2**	2.5
Dietary fibre %	0.86 (0.11)	1.55 (0.30)	1.17 (0.16)	1.64 (0.01)	1.77 (0.35)	1.40	0.37
Fat %	0.03 (0.01)	0.06 (0.01)	0.07 (0.01)	0.08 (0.02)	0.06 (0.01)	0.06	0.02

<sup>a</sup> Results are the mean of three analyses on three separate tubers of each cultivar. The averaged results at Dodo Creek are compared with those at Dala using Students *t*-test. Differences shown with one and two asterisks are significant at the 5% level ( $P < 0.05$ ) and the 1% level ( $P < 0.01$ ) respectively. Mean analyses for minerals and vitamins are given in Table 3.11.

<sup>b</sup> Planted 26 November 1983, harvested 31 July 1984 at Dodo Creek Research Station. Soil was sandy loam, excessively well drained on beach plain, 400 m from sea, elevation 5 m. Fertilizer 200 kg/ha potassium chloride, 300 kg/ha ammonium sulfate. Yields obtained from small unreplicated plots. Light sandy loam cropped with *D. esculenta* the previous year. Rainfall N 130, D 135, J 250, F 212, M 310, A 336, M 110, J 51, J 124 mm, total 1659 mm.

<sup>c</sup> Planted 23 November 1983, harvested 23 July 1984; fertilizer 200 kg/ha potassium chloride, 200 kg/ha ammonium sulfate. Soil was a deep, moderately weathered brown clay over calcareous rock. Rainfall F 246, M 827, A 338, M 209, J 274, J 342, total excluding Nov–Jan = 2236 mm.

**Table A.43.** Yam (*D. esculenta*) commonly grown cultivars, East Sepik Province, PNG.<sup>a</sup>

Cultivar	Yield (t/ha) <sup>b</sup>	Moisture %	Energy (kJ/100 g)		Protein %	Starch %	Sugar %	Dietary fibre %	Fat %	Ash %	Calcium (mg/100 g)	Iron (mg/100 g)
			E <sub>a</sub>	E <sub>b</sub>								
		a			b	e	f	g	c	d		
<b>Saramandi Research Station</b>												
Glame	19.0	77.6 (0.6)	310	350	2.03 (0.70)	15.8 (2.7)	0.31 (0.08)	0.90 (0.13)	0.07 (0.01)	0.83 (0.04)	3.5 (0.9)	0.25 (0.04)
Mart	14.8	75.1 (2.4)	386	394	2.27 (0.31)	19.9 (3.1)	0.38 (0.23)	0.98 (0.21)	0.07 (0.04)	0.85 (0.03)	5.5 (2.4)	0.34 (0.04)
Saikidi	27.9	74.6 (1.9)	369	402	2.31 (0.53)	18.9 (1.6)	0.37 (0.19)	1.04 (0.12)	0.07 (0.03)	0.84 (0.20)	3.9 (1.1)	0.36 (0.13)
Mangilmu	18.0	78.1 (2.4)	307	342	2.21 (0.34)	15.3 (0.8)	0.48 (0.41)	0.97 (0.25)	0.05 (0.02)	0.61 (0.16)	5.4 (1.0)	0.29 (0.04)
Kuali	—	74.6 (4.3)	—	402	1.68	16.6	—	0.64	—	—	—	—
Makow-ka	34.8	78.6 (0.5)	—	333	1.73 (0.16)	16.1 (1.3)	—	0.87 (0.01)	—	—	—	—
Mean	22.9	76.4	344	371	2.04	17.1	0.39	0.90	0.07	0.78	4.6	0.31
SD	8.2	1.9	40	32	0.28	1.9	0.07	0.14	0.01	0.12	1.0	0.05
<b>Numango, near Balip Village (Maprik)</b>												
Glame	12.6	71.0 (5.2)	437	465	2.24 (0.06)	23.1 (5.0)	0.18 (0.02)	1.19 (0.40)	0.09 (0.04)	0.71 (0.08)	5.0 (0.3)	0.26 (0.02)
Mart	13.0	77.8 (5.0)	286	347	2.40	14.0	0.19	0.97	0.09	0.89	9.9	0.23
Saikidi	—	78.2 (2.6)	315	340	1.94 (0.16)	16.2 (2.5)	0.27 (0.17)	0.96 (0.29)	0.06 (0.01)	0.89 (0.26)	6.3 (0.9)	0.25 (0.01)
Mangilmu	12.4	78.5 (2.1)	327	335	1.81 (0.08)	16.9 (1.6)	0.41 (0.26)	0.86 (0.17)	0.06 (0.02)	0.66 (0.09)	3.9 (0.4)	0.24 (0.01)
Kwarungig	—	81.2 (4.7)	—	288	1.54 (0.51)	13.1 (4.0)	—	1.01 (0.14)	—	0.65 (0.23)	5.4 (1.6)	0.18 (0.02)
Kamart	15.6	79.5 (0.9)	—	317	2.36	15.5	—	1.04	—	0.86	4.9	0.17

