

# P Avena sativa

## Common Name(s)

Oats

## How Used

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Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
0	1,3,4-PENTANE-TRICARBOXYLIC-ACID-TRIMETHYL-ESTER	Pericarp	--	1.3	
0	1,3,4-PENTANE-TRICARBOXYLIC-ACID-TRIMETHYL-ESTER	Hull Husk	1.3	1.3	
0	1,3-AMINO-PROPYL-PYRROLINIUM	Sprout Seedling	--	--	
0	2,2,6-TRIMETHYL-CYCLOHEXANONE	Seed	--	--	
0	2-CARBOXYARABINITOL	Leaf	--	517	0.7377260172344527 Moore, B. D., Isidoro, E., Seemann, J. R. 1993. Distribution of 2-Carboxyarabinitol Among Plants. Phytochemistry 34 3: 703-707. Dept. Biochem. Univ. Nevada Reno 89557, USA.
0	2-METHYL-HEPT-2-EN-6-ONE	Seed	--	--	
0	26-DESGLUCOAVENACOSIDES	Plant	--	--	J.S. Glasby Dict.Pls Containing 2ndary Metabolite. 1991.

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
0	29-ISOFUCOSTEROL	Seed	--	--	
0	3'-HYDROXYAVENALUMIC-ACID	Fruit	--	--	
0	3,4-DIMETHOXY-ACETOPHENONE	Petiole	--	--	
0	3,4-DIMETHOXY-ACETOPHENONE	Hull Husk	--	--	
0	4,5-DIHYDROXY-7-METHOXY-8-C-GLUCOSYL-O-RHAMNOSIDE	Leaf	--	--	
4	4-VINYL-GUAIACOL	Seed	--	--	
0	5-DEHYDRO-AVENASTEROL	Leaf	--	--	
0	5-DEHYDRO-AVENASTEROL	Seed	--	--	
0	5-HYDROXY-3',5'-DIMETHOXY-GLUCOSIDE	Leaf	--	--	
0	5-HYDROXY-N-HENTRIACONTAN-14,16-DIONE	Seed	--	--	Rizk, A.F.M., The Phytochemistry of the Flora of Qatar, Scientific and Applied Research Centre, University of Qatar, Kingprint, Richmond, UK, 1986.
0	6-HYDROXY-N-HENTRIACONTAN-14,16-DIONE	Seed	--	--	Rizk, A.F.M., The Phytochemistry of the Flora of Qatar, Scientific and Applied Research Centre, University of Qatar, Kingprint, Richmond, UK, 1986.
0	7-DEHYDRO-AVENASTEROL	Leaf	--	--	
0	7-DEHYDRO-AVENASTEROL	Seed	--	--	

Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference	Citation
0	7-HYDROXY-N-HENTRIACONTAN-14,16-DIONE	Seed	--	--		Rizk, A.F.M., The Phytochemistry of the Flora of Qatar, Scientific and Applied Research Centre, University of Qatar, Kingprint, Richmond, UK, 1986.
0	7-METHOXY-VITEXIN-O-RHAMNOSIDE	Leaf	--	--		
0	7-O-METHOXYVITEXIN-O-RHAMNO-GLUCOSIDE	Sprout Seedling	--	--		
16	ACETIC-ACID	Plant	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
1	ACONITIC-ACID	Plant	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	AEGILOPSIN	Hull Husk	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
3	ALANINE	Seed	4000	4000	-1.3086899322606569	Jim Duke's personal files.*
0	ALPHA-KETO-GLUTARIC-ACID	Petiole	--	--		
0	ALPHA-KETO-GLUTARIC-ACID	Hull Husk	--	--		
32	ALPHA-TOCOPHEROL	Seed	4.4	10.1	-0.6988762675539839	Jim Duke's personal files.*

