

Dr. Duke's Phytochemical and Ethnobotanical Database

Chemicals Found in *Apium graveolens*

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
10	3-N-BUTYL-PHTHALIDE	Fruit Essent. Oil	--	108000		
10	3-N-BUTYL-PHTHALIDE	Leaf Essent. Oil	--	40000		
10	3-N-BUTYL-PHTHALIDE	Seed	--	--		
10	3-N-BUTYL-PHTHALIDE	Seed Essent. Oil	--	108000		
10	5-METHOXY-PSORALEN	Fruit	--	7	-0.18569533817705186	
10	5-METHOXY-PSORALEN	Leaf Wax	2	2		
10	5-METHOXY-PSORALEN	Seed	--	7	1	
2	7-[3-(3,4-DIHYDROXY-4-HYDROXYMETHYL-TETRAHYDRO-FURAN-2-YLOXY)-4,5-DIHYDROXY-6-HYDROXYMETHYL-TETRAHYDRO-PYRAN-2-YLOXY]...	Seed	--	--		
21	8-METHOXY-PSORALEN	Leaf	--	1		
6	ACETALDEHYDE	Leaf	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
6	ACETALDEHYDE	Shoot	--	--		
16	ACETIC-ACID	Plant	--	--		
11	ADENINE	Plant	--	--		
28	ADENOSINE	Plant	--	--		
3	ALANINE	Pt	220	4665		USDA's Ag Handbook 8 and sequelae)
3	ALPHA-CEDRENE	Seed	--	--		Charalambous, G. (Ed.). 1994. Spices, Herbs and Edible Fungi. Elsevier Science B. V. Amsterdam. 764 pp.

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
2	ALPHA-HUMULENE	Leaf	266	2500	3.7785413446723948	Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
2	ALPHA-HUMULENE	Seed	20	33		Charalambous, G. (Ed.). 1994. Spices, Herbs and Edible Fungi. Elsevier Science B. V. Amsterdam. 764 pp.
5	ALPHA-IONONE	Plant	--	--		
5	ALPHA-IONONE	Seed Essent. Oil	--	500		
15	ALPHA-LINOLENIC-ACID	Seed	1600	2554	-0.2805131186501865	USDA's Ag Handbook 8 and sequelae)
11	ALPHA-PHELLANDRENE	Fruit	--	2000	0.431635886715178	
11	ALPHA-PHELLANDRENE	Seed Essent. Oil	--	2000	-0.8573553114168811	
28	ALPHA-PINENE	Fruit Essent. Oil	--	10000	-0.7166152772658864	
28	ALPHA-PINENE	Leaf Essent. Oil	--	2000	-0.7421534872468563	
28	ALPHA-PINENE	Root Essent. Oil	--	179000	0.7700366703490429	
28	ALPHA-PINENE	Et	12000	14000	-1	
28	ALPHA-PINENE	Seed	38	60	-0.47140904876924467	
28	ALPHA-PINENE	Seed Essent. Oil	10000	10500	-0.6694735069151678	
28	ALPHA-PINENE	Stem Essent. Oil	--	14000	-1	
2	ALPHA-SANTALOL	Seed	--	--		
3	ALPHA-SELINENE	Seed	95	250		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
3	ALPHA-SELINENE	Seed Essent. Oil	--	20500		
13	ALPHA-TERPINENE	Fruit Essent. Oil	--	1000	-0.8348120728111189	
13	ALPHA-TERPINENE	Leaf	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
13	ALPHA-TERPINENE	Seed Essent. Oil	--	1000	-1.0089204175742374	
13	ALPHA-TERPINENE	Leaf Essent. Oil	--	--		
23	ALPHA-TERPINEOL	Fruit Essent. Oil	3000	14000	-0.30405553353793474	
23	ALPHA-TERPINEOL	Leaf Essent. Oil	--	1000	-0.8444420280137835	
23	ALPHA-TERPINEOL	Root Essent. Oil	--	69000	1	
23	ALPHA-TERPINEOL	Seed	1	420	-0.37493466702522626	
23	ALPHA-TERPINEOL	Essential Oil	--	--		
23	ALPHA-TERPINEOL	Seed Essent. Oil	5000	14000	-0.651073092591952	
32	ALPHA-TOCOPHEROL	Plant	--	64	-1	
32	ALPHA-TOCOPHEROL	Pt	3	67	1	
32	ALPHA-TOCOPHEROL	Shoot	--	64		
32	ALPHA-TOCOPHEROL	Leaf	136	266	-0.22853429341464526	
32	ALPHA-TOCOPHEROL	Seed	--	--		
5	ALUMINUM	Root	0.3	9	-0.3076511978543176	ACTA AGRIC SCAND SUPPL 22: 1980