Table A.43. Continued.

Cultivar	Yield (t/ha) <sup>b</sup>	Moisture %	Energy (kJ/100 g)		Protein %	Starch %	Sugar %	Dietary fibre %	Fat %	Ash %	Calcium (mg/100 g)	Iron (mg/100 g)
			E <sub>a</sub>	E <sub>b</sub>								
		a			b	e	f	g	c	d		
Mean	13.4	77.7	344	349	2.05	16.5	0.26	1.01	0.08	0.78	5.9	0.22
SD	1.5	3.5	70	61	0.34	3.8	0.11	0.11	0.02	0.12	2.1	0.04
<b>Mikau Village (South Wosera)</b>												
Glame	16.6	73.3 (4.4)	385	425	1.98 (0.56)	20.3 (4.6)	0.22 (0.09)	1.01 (0.22)	0.09 (0.03)	0.66 (0.12)	7.7 (1.5)	0.28 (0.05)
Mart	13.2	71.7	447	453	2.97	22.9	0.37	0.82	0.05	0.74	14.8	0.34
Nimbukwaro	13.5	72.1 (8.9)	—	446	1.78 (0.69)	21.4 (8.9)	—	1.02 (0.02)	—	0.57 (0.10)	6.3 (1.2)	0.28 (0.04)
Biartgu	24.8	79.2 (2.1)	—	323	1.71	14.0 (0.45)	—	0.73	—	0.63	3.9	0.30
Mean	17.0	74.0	420	412	2.11	19.6	0.30	0.90	0.07	0.65	8.2	0.30
SD	5.4	3.5	42	60	0.58	4.0	0.11	0.14	0.03	0.07	4.7	0.03
Grand mean <sup>c</sup>		76.0	370	377	2.07	17.7	0.32	0.94	0.07	0.74	6.2	0.28
SD		1.9	42	32	0.04	1.7	0.07	0.06	0.01	0.08	1.8	0.05
Takura <sup>d</sup>		74.8 (2.9)	347	399	2.28 (0.08)	16.6 (4.0)	1.45 (0.36)	1.59 (0.27)	0.07 (0.01)	0.76 (0.12)	9.8 (5.7)	0.39 (0.03)

<sup>a</sup> Planted at Saramandi Research Station (Angoram District) in moderately heavy clay with evidence of sand, Numango near Balip Village (Maprik District) in heavy clay and at Mikau Village (South Wosera District) in sandy loam, harvested 20 August 1984. Numango and Mikau samples had no fertilizer. Some Saramandi samples had fertilizer added but there was no difference in results between those with fertilizer added (compound fertilizer 12% N, 6% P, 17% K) and those where no fertilizer was used (ACIAR/ANU Program 1985). Each result is the mean of 1-6 analyses on separate tubers of the same cultivar. Mean analyses for minerals, vitamins and organic acids given in Table 3.11.

<sup>b</sup> Yield (total fresh weight of tubers >250 g) t/ha; Table 7 of Quin (1984).

<sup>c</sup> Sum of a + b + c + d + e + f + g = 97.8.

<sup>d</sup> This cultivar of *D. esculenta* is of the family Asakua harvested October 1984 at Saramandi Research Station. Results are mean of four analyses on different tubers. It is grown without staking (Quin 1984). Tubers analysed were grown without fertilizer. Fertilizer had no effect on moisture or protein content (ACIAR/ANU Program 1985).

**Table A.44.** Amino acid analyses (mg amino acid/g N sample) and amino acid scores for yam (*D. esculenta*) from Solomon Islands.