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
5	ALUMINUM	Plant	--	--		
0	APIGENIN-6,8-DI-C-GLUCOSIDE	Leaf	--	--		
0	APIGENIN-6-C-GLUCOSIDE	Leaf	--	--		
0	APIGENIN-6-C-GLUCOSYL-ARABINOSIDE	Leaf	--	--		
0	APIGENIN-6-C-GLUCOSYL-O-ARABINOSIDE	Leaf	--	--		
0	APIGENIN-8-C-ARABINOSYLHEXOSIDE	Leaf	--	--		Rizk, A.F.M., The Phytochemistry of the Flora of Qatar, Scientific and Applied Research Centre, University of Qatar, Kingprint, Richmond, UK, 1986.
0	APIGENIN-8-C-GLUCOSYL-O-RHAMNOSIDE	Leaf	--	--		
0	APIGENIN-8-C-RHAMNOSYLGLUCOSIDE	Leaf	--	--		Rizk, A.F.M., The Phytochemistry of the Flora of Qatar, Scientific and Applied Research Centre, University of Qatar, Kingprint, Richmond, UK, 1986.
14	ARGININE	Seed	3000	13000	-0.492896993165164	Jim Duke's personal files.*
112	ASCORBIC-ACID	Plant	26	120	-0.5655146584691259	
0	ASH	Plant	18040	82000	-0.7048006092883108	
0	ASH	Seed	19000	96000	1.4473321359680458	
3	ASPARTIC-ACID	Seed	7000	7000	-1.3839193496072566	Jim Duke's personal files.*
0	AVENACIN-A-1	Plant	--	--		

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
0	AVENACIN-A-1	Root	--	--	
0	AVENACIN-B-2	Plant	--	--	Jeffery B. Harborne and H. Baxter, eds. 1983. Phytochemical Dictionary. A Handbook of Bioactive Compounds from Plants. Taylor & Frost, London. 791 pp.
0	AVENACINS	Root	--	--	
0	AVENACOSIDE-A	Seed	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	AVENACOSIDE-A	Shoot	--	--	Jeffery B. Harborne and H. Baxter, eds. 1983. Phytochemical Dictionary. A Handbook of Bioactive Compounds from Plants. Taylor & Frost, London. 791 pp.
0	AVENACOSIDE-B	Seed	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.

Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
0	AVENACOSIDE-B	Shoot	--	--	Jeffery B. Harborne and H. Baxter, eds. 1983. Phytochemical Dictionary. A Handbook of Bioactive Compounds from Plants. Taylor & Frost, London. 791 pp.
2	AVENACOSIDES	Plant	1000	15000	
0	AVENALUMIC-ACID	Fruit	--	--	
0	AVENALUMIN-I	Leaf	--	--	
0	AVENANTHRAMIDE-G	Shoot	--	22.4	
3	AVENANTHRAMIDES	Seed	--	--	
0	AVENARIN	Plant	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	AVENEIN	Sprout Seedling	--	--	Wealth of India.
0	AVENIC-ACID-A	Root	--	--	
0	AVENIC-ACIDS	Root	--	--	
1	AVENIN	Root	--	--	
1	AVENIN	Seed	11200	185600	
24	BENZALDEHYDE	Seed	--	--	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
53	BETA-CAROTENE	Plant	16	72	-0.3372351827937805	
0	BETA-CYCLOCITRAL	Seed	--	--		
0	BETA-HYDROXY-BETA-METHYL-GLUTARIC-ACID	Petiole	--	--		
0	BETA-HYDROXY-BETA-METHYL-GLUTARIC-ACID	Hull Husk	--	--		
13	BETA-IONONE	Seed	--	--		
47	BETA-SITOSTEROL	Plant	--	--		Stitt, Paul. Why George should eat broccoli.
47	BETA-SITOSTEROL	Leaf	--	--		
47	BETA-SITOSTEROL	Seed	--	--		
14	BETAINE	Root	11.7	0.1	-0.36834838536964337	
14	BETAINE	Shoot	234	2	-0.576538228658353	
4	BIOTIN	Seed	0.132	1.4	-0.5261329414364116	Jim Duke's personal files.*
4	BORON	Seed	2	7	-0.8116798946510148	Betting on Boron, Unpublished draft by J. A. Duke on file at USDA, draft and papers relating to boron percentages. Includes Internat. Z. Vit. Ern. Forschung 43:1973 (boron).
0	BRASSICASTEROL	Seed	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	BUTENYL-ISOTHIOCYANATE	Seed	--	--		