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
1	ANGELIC-ACID	Plant	--	--		
17	ANGELICIN	Stem	--	--		
101	APIGENIN	Plant	--	--		
101	APIGENIN	Pt	--	1910		
101	APIGENIN	Seed	--	--		
4	APIIN	Plant	--	2000		
4	APIIN	Seed	--	--		
20	APIOLE	Essential Oil	--	--		
20	APIOLE	Seed	115	180	-1	
14	ARGININE	Pt	200	4105		USDA's Ag Handbook 8 and sequelae)
2	ARSENIC	Root	0.01	0.09	-0.2036587057933666	ACTA AGRIC SCAND SUPPL 22: 1980
112	ASCORBIC-ACID	Plant	17	129	-0.563401826162719	
112	ASCORBIC-ACID	Pt	58	2778	-0.2550992791713734	
112	ASCORBIC-ACID	Seed	171	182	0.6821363243307782	
112	ASCORBIC-ACID	Shoot	17	129	-0.3648933330728539	
112	ASCORBIC-ACID	Fruit	357	1700	-0.17878811783375667	
2	ASPARAGINE	Root	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
3	ASPARTIC-ACID	Pt	1130	23880		USDA's Ag Handbook 8 and sequelae)
3	ASPARTIC-ACID	Shoot	--	--		
17	BENZYL-BENZOATE	Shoot	--	--		
26	BERGAPTEN	Plant	--	520	-1	
26	BERGAPTEN	Pt	0.04	0.35		
26	BERGAPTEN	Seed	--	1	-0.8858167353904262	

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
26	BERGAPTEN	Leaf	--	1.17	-0.5894785933481757	
26	BERGAPTEN	Root	--	--		
26	BERGAPTEN	Shoot	--	145	-1	
53	BETA-CAROTENE	Pt	1	144	1.4105317625651812	
53	BETA-CAROTENE	Fruit	8	36	-0.0812132777507324	
53	BETA-CAROTENE	Seed	7.5	36	1.8210249021680307	
5	BETA-ELEMENE	Fruit Essent. Oil	--	35000	1.6778472777341984	
5	BETA-ELEMENE	Leaf	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
5	BETA-ELEMENE	Seed	1	875	1.4124808434543825	
5	BETA-ELEMENE	Leaf Essent. Oil	--	--		
5	BETA-ELEMENE	Seed Essent. Oil	--	35000		
13	BETA-EUDESOL	Seed	76	225		
3	BETA-PHELLANDRENE	Fruit	--	2000	-0.1272127645580522	
3	BETA-PHELLANDRENE	Seed Essent. Oil	200	2000	-1.027685692005648	
13	BETA-PINENE	Fruit Essent. Oil	5	15000	-0.5950573182789025	
13	BETA-PINENE	Seed	57	210	-0.5053346825286588	
13	BETA-PINENE	Leaf Essent. Oil	--	2000	-0.9267593911993299	
13	BETA-PINENE	Seed Essent. Oil	5000	15000	-0.7438446821280019	

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
13	BETA-PINENE	Stem Essent. Oil	--	12000	-1	
13	BETA-PINENE	Root Essent. Oil	--	179000	1.3589513237802975	
3	BETA-SELINENE	Fruit Essent. Oil	55000	325000	1	
3	BETA-SELINENE	Leaf Essent. Oil	--	30000	1	
3	BETA-SELINENE	Stem Essent. Oil	--	10000		
3	BETA-SELINENE	Seed	100	8125	1	
3	BETA-SELINENE	Seed Essent. Oil	55000	325000		
47	BETA-SITOSTEROL	Pt	--	30		Spiller, G. A. 1996 (Spiller, G. A. Ed. 1996. CRC Handbook of Lipids in Human Nutrition. CRC Press. Boca Raton, FL. 233 pp.)
47	BETA-SITOSTEROL	Seed	--	210	-0.550389634708716	Spiller, G. A. 1996 (Spiller, G. A. Ed. 1996. CRC Handbook of Lipids in Human Nutrition. CRC Press. Boca Raton, FL. 233 pp.)
4	BORON	Root	4	103	2.919010239761024	
4	BORON	Seed	43	61	1.7498078343361594	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).

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
10	BUTYLIDENE-PHTHALIDE	Fruit Essent. Oil	--	4000		
10	BUTYLIDENE-PHTHALIDE	Leaf Essent. Oil	--	15000		
10	BUTYLIDENE-PHTHALIDE	Et	--	12000		
10	BUTYLIDENE-PHTHALIDE	Seed Essent. Oil	--	4000		
10	BUTYLIDENE-PHTHALIDE	Stem Essent. Oil	--	12000		
3	CADMIUM	Root	0.001	0.364	-0.49785433960777487	ACTA AGRIC SCAND SUPPL 22: 1980
102	CAFFEIC-ACID	Leaf	--	--		
102	CAFFEIC-ACID	Seed	--	--		Wealth of India.
102	CAFFEIC-ACID	Root	--	--		
28	CALCIUM	Pt	313	11918	-1.4133911092017	
28	CALCIUM	Root	340	3635	-0.4126425625417656	ACTA AGRIC SCAND SUPPL 22: 1980
28	CALCIUM	Seed	170	20776	3.054154794705198	
28	CALCIUM	Fruit	1680	8000	0.9562048951774965	
2	CAMPESTEROL	Pt	--	--		Spiller, G. A. 1996 (Spiller, G. A. Ed. 1996. CRC Handbook of Lipids in Human Nutrition. CRC Press. Boca Raton, FL. 233 pp.)
2	CAMPESTEROL	Seed	--	50	-0.5188689275444304	Spiller, G. A. 1996 (Spiller, G. A. Ed. 1996. CRC Handbook of Lipids in Human Nutrition. CRC Press. Boca Raton, FL. 233 pp.)
9	CAMPHENE	Leaf Essent. Oil	--	1000	-0.8415153554301138	