Amino acid	GUP4 cv	NGP4 cv	NG4 cv	GUP5 cv	Mean	SD
Alanine	319 (36)	252 (22)	290 (112)	406	—	—
Arginine	390 (25)	267 (31)	432 (25)	490	—	—
Aspartic acid	661 (15)	604 (69)	742 (129)	803	—	—
Cystine (Cys)	100 (16)	130 (20)	110 (10)	96	—	—
Glutamic acid	751 (100)	820 (105)	803 (112)	910	—	—
Glycine	257 (5)	221 (20)	231 (74)	303	—	—
Histidine	101 (25)	68 (21)	98 (54)	178	—	—
Isoleucine	294 (26)	126 (29)	178 (64)	276	—	—
Leucine	457 (61)	415 (95)	416 (91)	289	—	—
Lysine	259 (32)	130 (24)	159 (76)	302	—	—
Methionine (Met)	67 (0)	28 (14)	70 (34)	122	—	—
Phenylalanine (Phe)	309 (1)	188 (25)	237 (102)	260	—	—
Proline	370 (35)	210 (21)	241 (59)	304	—	—
Serine	282 (48)	234 (31)	257 (61)	268	—	—
Threonine	219 (9)	154 (33)	183 (74)	269	—	—
Tryptophan	111	—	—	107	—	—
Tyrosine (Tyr)	192 (16)	189 (28)	191 (95)	424	—	—
Valine	240 (18)	178 (53)	235 (91)	338	—	—
<b>Amino Acid Scores</b>						
Histidine	85	59	82	150	94	39
S-containing (Cys + Met)	107	101	115	140	116	17
Isoleucine	168	72	102	158	125	46
Leucine	111	100	101	70	96	18
Lysine	71	36	44	83	59	22
Aromatic (Phe + Tyr)	127	96	109	174	127	34
Threonine	103	72	86	126	97	23
Tryptophan	185	—	—	178	182	5
Valine	110	81	107	154	113	30
% Recovery of N	66 (14)	58 (3)	81 (4)	—	68	12

**Table A.45.** Yam (*D. nummularia*): popular cultivars from Western Samoa.<sup>a</sup>

		Dn 10 cv	Dn 12 cv	Mean <sup>b</sup>	SD
Moisture %	a	65.8 (1.7)	77.0 (3.0)	71.4	7.9
Energy (kJ/100 g)					
E <sub>a</sub>		520	334	427	132
E <sub>b</sub>		555	362	459	136
Protein %	b	2.25 (0.53)	1.51 (0.22)	1.88	0.52
Starch %	e	28.3 (2.0)	17.7 (2.9)	23.0	7.5
Sugar %	f	0.01 (0.01)	0.24 (0.12)	0.13	0.17
Dietary fibre %	g	0.59 (0.06)	2.06 (0.68)	1.33	1.04
Fat %	c	0.02 (0.01)	0.06 (0.02)	0.04	0.03
Ash %	d	1.14 (0.08)	0.69 (0.01)	0.92	0.32
Calcium (mg/100 g)		9.2 (2.7)	6.3 (1.4)	7.8	2.1
Iron (mg/100 g)		0.60 (0.08)	0.24 (0.01)	0.42	0.25

<sup>a</sup> Grown at University of South Pacific School of Agriculture, Alafua, in same plot, planted 20 September 1985, 1 × 1 m spacing staked, fertilised 11 November 1985 with 60 ml of 12-5-20 per plant harvested 1 August 1986, rainfall ~ 3000 mm/year. Processed immediately on arrival in Canberra; results are mean values from analysis of five tubers of each cultivar.

<sup>b</sup> Sum of a + b + c + d + e + f + g = 98.7.

