

Table 22. Oil and squalene contents in different *Amaranthus* species seeds*

Species	Genotype	Origin	Oil (%)	Squalene (% in oil)
1. <i>Amaranthus blitoides</i>	Pl 608662	Hungary	3.3	6.46
	Pl 608663	Canada	3.3	4.95
2. <i>Amaranthus cruentus</i>	Ames 1978	Ghana	3.7	3.87
	Ames 5604	Taiwan	5.0	3.72
	Pl 462371	Sudan	3.9	4.93
	Pl 511714	Peru	1.9	4.08
	Pl 511720	Guatemala	2.2	4.35
	Pl 566896	United States	2.2	3.32
	Pl 566897	India	3.6	4.21
3. <i>Amaranthus hybridus</i>	Ames 2028	China	4.05	5.89
	Ames 5331	Argentina	2.83	4.14
	Ames 5684	United States	5.03	6.00
	Ames 23371	Brazil	6.69	4.94
	Pl 604574	Mexico	7.00	7.30
	Pl 607463	United States	2.36	2.26
4. <i>Amaranthus hypochondriacus</i>	Ames 2178	Nepal	5.23	6.98
	Ames 5158	Puerto Rico	4.10	5.07
	Pl 538794	Russia	5.97	5.09
	Pl 612177	China	3.03	4.74
5. <i>Amaranthus palmeri</i>	Ames 5665	Mexico	5.20	2.20
	Ames 15298	United States	4.42	2.76
	Pl 549158	Mali	4.56	2.47
	Pl 612856	United States	3.46	2.46
6. <i>Amaranthus retroflexus</i>	Ames 5328	Canada	5.04	3.82
	Ames 21767	China	7.09	4.55
	Ames 22592	Mongolia	4.94	4.23
	Ames 23890	Italy	6.25	4.20
	Pl 177261	Turkey	5.86	3.78
	Pl 607465	United States	6.43	4.54
	Pl 612857	United States	4.89	4.56
7. <i>Amaranthus spinosus</i>	Ames 2043	Indonesia	7.21	3.20
	Ames 2053	Thailand	6.81	2.98
	Pl 482057	Zimbabwe	6.12	2.72
	Pl 500294	Zambia	5.67	2.71
8. <i>Amaranthus tricolor</i>	Ames 1980	Zaire	5.34	5.33
	Ames 5163	Puerto Rico	4.24	5.22
	Ames 5317	Hong Kong	4.31	4.73
	Ames 5368	Bangladesh	3.34	5.00
	Ames 15330	China	5.34	5.75
	Ames 18049	Nepal	5.58	5.52
	NSL 6100	United States	3.56	5.68

Table 22. Oil and squalene contents in different *Amaranthus* species seeds* (cont.)

Species	Genotype	Origin	Oil (%)	Squalene (% in oil)
<i>9. Amaranthus viridis</i>	Ames 5583	Philippines	5.27	5.74
	Ames 10828	United States	5.13	3.28
	Ames 15313	Argentina	5.08	3.71
	Ames 23271	India	5.09	3.45
	Ames 23388	Brazil	5.40	4.81
	Ames 23806	Israel	4.93	3.71
	Ames 25136	Nigeria	4.22	4.69
	Ames 25413	South Africa	4.69	4.26
	PI 540445	Indonesia	5.23	4.39
Overall mean and standard deviation			5.0±1.5	4.2±1.4

* (He and Corke, 2003)

Table 23. Average composition of fatty acids in *Amaranthus* species grains^a

Species	N ^b	FAs in oil (%)	Palmitic 16.0	Stearic 18.0	Oleic 18.1	Linoleic 18.2	S/U ratio ^c
1. <i>Amaranthus blitoides</i>	2	84.8±19.3	17.2±8.5	1.5±0.3	22.2±3.5	56.3±11.8	0.26±0.13
2. <i>Amaranthus cruentus</i>	7	53.5±13.2	27.0±3.1	1.4±0.8	27.9±2.4	38.1±3.1	0.44±0.07
3. <i>Amaranthus hybridus</i>	6	48.2±12.9	22.0±5.0	1.3±1.0	26.3±2.8	47.4±7.2	0.34±0.08
4. <i>Amaranthus hypochondriacus</i>	5	63.8±6.4	24.0±1.7	0.9±0.4	33.7±6.5	38.9±5.1	0.37±0.02
5. <i>Amaranthus palmeri</i>	4	64.9±9.3	22.3±0.9	3.9±6.8	21.0±1.5	52.4±1.7	0.37±0.10
6. <i>Amaranthus retroflexus</i>	8	69.5±5.3	14.3±1.8	0.7±0.2	27.1±2.5	55.2±4.3	0.20±0.03
7. <i>Amaranthus spinosus</i>	4	67.0±6.0	24.9±0.4	0.9±0.1	27.4±0.5	44.6±0.3	0.37±0.01
8. <i>Amaranthus tricolor</i>	8	56.8±16.2	24.3±1.6	1.1±0.4	25.9±2.9	46.4±2.7	0.36±0.03
9. <i>Amaranthus viridis</i>	9	60.1±12.6	23.0±1.3	1.3±0.1	34.4±2.8	38.7±2.9	0.35±0.03
Overall mean and standard deviation		61.3±10.1	21.3±5.1	1.1±1.4	28.2±4.5	46.5±7.9	0.32±0.09