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
102	CAFFEIC-ACID	Plant	--	--		Stitt, Paul. Why George should eat broccoli.
0	CAFFEIC-ACID-ESTER	Seed	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
28	CALCIUM	Plant	3146	14300	0.07601124250227355	
28	CALCIUM	Seed	400	4800	0.12003541790252584	
0	CAMPESTANOL	Leaf	--	--		
0	CAMPESTANOL	Seed	--	--		
2	CAMPESTEROL	Seed	--	--		
0	CARBOHYDRATES	Plant	265000	861000	1.2143728174932495	
0	CARBOHYDRATES	Seed	562000	775000	0.9999001412733444	
0	CAROTENE	Plant	2.6	702	0.3623054192861281	Jim Duke's personal files.*
0	CAROTENE	Seed	--	0.22	-1	Jim Duke's personal files.*
31	CARYOPHYLLENE	Seed	--	--		
1	CELLULOSE	Hull Husk	350000	350000	-0.16222142113076254	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
1	CELLULOSE	Plant	305000	305000	0.0010903022272763664	Jim Duke's personal files.*



Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
7	CHLORINE	Plant	1000	5700	-0.16621641797392214	Jim Duke's personal files.*
7	CHLORINE	Seed	500	1900	3.160532696671519	Jim Duke's personal files.*
0	CHLOROPHYLL-A	Plant	--	--		Stitt, Paul. Why George should eat broccoli.
0	CHLOROPHYLL-B	Plant	--	--		Stitt, Paul. Why George should eat broccoli.
0	CHOLEST-7-EN-3-BETA-OL	Leaf	--	--		
0	CHOLEST-7-EN-3-BETA-OL	Seed	--	--		
0	CHOLESTANOL	Leaf	--	--		
0	CHOLESTANOL	Seed	--	--		
1	CHOLESTEROL	Seed	--	--		
1	CHOLESTEROL	Leaf	--	--		
20	CHOLINE	Root	24	0.2	-0.4135487761450312	
20	CHOLINE	Seed	134	1712	0.03730095447113204	
20	CHOLINE	Shoot	37	0.3	-0.7676470168924543	
24	CHROMIUM	Plant	0.9	3.9	-0.4995358912242695	
23	CITRIC-ACID	Petiole	--	--		
23	CITRIC-ACID	Hull Husk	--	--		
2	COBALT	Plant	0.4	1.7	-0.4218779584044709	
2	COBALT	Seed	--	0.32	-0.19206513214434717	Jim Duke's personal files.*

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
0	COLAMINE	Seed	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
12	COPPER	Plant	4	4	-1.1092588472799756	Jim Duke's personal files.*
12	COPPER	Seed	2.4	25.7	0.987370350962101	Jim Duke's personal files.*
2	CYSTINE	Seed	1000	5000	1.2870395709433473	Jim Duke's personal files.*
5	DAUCOSTEROL	Seed	--	--		
0	DEC-TRANS-2-EN-1-AL	Seed	--	--		
0	DEC-TRANS-2-TRANS-4-DIEN-1-AL	Seed	--	--		
1	DELTA-5-AVENASTEROL	Seed	--	--		
1	DELTA-7-AVENASTEROL	Seed	--	--		Rizk, A.F.M., The Phytochemistry of the Flora of Qatar, Scientific and Applied Research Centre, University of Qatar, Kingprint, Richmond, UK, 1986.
0	DELTA-7-STIGMASTEROL	Seed	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	DELTA-AMINO-LEVULINIC-ACID	Sprout Seedling	--	--		

Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference	Citation
0	DIADENOSINE-TETRAPHOSPHORIC-ACID	Sprout Seedling	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	DIAMINO-PROPANE	Sprout Seedling	--	--		
0	DIHYDROHAEMATINIC-ACID	Hull Husk	--	--		
0	DIMETHOXY-BUTYL-BENZENE	Petiole	--	--		
0	DIMETHOXY-BUTYL-BENZENE	Hull Husk	--	--		
0	ERGOTHIONEINE	Seed	--	--		
0	FAT	Plant	1540	7000	-0.6531012955597851	
0	FAT	Seed	11000	97000	-0.8869576751709459	
61	FERULIC-ACID	Seed	--	--		
0	FERULIC-ACID-ESTER	Seed	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
15	FIBER	Plant	122000	417000	1.43574425001656	Jim Duke's personal files.*
15	FIBER	Seed	10000	289000	1.2177567557101374	
0	FIBER(CRUDE)	Plant	--	173000	1.2755446864775144	
0	FIBER(DIETARY)	Plant	--	620000	2.767466493208292	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
15	FOLACIN	Seed	--	0.75	-0.7652388262743898	
23	FOLIC-ACID	Seed	--	0.75	-0.35541240931301027	Jim Duke's personal files.*
12	FORMALDEHYDE	Seed	--	--		
8	FRUCTOSE	Plant	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
8	FRUCTOSE	Root	--	--		
0	FUR-2-ALDEHYDE	Seed	--	--		
6	FURFURAL	Hull Husk	100000	132000		
0	GAMMA-MUUROLENE	Seed	--	--		
0	GERANIOL-ACETONE	Seed	--	--		
7	GLUCOSE	Plant	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	GLUCOVANILLIN	Hull Husk	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
8	GLUTAMIC-ACID	Plant	19000	19000	-0.17653409934818678	Jim Duke's personal files.*
8	GLUTAMIC-ACID	Seed	29000	31000	-0.4519999471714031	Jim Duke's personal files.*