**Table A.46.** Yam (*D. nummularia*): popular cultivars from Vanuatu.<sup>a</sup>

		7	14	153	211	218	Mean <sup>b</sup>	SD
		cv	cv	cv	cv	cv		
Moisture %	a	74.0 (2.0)	72.2 (0.9)	69.2 (4.7)	71.6 (0.6)	66.1 (2.0)	70.6	3.1
Energy (kJ/100 g)								
E <sub>a</sub>		402	418	469	415	508	442	45
E <sub>b</sub>		413	444	496	455	550	472	53
Protein %	b	1.65 (0.40)	2.40 (0.25)	2.16 (0.49)	2.57 (0.39)	2.19 (0.28)	2.19	0.35
Starch %	e	21.8 (1.5)	21.8 (2.0)	25.2 (1.6)	21.2 (0.5)	27.0 (1.3)	23.4	2.6
Sugar %	f	0.11 (0.05)	0.31 (0.06)	0.12 (0.10)	0.46 (0.04)	0.49 (0.16)	0.30	0.18
Dietary fibre %	g	1.80 (0.76)	3.20 (0.55)	1.60 (0.08)	2.98 (0.58)	2.13 (0.42)	2.34	0.71
Fat %	c	0.06 (0.03)	0.06 (0.01)	0.05 (0.04)	0.07 (0.01)	0.10 (0.03)	0.07	0.02
Ash %	d	0.92 (0.05)	0.92 (0.05)	0.95 (0.05)	0.91 (0.02)	1.13 (0.03)	0.97	0.09
<b>Minerals (mg/100 g)</b>								
Ca		3.09	4.06	5.64	5.60	7.0	5.08	1.5
P		27.9	41.7	43.3	45.0	—	39.5	7.8
Mg		14.1	23.2	18.3	24.7	—	20.1	4.9
Na		7.4	9.2	10.0	7.7	—	8.6	1.2
K		384	477	500	432	—	448	51
S		12.5	15.5	17.0	14.2	—	14.8	1.9
Fe		0.26	0.33	0.35	0.27	0.51	0.34	0.10
Cu		0.36	0.30	0.40	0.29	—	0.34	0.05
Zn		0.44	0.49	0.46	0.60	—	0.50	0.07
Mn		0.03	0.05	0.03	0.04	—	0.04	0.01
Al		0.26	0.17	0.54	0.19	—	0.29	0.17
B		0.06	0.05	0.07	0.04	—	0.05	0.01

<sup>a</sup> Samples obtained October 1986. Results are the mean of analyses on three tubers of each cultivar.

<sup>b</sup> Sum of a + b + c + d + e + f + g = 99.9.

**Table A.47.** Amino acid analyses (mg amino acid/g N sample) and amino acid scores for yam *D. nummularia* from Western Samoa.<sup>a</sup>

<i>Amino acid</i>	<i>Dn 10</i>	<i>Dn 12</i>	<i>Dn 12</i>	<i>Mean</i>	<i>SD</i>
	<i>cv</i> <i>tuber 3</i>	<i>cv</i> <i>tuber 1</i>	<i>cv</i> <i>tuber 3</i>		
Alanine	385	256	298	—	—
Arginine	671	473	472	—	—
Aspartic acid	1218	630	484	—	—
Cystine (Cys)	167	98	68	—	—
Glutamic acid	872	958	758	—	—
Glycine	321	211	249	—	—
Histidine	158	98	89	—	—
Isoleucine	295	202	164	—	—
Leucine	504	380	308	—	—
Lysine	318	217	166	—	—
Methionine (Met)	106	74	52	—	—
Phenylalanine (Phe)	292	310	132	—	—
Proline	428	223	167	—	—
Serine	331	284	343	—	—
Threonine	304	175	167	—	—
Tryptophan	124	46	45	—	—
Tyrosine (Tyr)	203	174	102	—	—
Valine	278	213	192	—	—
<b>Amino Acid Scores</b>					
Histidine	133	82	74	96	32
S-containing (Cys + Met)	175	110	77	121	50
Isoleucine	169	115	94	126	39
Leucine	122	92	75	96	24
Lysine	87	60	46	64	21
Aromatic (Phe + Tyr)	126	123	59	103	38
Threonine	143	82	78	101	36
Tryptophan	207	77	75	120	76
Valine	127	97	88	104	20
% recovery of N	95	67	61	74	18

<sup>a</sup> See Table A.45.