^aMeans of duplicate determinations. ^bNumber of genotypes in relevant species. ^cS/U ratio = saturated/unsaturated = (14:0 + 16:0 + 18:0 + 20:0)/(18:1 + 18:2). He and Corke (2003)

Table 24. Oil and squalene in mature *Amaranthus* species leaves*

Species	Genotype	Oil % (DB)	Squalene in oil (%)
1. <i>Amaranthus blitoides</i>	PI 608663	1.54	0.33
2. <i>Amaranthus cruentus</i>	Ames 5604	1.90	0.24
3. <i>Amaranthus hybridus</i>	Ames 2028	1.68	0.26
	Ames 5684	1.66	0.17
	PI 604574	1.63	0.28
4. <i>Amaranthus hypochondriacus</i>	Ames 5158	1.75	0.28
5. <i>Amaranthus retroflexus</i>	Ames 5328	1.38	0.14
	Ames 21767	1.50	0.16
	Ames 23890	1.75	0.26
6. <i>Amaranthus spinosus</i>	PI 607465	1.77	0.14
	Ames 2043	1.64	0.18
	PI 482057	1.08	0.4
7. <i>Amaranthus tricolor</i>	PI 500294	1.13	0.21
	Ames 1980	1.36	0.20
	Ames 15330	1.28	0.37
8. <i>Amaranthus viridis</i>	Ames 18049	1.81	0.44
	PI 607446	1.49	0.31
	Ames 23388	2.18	0.104
	Ames 25413	1.91	0.16
Overall mean		1.63	0.26
Standard deviation		0.30	0.13

* He and Corke (2003)

Table 25. Quantification and distribution of simple (nonacylated) and acylated betacyanins in *Amaranthus* species*

Species	Genotype name	Origin	Plant part	Individual betacyanin composition (%)						Total pigment content (mg/g)
				Amaran-thine	Isoama-ranthine	Betanin	Isobet-anin	Celosi-anin I	Celosi-anin II	
1- <i>Amaranthus aspera</i>	Am 10	China	S	94.7	2.6	1.7				
2- <i>Amaranthus albus</i>	A1002	Spain	S	94.1	5.4					0.57
3- <i>Amaranthus blitoides</i>	B1001	Hungary	St	95.7	tr	3.1				0.12
4- <i>Amaranthus caudatus</i>	Ca 1657	U.K.	S	95.3	2.8	0.7				0.73
	San 119	China	If	97.7	2.0					1.22
5- <i>Amaranthus cruentus</i>	Cr 071	U.S.	S	97.0	1.6	1.0				1.36
	Cr 072	India	L	96.1	1.7	1.8	0.2			1.27
6- <i>Amaranthus graecizans</i>	Gr 001	U.S.	S	93.3	tr	tr				0.08
7- <i>Amaranthus hybridus</i>	Hr 008	Zimbabwe	S	96.1	1.2	2.5				0.76
8- <i>Amaranthus hypochondriacus</i>	Hy 041	U.S.	If	95.5	2.0	0.8	tr			1.08
9- <i>Amaranthus lividus</i>	Lv 003	India	S	97.0	1.9	0.5				0.45
10- <i>Amaranthus mangostanus</i>	Xian C.	China	S	95.6	2.2	1.3				0.36
11- <i>Amaranthus palmeri</i>	Pa 002	U.S.	St	96.4	tr				1.9	0.24
12- <i>Amaranthus paniculatus</i>	Tibet Y.	China	S	97.3	1.1	0.8				0.87
13- <i>Amaranthus retroflexus</i>	Re 003	Turkey	S	96.6	tr	2.6				0.50
14- <i>Amaranthus spinosus</i>	Sn 002	Taiwan	S	94.9	2.2	1.0				0.26
15- <i>Amaranthus tricolor</i>	Tr 011	China	S	95.6	4.1					1.05
	Beijing R.	China	L	93.5	4.6	1.2	tr			1.28
16- <i>Amaranthus viridis</i>	Vd 002	Maldives	St	90.7	2.7	tr		tr	1.8	0.18

If: inflorescences, L: leaves, S: seeds, St: stems, tr: trace amount.

* Cai *et al.* (2001)