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
0	GLUTARIC-ACID	Petiole	--	--		
0	GLUTARIC-ACID	Hull Husk	--	--		
2	GLUTEN	Seed	--	--		Jeffery B. Harborne and H. Baxter, eds. 1983. Phytochemical Dictionary. A Handbook of Bioactive Compounds from Plants. Taylor & Frost, London. 791 pp.
12	GLYCINE	Seed	2000	2000	-1.294330495155266	Jim Duke's personal files.*
0	GRAMININE	Rhizome	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
1	GUANINE	Plant	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	HEPTAN-1-AL	Seed	--	--		
0	HEPTANAL	Seed	--	--		
0	HEX-CIS-3-EN-1-OL	Seed	--	--		
0	HEX-TRANS-3-ENYL-ACETATE	Seed	--	--		
0	HEXAN-1-AL	Seed	--	--		
5	HEXANAL	Seed	--	--		

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
1	HEXYL-ACETATE	Seed	--	--		
7	HISTIDINE	Seed	1000	6000	-0.03298707830764554	Jim Duke's personal files.*
8	HORDENINE	Leaf	--	--		Wealth of India.
0	HYPOXANTHIN	Plant	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	INDOLE-3-ACETIC-ACID-GLUCOPROTEIN	Shoot	--	--		
0	INDOLE-3-ACETIC-ACID-GLUCOPROTEIN	Seed	--	--		
12	IODINE	Plant	0.154	0.154	-0.4470535169676872	Jim Duke's personal files.*
6	IRON	Plant	3	13.5	-0.7224047313177726	
6	IRON	Seed	20	300	0.6932609533256522	Jim Duke's personal files.*
3	ISOLEUCINE	Plant	13000	13000	0.629975306413423	Jim Duke's personal files.*
3	ISOLEUCINE	Seed	4000	9000	-0.1903246733732836	Jim Duke's personal files.*
4	ISOORIENTIN	Leaf	--	--		
0	ISOORIENTIN-2'-O-ALPHA-L-ARABINOSIDE	Leaf	--	--		
0	ISOORIENTIN-2'-O-ARABINOSIDE	Leaf	--	--		
0	ISOORIENTIN-2'-O-BETA-D-DIGLYCOSIDE	Leaf	--	--		
0	ISOORIENTIN-7-O-BETA-D-GLYCOSIDE	Leaf	--	--		
0	ISOPROPYL-TARTARIC-ACID	Hull Husk	--	--		

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
0	ISOSWERTISIN-2'-O-ALPHA-L-RHAMNOSIDE	Leaf	--	--		
0	ISOSWERTISIN-2'-O-ALPHA-L-RHAMNOSIDE	Shoot	--	--		
0	ISOSWERTISIN-2'-RHAMNOSIDE	Leaf	--	16		
0	ISOSWERTISIN-O'-RHAMNOSIDE	Leaf	16	16		
4	ISOVITEXIN	Plant	--	--		Stitt, Paul. Why George should eat broccoli.
4	ISOVITEXIN	Sprout Seedling	--	--		
0	ISOVITEXIN--O-ARABINOSIDE	Sprout Seedling	--	--		
0	ISOVITEXIN-2'-O-ALPHA-L-ARABINOSIDE	Shoot	--	--		
0	ISOVITEXIN-2'-O-ARABINOSIDE	Leaf	--	--		
0	ISOVITEXIN-2'-O-RHAMNOSIDE	Stem	--	--		
0	KILOCALORIES	Plant	4529	4540	1.1415923130022652	
0	KILOCALORIES	Seed	3740	4710	-0.11644557042776867	CRC Handbook of Medicinal Herbs and/or CRC Handbook of Proximate Analyses
2	LEUCINE	Plant	18000	18000	0.4870195094224758	Jim Duke's personal files.*
2	LEUCINE	Seed	6000	14000	-0.2949527778801378	Jim Duke's personal files.*
0	LICHENIN	Seed	--	--		