Table A.48. Yam (*D. bulbifera*, *D. pentaphylla*, *D. rotundata* and *D. trifida*): popular cultivars from Vanuatu.<sup>a</sup>

		<i>D. bulbifera</i>					<i>D. pentaphylla</i>				<i>D. rotun-</i>	<i>D. trifida</i>
		64 cv	88 cv	251 cv	348 cv	Mean	22 cv	263 cv	351 cv	Mean	10 cv	29 cv
Moisture %	a	83.0 (1.0)	77.6 (2.2)	84.0 (0.8)	82.2 (0.4)	81.7 (2.8)	84.4 (2.1)	80.3 (0.7)	82.7 (0.2)	82.5 (2.1)	65.7 (1.0)	80.7 (0.5)
Energy (kJ/100 g)												
E <sub>a</sub>		231	318	174	225	237 (66)	226	314	258	265	542	272
E <sub>b</sub>		256	350	239	270	279 (49)	232	303	262	266 (36)	557	296
Protein %	b	1.81 (0.22)	3.17 (0.34)	1.38 (0.09)	1.40 (0.40)	1.94 (0.84)	1.44 (0.50)	1.83 (0.04)	1.69 (0.08)	1.65 (0.20)	1.42 (0.03)	1.52 (0.42)
Starch %	e	11.6 (0.7)	15.3 (1.1)	8.6 (0.4)	11.3 (0.2)	11.7 (2.9)	11.7 (1.3)	16.6 (0.7)	13.4 (0.2)	13.9 (2.5)	30.2 (0.7)	14.2 (1.0)
Sugar %	f	0.08 (0.04)	0.14 (0.05)	0.21 (0.18)	0.36 (0.02)	0.20 (0.12)	0.11 (0.06)	0.10 (0.01)	0.14 (0.01)	0.12 (0.02)	0.32 (0.08)	0.23 (0.10)
Dietary fibre %	g	1.29 (0.09)	1.42 (0.09)	1.49 (0.08)	1.47 (0.14)	1.42 (0.09)	0.66 (0.14)	—	—	0.66 (0.14)	0.63 (0.10)	1.02 (0.16)
Fat %	c	0.04 (0.02)	0.04 (0.01)	0.04 (0.03)	0.07 (0.01)	0.05 (0.02)	0.02 (0.01)	0.04 (0.03)	0.02 (0.01)	0.03 (0.01)	0.09 (0.01)	0.04 (0.02)
Ash %	d	0.81 (0.05)	0.84 (0.07)	0.53 (0.07)	0.59 (0.07)	0.69 (0.16)	0.73 (0.07)	0.81 (0.01)	0.75 (0.03)	0.76 (0.04)	0.73 (0.01)	0.70 (0.08)
<b>Minerals (mg/100 g)</b>												
Ca		6.7	6.7	7.7	12.4	8.4 (2.8)	12.6	19.4	8.1	13.4 (5.7)	4.6 (0.04)	8.0 (3.1)
P		27.2	47.6	15.8	15.2	26.5 (15)	23.7	25.3	28.2	25.7 (2.3)	28.2 (0.6)	37.8 (2.3)
Mg		23.6	22.9	12.0	17.3	19.0 (5.4)	20.1	25.7	21.6	22.5 (2.9)	17.3 (0.8)	15.4 (0.7)
Na		2.92	3.69	2.51	1.73	2.71 (0.82)	4.15	8.23	5.89	6.09 (2.1)	4.74 (3.1)	2.86 (0.36)
K		452	447	232	253	346 (120)	362	383	377	374 (11)	361 (19)	350 (41)
S		10.6	15.0	5.6	4.9	9.0 (4.7)	13.0	11.5	15.8	13.4 (2.2)	12.4 (0.5)	8.2 (2.1)
Fe		0.51	0.66	0.43	0.65	0.56 (0.11)	0.32	0.65	0.39	0.44 (0.16)	0.60 (0.12)	0.54 (0.20)
Cu		0.25	0.23	0.22	0.14	0.21 (0.05)	0.24	0.21	0.29	0.25 (0.04)	0.12 (0.01)	0.13 (0.03)

Zn	0.28	0.45	0.26	0.23	0.31 (0.10)	0.32	0.34	0.41	0.36 (0.05)	0.30 (0.01)	0.35 (0.02)
Mn	0.15	0.14	0.06	0.17	0.13 (0.05)	0.04	0.06	0.05	0.05 (0.01)	0.03 (0.00)	0.03 (0.00)
Al	0.21	0.32	0.47	0.96	0.49 (0.33)	0.26	1.14	0.45	0.62 (0.46)	0.63 (0.46)	0.41 (0.19)
B	0.12	0.10	0.07	0.13	0.10 (0.03)	0.15	0.17	0.20	0.17 (0.03)	0.08 (0.01)	0.11 (0.01)
Sum of a+b+c+d+e+f+g	—	—	—	—	97.7	—	—	—	99.6	99.1	98.4

<sup>a</sup> Each result is the mean of three analyses on three tubers of each cultivar.

