

**Dr. Duke's Phytochemical and Ethnobotanical Database**

**Chemicals Found in Avena sativa**

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
4	4-VINYLGUAIACOL	Seed	--	--		
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.
3	ALANINE	Seed	4000	4000	-1.3086899322606569	Jim Duke's personal files.*
32	ALPHA-TOCOPHEROL	Seed	4.4	10.1	-0.6988762675539839	Jim Duke's personal files.*
5	ALUMINUM	Plant	--	--		
14	ARGININE	Seed	3000	13000	-0.492896993165164	Jim Duke's personal files.*
112	ASCORBIC-ACID	Plant	26	120	-0.5655146584691259	
3	ASPARTIC-ACID	Seed	7000	7000	-1.3839193496072566	Jim Duke's personal files.*
2	AVENACOSIDES	Plant	1000	15000		
3	AVENANTHRAMIDES	Seed	--	--		
1	AVENIN	Root	--	--		
1	AVENIN	Seed	11200	185600		
24	BENZALDEHYDE	Seed	--	--		
53	BETA-CAROTENE	Plant	16	72	-0.3372351827937805	
13	BETA-IONONE	Seed	--	--		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
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4	BORON	Seed	2	7	-0.8116798946510148	Betting on Boron, Unpublished draft by J. A. Duke on file at USDA, draft and papers relating to boron percentages.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).
102	CAFFEIC-ACID	Plant	--	--		Stitt, Paul. Why George should eat broccoli.
28	CALCIUM	Plant	3146	14300	0.07601124250227355	
28	CALCIUM	Seed	400	4800	0.12003541790252584	
2	CAMPESTEROL	Seed	--	--		
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.*
7	CHLORINE	Plant	1000	5700	-0.16621641797392214	Jim Duke's personal files.*
7	CHLORINE	Seed	500	1900	3.160532696671519	Jim Duke's personal files.*

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
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.*
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	--	--		
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.
61	FERULIC-ACID	Seed	--	--		
15	FIBER	Plant	122000	417000	1.43574425001656	Jim Duke's personal files.*

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
15	FIBER	Seed	10000	289000	1.2177567557101374	
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	--	--		
6	FURFURAL	Hull Husk	100000	132000		
7	GLUCOSE	Plant	--	--		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.*
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.*
1	GUANINE	Plant	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
5	HEXANAL	Seed	--	--		

Activity Count	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.
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	--	--		
4	ISOVITEXIN	Plant	--	--		Stitt, Paul. Why George should eat broccoli.
4	ISOVITEXIN	Sprout Seedling	--	--		
2	LEUCINE	Plant	18000	18000	0.4870195094224758	Jim Duke's personal files.*
2	LEUCINE	Seed	6000	14000	-0.2949527778801378	Jim Duke's personal files.*
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	--	--		
4	LYSINE	Plant	14000	14000	0.48205927294439394	Jim Duke's personal files.*
4	LYSINE	Seed	2000	7000	-0.6906340633332377	Jim Duke's personal files.*

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
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	
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.*
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	--	--		
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.

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
25	P-COUMARIC-ACID	Seed	--	--		
13	P-HYDROXY-BENZOIC-ACID	Seed	--	--		
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.
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	
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.)
14	POTASSIUM	Plant	598	2720	-1.3304292991673436	
14	POTASSIUM	Seed	2200	8900	-0.3227574844725049	Jim Duke's personal files.*
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	

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15	RIBOFLAVIN	Seed	0.66	11.66	3.1334031477822193	Jim Duke's personal files.*
7	SALICYLATES	Seed	--	--	-0.3401776874861938	
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	
44	SCOPOLETIN	Sprout Seedling	--	--		
3	SCOPOLIN	Sprout Seedling	--	--		
60	SELENIUM	Plant	0.3	1.3	-0.3695058107533004	
60	SELENIUM	Bran	--	--		
1	SERINE	Seed	4000	4000	-1.2599694074180983	Jim Duke's personal files.*
1	SILICIC-ACID	Leaf	--	--		Wealth of India.
4	SILICON	Plant	4	18.3	-0.4358023545388019	
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		
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.



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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.
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	
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	
9	TRICIN	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.*
3	VALINE	Plant	12000	12000	0.45057332688469326	Jim Duke's personal files.*

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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.
24	VITAMIN-B-1	Seed	--	7	1.00000000000000002	
1	VITEXIN-2''-O-ALPHA-L-RHAMNOSIDE	Shoot	--	--		
77	ZINC	Plant	--	--		