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
13	LIGNIN	Hull Husk	100000	150000	-1	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
13	LIGNIN	Plant	85000	85000	-0.9668714696835661	Jim Duke's personal files.*
60	LIMONENE	Seed	--	--		
0	LOPHENOL	Seed	--	--		
0	LOPHENOL	Leaf	--	--		
0	LUTEOLIN-6-C-GLUCOSIDE	Leaf	--	--		
0	LUTEOLIN-6-C-GLUCOSYL-ARABINOSIDE	Leaf	--	--		
0	LUTEOLIN-6-C-GLUCOSYL-O-ARABINOSIDE	Leaf	--	--		
4	LYSINE	Plant	14000	14000	0.48205927294439394	Jim Duke's personal files.*
4	LYSINE	Seed	2000	7000	-0.6906340633332377	Jim Duke's personal files.*
65	MAGNESIUM	Plant	2640	12000	2.4628926226809362	
65	MAGNESIUM	Seed	300	2900	-0.018215347061146407	Jim Duke's personal files.*
15	MALIC-ACID	Petiole	--	--		
15	MALIC-ACID	Hull Husk	--	--		
1	MALONIC-ACID	Petiole	--	--		
1	MALONIC-ACID	Hull Husk	--	--		
14	MANGANESE	Plant	0.1	0.5	-0.6913213438464151	



Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
14	MANGANESE	Seed	20	204	1.8744753503352685	Jim Duke's personal files.*
23	MELATONIN	Seed	--	--		Hattori, A., et. al. 1995. Identification of Melatonin in Plants and its Effects on Plasma Melatonin Levels and Binding to Melatonin Receptors in Vertebrates. Biochem. Mol. Biol. Int., 35(3): 627-634.
15	METHIONINE	Plant	2000	2000	0.009670052634868679	Jim Duke's personal files.*
15	METHIONINE	Seed	1000	4000	-0.0812868777702854	Jim Duke's personal files.*
0	METHOXY-MALIC-ACID	Petiole	--	--		
0	METHOXY-MALIC-ACID	Hull Husk	--	--		
0	MYOINOSITOL-OXIDASE	Shoot	--	--		Wealth of India.
22	MYRCENE	Seed	--	--		
39	NIACIN	Plant	17	75	-0.024042680398474098	
39	NIACIN	Seed	6	44	0.03334512236633281	Jim Duke's personal files.*
1	NICOTIANAMINE	Sprout Seedling	--	--		
0	NONA-TRANS-2-TRANS-4-DIENAL	Seed	--	--		
0	NONAN-1-AL	Seed	--	--		
0	NONAN-1-OL	Seed	--	--		

Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
0	NUATIGENIN	Seed	--	--	Jeffery B. Harborne and H. Baxter, eds. 1983. Phytochemical Dictionary. A Handbook of Bioactive Compounds from Plants. Taylor & Frost, London. 791 pp.
0	O'-RHAMNOSYL-8-C-D-GLUCOPYRANOSYLGENKWANIN	Sprout Seedling	--	--	Rizk, A.F.M., The Phytochemistry of the Flora of Qatar, Scientific and Applied Research Centre, University of Qatar, Kingprint, Richmond, UK, 1986.
0	OCT-1-EN-3-OL	Seed	--	--	
0	OCT-TRANS-2-EN-1-OL	Seed	--	--	
0	OCTAN-1-AL	Seed	--	--	
0	OCTAN-1-OL	Seed	--	--	
0	OCTANAL	Seed	--	--	
0	ORGOTHIONENINE	Seed	--	--	Wealth of India.
9	OXALIC-ACID	Plant	400	400	-0.5323291024119612 List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
25	P-COUMARIC-ACID	Seed	--	--	
13	P-HYDROXY-BENZOIC-ACID	Seed	--	--	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
11	PANTOTHENIC-ACID	Plant	3.5	45.3	0.9128756483055993	Jim Duke's personal files.*
11	PANTOTHENIC-ACID	Seed	4.4	28.3	1.2104233244034384	Jim Duke's personal files.*
24	PECTIN	Plant	--	800	-0.774079561685048	Wealth of India.
0	PENTANE-1,3,4-TRICARBOXYLIC-ACID	Hull Husk	--	--		
0	PENTOSANS	Hull Husk	320000	360000	1	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
0	PHAEOPHORBIDE	Sprout Seedling	--	--		
7	PHENYLALANINE	Seed	4000	10000	-0.1839547111693311	Jim Duke's personal files.*
4	PHOSPHORUS	Plant	618	2810	-0.3741734298409137	
4	PHOSPHORUS	Seed	500	10200	1.2807700551263885	Jim Duke's personal files.*
5	PHYLLOQUINONE	Seed	--	0.1	-0.04540766091865027	
0	PHYTATE	Seed	8970	10000	-0.30876780753705974	
9	PHYTIC-ACID	Hull Husk	5600	8700		
9	PHYTIC-ACID	Bran	--	--		
2	PHYTOSTEROLS	Seed	--	580	-0.49166318384124835	Spiller, G. A. 1996 (Spiller, G. A. Ed. 1996. CRC Handbook of Lipids in Human Nutrition. CRC Press. Boca Raton, FL. 233 pp.)

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
14	POTASSIUM	Plant	598	2720	-1.3304292991673436	
14	POTASSIUM	Seed	2200	8900	-0.3227574844725049	Jim Duke's personal files.*
0	PROLINE	Root	276	2.4	-1.2997594393680416	
0	PROLINE	Shoot	150	1.3	-0.7081532669989642	
0	PROPANAL	Seed	--	--		
0	PROTEIN	Plant	15840	72000	-0.8315036968096554	
0	PROTEIN	Seed	74000	232000	-0.01597695077093895	Jim Duke's personal files.*
0	PUTRESCINE	Leaf	--	1186		
43	PYRIDOXINE	Plant	1.76	3.08		Jim Duke's personal files.*
43	PYRIDOXINE	Seed	0.22	2.4	-0.8240428163590194	Jim Duke's personal files.*
176	QUERCETIN	Hay	310	310		
15	RIBOFLAVIN	Plant	0.4	2	-0.6558678757056521	
15	RIBOFLAVIN	Seed	0.66	11.66	3.1334031477822193	Jim Duke's personal files.*
7	SALICYLATES	Seed	--	--	-0.3401776874861938	
0	SALICYLIC-ACID-METHYL-ESTER	Seed	--	--		
5	SAPONINS	Seed	1000	13000	-0.3206748989657371	Spiller, G. A. 1996 (Spiller, G. A. Ed. 1996. CRC Handbook of Lipids in Human Nutrition. CRC Press. Boca Raton, FL. 233 pp.)
44	SCOPOLETIN	Root	10	10	-1	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
44	SCOPOLETIN	Sprout Seedling	--	--		
3	SCOPOLIN	Sprout Seedling	--	--		
0	SECALOSE	Plant	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
60	SELENIUM	Plant	0.3	1.3	-0.3695058107533004	
60	SELENIUM	Bran	--	--		
1	SERINE	Seed	4000	4000	-1.2599694074180983	Jim Duke's personal files.*
0	SILICA	Plant	--	36000	-0.6150458899014142	Wealth of India.
1	SILICIC-ACID	Leaf	--	--		Wealth of India.
4	SILICON	Plant	4	18.3	-0.4358023545388019	
0	SILICON-OXIDE	Ash	--	--		
0	SILICON-OXIDE	Plant	--	--		
9	SINAPIC-ACID	Seed	--	--		
1	SODIUM	Plant	862	3920	-0.08708138356494911	
1	SODIUM	Seed	100	1600	1.824152591251745	Jim Duke's personal files.*
1	SPERMIDINE	Leaf	14	14		
1	SPERMINE	Leaf	13	13		

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
5	STARCH	Seed	500000	600000	1.1736828138582762 List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	STIGMAST-7-EN-3-BETA-OL	Leaf	--	--	
0	STIGMAST-7-EN-3-BETA-OL	Seed	--	--	
0	STIGMASTA-7,24(28)-DIEN-3-BETA-OL	Seed	--	--	
0	STIGMASTADIENOL	Seed	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	STIGMASTANEDIOL	Seed	--	--	
0	STIGMASTANOL	Leaf	--	--	
0	STIGMASTANOL	Seed	--	--	
12	STIGMASTEROL	Seed	--	--	
12	STIGMASTEROL	Leaf	--	--	
14	SUCROSE	Plant	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.

Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference	Citation
0	SUGARS	Plant	30000	93000	-0.22286679279323657	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
0	SUGARS	Seed	20000	50000	-0.14394703178324852	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
14	SULFUR	Plant	800	4100	0.1026280463781624	Jim Duke's personal files.*
14	SULFUR	Seed	1500	3100	0.31967317026072223	Jim Duke's personal files.*
6	TARTARIC-ACID	Petiole	--	--		
6	TARTARIC-ACID	Hull Husk	--	--		
31	THIAMIN	Plant	0.9	4	-0.3059929673424499	Jim Duke's personal files.*
31	THIAMIN	Seed	2.6	12.1	1.3159899428962132	
0	THIAMINE	Plant	0.4	2	-0.4618949437111338	
4	THREONINE	Plant	16000	16000	1.1658056814606805	Jim Duke's personal files.*
4	THREONINE	Seed	3000	7000	-0.2544416663340577	Jim Duke's personal files.*
4	TIN	Plant	1.3	6	-1.008758312691185	
0	TRANS-BETA-OCIMENE	Seed	--	--		
0	TRANS-HEPT-2-ENAL	Seed	--	--		
0	TRANS-NON-2-EN-1-AL	Seed	--	--		

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
0	TRANS-NON-2-ENAL	Seed	--	--		
9	TRICIN	Leaf	--	--		
0	TRICIN-4',7-DI-O-BETA-D-GLYCOSIDE	Inflorescence	--	--		
0	TRICIN-4'-O-ALPHA-L-ARABINOSIDE	Inflorescence	--	--		
0	TRICIN-4'-O-ALPHA-L-ARABINOSIDE	Leaf	--	--		
0	TRICIN-4'-O-BETA-D-GLUCOSIDE	Leaf	--	--		
0	TRICIN-4'-O-BETA-D-GLYCOSIDE	Leaf	--	--		
0	TRICIN-7-O-ALPHA-L-RHAMNOSYL-HEXOSIDE	Stem	--	--		
0	TRICIN-7-O-BETA-D-GLUCOSIDE	Leaf	--	--		
0	TRICIN-7-O-BETA-D-GLYCOSIDE	Leaf	--	--		
15	TRIGONELLINE	Seed	--	--		Wealth of India.
29	TRYPTOPHAN	Plant	2000	2000	-0.9503762425454777	Jim Duke's personal files.*
29	TRYPTOPHAN	Seed	--	3000	-0.1108675145369685	Jim Duke's personal files.*
8	TYROSINE	Seed	2000	14000	1.4498681987287636	Jim Duke's personal files.*
0	URONIC-ACIDS	Plant	--	--		
3	VALINE	Plant	12000	12000	0.45057332688469326	Jim Duke's personal files.*
3	VALINE	Seed	4000	11000	-0.12458055729354042	Jim Duke's personal files.*
24	VANILLIC-ACID	Seed	--	--		
28	VANILLIN	Plant	--	--		Stitt, Paul. Why George should eat broccoli.



Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
0	VITAMIN-A	Leaf	--	0.6		
24	VITAMIN-B-1	Seed	--	7	1.0000000000000002	
0	VITAMIN-B-2	Seed	--	1.3	1	
1	VITEXIN-2''-O-ALPHA-L-RHAMNOSIDE	Shoot	--	--		
0	VITEXIN-2'-RHAMNOSIDE	Leaf	--	--		J.S. Glasby Dict.Pls Containing 2ndary Metabolite. 1991.
0	VITEXIN-O-GLUCOSIDE	Sprout Seedling	--	--		
0	WATER	Plant	--	780000	0.038825343690180966	
0	WATER	Seed	48000	213000	-0.05605353286919712	Jim Duke's personal files.*
0	WAX	Seed	9000	9000	-0.0905357460425187	
0	XANTHOPHYLL-EPOXIDE	Sprout Seedling	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
77	ZINC	Plant	--	--		