Table A.49. Composition of popular cassava cultivars from Solomon Islands.<sup>a</sup>

Cultivar	Total yield (t/ha)	Moisture % <sub>n</sub>	Energy (kJ/100 g)		Protein % <sub>n</sub>	Starch % <sub>n</sub>	Sugar % <sub>n</sub>	Dietary fibre % <sub>n</sub>	Fat % <sub>n</sub>	Ash % <sub>n</sub>	Calcium (mg/100 g)	Iron (mg/100 g)	Trypsin inhibitor (TIU/g)	Cyanide (mg/100 g) <sup>c</sup>		
			E <sub>a</sub>	E <sub>b</sub>										Free	Total	
		a			b	e	f	g	c	d						
WSH 9	34.2	66.4	493	545	0.67	27.6	0.71	1.57	0.09	0.80	29.3	0.37	0 <sup>b</sup>	5.46	5.52	
		(1.1)			(0.26)	(1.0)	(0.12)	(0.12)	(0.02)	(0.03)	(1.7)	(0.06)		(3.12)	(3.09)	
Tikopia	27.9	65.4	506	562	0.84	28.3	0.62	1.44	0.10	0.72	24.4	0.33	0	5.37	5.49	
		(1.0)			(0.13)	(0.7)	(0.28)	(0.09)	(0.03)	(0.02)	(2.6)	(0.01)		(1.76)	(1.65)	
Malaita red	35.4	60.3	600	651	0.79	33.8	0.67	1.24	0.13	0.76	11.6	0.31	0	2.66	2.64	
		(1.8)			(0.02)	(2.3)	(0.22)	(0.04)	(0.02)	(0.02)	(0.3)	(0.04)		(0.74)	(0.74)	
WSH 1	16.3	62.2	561	618	0.40	31.7	0.87	1.48	0.13	0.68	16.2	0.37	0	2.37	2.47	
		(2.1)			(0.01)	(2.1)	(0.09)	(0.07)	(0.01)	(0.04)	(3.2)	(0.04)		(0.33)	(0.42)	
Betikama	23.8	72.9	412	432	0.64	22.3	1.18	1.47	0.16	0.50	18.5	0.26	0	3.37	3.48	
		(2.2)			(0.06)	(3.0)	(0.10)	(0.11)	(0.04)	(0.03)	(3.6)	(0.02)		(0.47)	(0.43)	
Maliae 2	13.9	69.4	455	493	0.61	24.0	2.08	1.56	0.15	0.67	15.8	0.25	0	4.45	4.51	
		(4.6)			(0.34)	(4.8)	(0.18)	(0.13)	(0.06)	(0.11)	(2.4)	(0.03)		(0.51)	(0.62)	
Curry Gizo	18.5	66.2	513	548	0.44	28.1	1.59	1.50	0.16	0.66	24.6	0.15	0	2.62	2.70	
		(1.1)			(0.07)	(0.6)	(0.22)	(0.31)	(0.01)	(0.03)	(1.5)	(0.02)		(0.10)	(0.15)	
WSH 5	22.6	63.2	553	601	0.84	30.5	1.15	1.30	0.13	0.65	14.1	0.27	0	3.73	3.96	
		(2.3)			(0.18)	(2.0)	(0.18)	(0.10)	(0.02)	(0.06)	(1.5)	(0.03)		(1.40)	(1.34)	
WSH 2	27.2	69.7	470	488	0.57	25.7	1.39	1.31	0.12	0.66	13.1	0.20	0	2.07	2.19	
		(4.0)			(0.13)	(3.3)	(0.83)	(0.11)	(0.03)	(0.05)	(1.5)	(0.02)		(0.37)	(0.39)	
Mean <sup>d</sup>	24.4	66.2	507	549	0.64	28.0	1.14	1.43	0.13	0.69	18.6	0.28	—	3.57	3.66	
SD	7.5	4.0	60	69	0.16	3.8	0.49	0.12	0.02	0.06	6.1	0.07	—	1.28	1.28	

<sup>a</sup> Grown at Dodo Creek, sandy soil, planted 24 November 1984, harvested 8 September 1985. Fertiliser applied as split dressing at 1 and 4 months. Ammonium sulfate 300 kg/ha, potassium chloride 300 kg/ha. Results are mean of analyses on three tubers of each cultivar. Other minerals, organic acids and vitamin analyses given in Table 3.14.

<sup>b</sup> Estimated to be <0.1 TIU/g.

<sup>c</sup> Cassava cut tissue stored in deep freeze for 6 months before cyanide analysis.

<sup>d</sup> Sum of a + b + c + d + e + f + g = 98.2.

Table A.50. Composition of tubers of popular cassava cultivars from Fiji.<sup>a</sup>

	Navolau cv	Beqa cv	Vulatolu cv	Sokobale cv	New Guinea cv	Mean <sup>b</sup>	SD
Yield (t/ha)	31.6	29.3	24.2	20.0	30.0	—	—
Moisture %	64.7 (5.6)	58.3 (5.1)	64.7 (2.4)	60.2 (1.9)	60.0 (2.5)	61.6	2.9
Energy (kJ/100 g)							
E <sub>a</sub>	519	644	516	588	591	571	55
E <sub>b</sub>	575	686	575	653	656	629	51
Protein %	0.56 (0.04)	0.67 (0.13)	0.46 (0.03)	0.56 (0.06)	0.45 (0.08)	0.54	0.10
Starch %	28.4 (6.0)	36.1 (4.6)	28.3 (2.7)	33.3 (1.9)	33.4 (4.3)	31.9	3.5
Sugar %	1.25 (0.59)	0.90 (0.17)	1.42 (0.40)	0.47 (0.11)	0.96 (0.10)	1.00	0.36
Dietary fibre %	1.76 (0.15)	1.28 (0.30)	1.33 (0.19)	1.36 (0.11)	1.51 (0.25)	1.45	0.19
Fat %	0.24 (0.03)	0.22 (0.02)	0.21 (0.01)	0.23 (0.09)	0.10 (0.06)	0.20	0.06
Ash %	0.94 (0.08)	0.99 (0.08)	1.00 (0.08)	0.95 (0.10)	0.91 (0.04)	0.96	0.04
Calcium (mg/100 g)	19.0 (2.2)	18.6 (3.5)	21.2 (3.8)	20.0 (5.0)	15.4 (0.9)	18.8	2.2
Iron (mg/100 g)	0.22 (0.04)	0.20 (0.03)	0.24 (0.04)	0.25 (0.04)	0.13 (0.04)	0.21	0.05
Cyanide (mg/100 g) <sup>c</sup>							
Free	1.00 (0.60)	1.04 (0.24)	0.90 (0.70)	0.30 (0.12)	0.60 (0.42)	0.77	0.31
Total	2.41 (0.65)	3.40 (0.96)	3.15 (0.92)	2.69 (0.85)	2.36 (2.20)	2.80	0.46

<sup>a</sup> Planted 23 April 1985, harvested 26 June 1986 at Koronivia Research Station. Fertilizer was urea (50 kg/ha) applied 8 weeks after planting. Total rainfall over life of crop 4400 mm. Results are mean of analyses on five tubers of each cultivar.

<sup>b</sup> Sum of a + b + c + d + e + f + g = 97.7.

<sup>c</sup> These cyanide results were obtained on fresh samples. Samples were also stored at -20 °C for 5 months and gave total cyanides for Navolau, Beqa, Vulatolu and Sokobale of 1.17, 2.20, 3.10 and 2.90 respectively.

Table A.51. Composition of cassava cultivars from PNG.<sup>a</sup>

		White	Yellow	L4	L12	L19	L23	Mean <sup>b</sup>	SD
Moisture %	a	61.1 (4.2)	59.3 (3.2)	63.5 (7.7)	62.0 (2.9)	61.7 (7.5)	56.8 (1.9)	60.7	2.4
Energy (kJ/100 g)									
E <sub>a</sub>		573	619	532	552	556	636	578	40
E <sub>b</sub>		637	668	595	621	627	712	643	41
Protein % <sup>d</sup>	b	0.37 (0.05)	0.54 (0.12)	0.34 (0.07)	0.39 (0.07)	0.45 (0.12)	0.32 (0.06)	0.40	0.08
Starch %	e	32.9 (3.5)	35.6 (2.7)	30.4 (8.0)	31.5 (3.0)	32.0 (6.0)	36.5 (1.1)	33.2	2.5
Sugar %	f	0.37 (0.18)	0.18 (0.05)	0.33 (0.10)	0.39 (0.18)	0.18 (0.10)	0.58 (0.19)	0.34	0.15
Dietary fibre %	g	1.50 (0.14)	1.41 (0.34)	1.47 (0.23)	1.56 (0.23)	1.62 (0.24)	1.83 (0.25)	1.57	0.15
Fat %	c	0.13 (0.03)	0.12 (0.02)	0.20 (0.02)	0.20 (0.02)	0.14 (0.05)	0.17 (0.02)	0.16	0.04
Ash %	d	0.84 (0.06)	0.91 (0.04)	0.81 (0.08)	0.84 (0.05)	0.88 (0.10)	0.89 (0.05)	0.86	0.04
Calcium (mg/100 g)		24.9 (2.8)	21.7 (1.9)	25.5 (3.9)	23.0 (5.6)	19.6 (0.7)	17.9 (2.4)	22.1	3.0
Iron (mg/100 g)		0.21 (0.04)	0.18 (0.03)	0.17 (0.05)	0.23 (0.03)	0.16 (0.03)	0.22 (0.02)	0.20	0.03
Cyanide (mg/100 g) <sup>c</sup>									
Free		2.06 (0.16)	2.07 (0.67)	3.37 (1.25)	1.31 (0.63)	1.23 (0.41)	6.21 (0.86)	2.69	1.88
Total		2.20 (0.18)	2.10 (0.63)	3.48 (1.39)	1.43 (0.69)	1.33 (0.53)	6.29 (0.88)	2.78	1.87

<sup>a</sup> Planted January 1985 at Laloki Research Station, harvested January 1986, no fertilizer or irrigation used. Total rainfall over life of crop about 1200 mm. Yellow and white are the most popular varieties around Port Moresby. The other four cultivars were originally from Lowlands Agricultural Experimental Station, Keravat, New Britain. Results are mean of separate analyses on five tubers of each cultivar. Other mineral and organic acid analyses given in Table 3.15.

<sup>b</sup> Sum of a + b + c + d + e + f + g = 97.2.

<sup>c</sup> Cassava cut tissue stored in deep freeze at -20 °C for 4 months before analysis.

<sup>d</sup> These low protein results were double-checked, total of 60 Kjeldahl nitrogen analyses.

**Table A.52.** Amino acid analyses (mg amino acid/g N) and amino acid scores of cassava tubers from Solomon Islands and PNG.

Amino acid	Solomon Islands			PNG			Mean
	Malaita Red cv	Curry Gizo cv	Tikopia cv	Yellow cv	White cv	L12 cv	
Alanine	386	288	265	443	404	352	—
Arginine	297	129	158	122	205	140	—
Aspartic acid	494	424	392	976	762	520	—
Cystine	108	81	86	226	236	144	—
Glutamic acid	636	743	529	1187	898	632	—
Glycine	311	222	226	236	330	232	—
Histidine	116	106	83	102	92	76	—
Isoleucine	310	280	261	120	224	168	—
Leucine	450	295	291	376	410	279	—
Lysine	354	357	275	372	357	264	—
Methionine	45	194	95	130	132	133	—
Phenylalanine (Phe)	275	199	150	141	249	182	—
Proline	162	142	133	179	185	187	—
Serine	182	125	116	385	284	192	—
Threonine	200	156	145	381	326	196	—
Tryptophan	—	—	—	56	49	—	—
Tyrosine (Tyr)	275	258	213	115	250	182	—
Valine	323	245	246	161	280	315	—
<b>Amino Acid Scores</b>							
Histidine	98	89	69	86	77	62	80 (13)
S-containing (Cys + Met)	98	176	116	228	236	177	172 (56)
Isoleucine	177	160	149	69	128	96	130 (41)
Leucine	109	71	71	91	99	68	85 (17)
Lysine	97	98	76	103	99	72	91 (13)
Aromatic (Phe + Tyr)	140	116	92	65	127	92	105 (27)
Threonine	94	73	68	179	153	92	110 (45)
Tryptophan	—	—	—	93	82	—	88 (8)
Valine	147	112	112	74	128	144	120 (27)
% Recovery of N	67	63	50	86	77	53	66 (14)