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
9	CAMPHENE	Seed Essent. Oil	--	--		
9	CAMPHENE	Seed	--	--		Charalambous, G. (Ed.). 1994. Spices, Herbs and Edible Fungi. Elsevier Science B. V. Amsterdam. 764 pp.
3	CAPRIC-ACID	Leaf	200	213	-1	USDA's Ag Handbook 8 and sequelae)
1	CARVEOL	Plant	--	--		
19	CARVONE	Fruit Essent. Oil	--	550000	1.414109513569833	
19	CARVONE	Essential Oil	2000	5000	-0.840408219433312	
19	CARVONE	Leaf	1	1	-0.2826540108062902	Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
19	CARVONE	Seed	19	75	-1.2079718747791435	Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
19	CARVONE	Shoot	--	--		
19	CARVONE	Seed Essent. Oil	900	550000	-0.4461789646766616	
31	CARYOPHYLLENE	Seed Essent. Oil	--	1700		
8	CARYOPHYLLENE-OXIDE	Seed	125	200	-1.3209276708861737	Charalambous, G. (Ed.). 1994. Spices, Herbs and Edible Fungi. Elsevier Science B. V. Amsterdam. 764 pp.
77	CHLOROGENIC-ACID	Leaf	--	--		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
77	CHLOROGENIC-ACID	Seed	--	--		Wealth of India.
77	CHLOROGENIC-ACID	Root	--	--		
20	CHOLINE	Root	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
24	CHROMIUM	Root	0.002	0.045	-0.5509691200246839	ACTA AGRIC SCAND SUPPL 22: 1980
24	CHROMIUM	Fruit	--	--		
24	CHROMIUM	Seed	--	--		Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.
60	CINNAMALDEHYDE	Seed Essent. Oil	--	1500		
1	CIS-3-HEXENOL	Essential Oil	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
3	CIS-OCIMENE	Leaf Essent. Oil	--	145000		
3	CIS-OCIMENE	Root Essent. Oil	--	68000		
3	CIS-OCIMENE	Et	--	78000		
3	CIS-OCIMENE	Leaf	2000	2500	1.4135514162255571	Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
3	CIS-OCIMENE	Stem Essent. Oil	--	78000		
23	CITRIC-ACID	Pt	--	--		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
23	CITRIC-ACID	Root	--	--		
20	CITRONELLAL	Leaf	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
20	CITRONELLAL	Shoot	--	--		
2	CITRONELLYL-ACETATE	Leaf	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
5	CNIDILIDE	Root	--	--		
2	COBALT	Root	--	0.005	-0.5451001113256595	ACTA AGRIC SCAND SUPPL 22: 1980
2	COBALT	Fruit	0.4	2	-0.29299669899909336	
2	COBALT	Seed	0.4	2	-0.11920111863142302	Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.
12	COPPER	Pt	0.4	7	1.0000000000000007	USDA's Ag Handbook 8 and sequelae)
12	COPPER	Root	0.7	11	-0.07975431813856294	ACTA AGRIC SCAND SUPPL 22: 1980
12	COPPER	Seed	14	14	-0.07387673724713412	USDA's Ag Handbook 8 and sequelae)
57	COUMARIN	Plant	--	--		
2	CYSTINE	Pt	40	755		USDA's Ag Handbook 8 and sequelae)
1	DECYL-ACETATE	Leaf	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
1	DECYL-ACETATE	Shoot	--	--		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
2	DIACETYL	Leaf	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
2	DIACETYL	Shoot	--	--		
2	DIHYDROCARVEOL	Fruit Essent. Oil	--	2000	1	
2	DIHYDROCARVEOL	Leaf	--	--		
2	DIHYDROCARVEOL	Essential Oil	--	--		
2	DIHYDROCARVEOL	Seed Essent. Oil	--	1000		
1	DIHYDROCARVYL-ACETATE	Plant	--	--		
2	DIMETHYL-AMINE	Pt	--	5.1		
2	DIMETHYL-AMINE	Stem	--	5.1		
3	DIPHENYLAMINE	Plant	--	--		Karawva, M. S., Khayyal, S. E., Farrag, N. M., Ayad, M. M. 1986. Screening of Diphenylamine as an Antihyperglycemic in Certain Edible Plant Organs. Egypt J. Pharm. Sci., 25(1,2,3): 21-25.
2	DODECANAL	Leaf	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
2	ELEMOL	Seed	--	--		Charalambous, G. (Ed.). 1994. Spices, Herbs and Edible Fungi. Elsevier Science B. V. Amsterdam. 764 pp.
76	EUGENOL	Plant	--	--		Stitt, Paul. Why George should eat broccoli.

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
76	EUGENOL	Seed Essent. Oil	--	--		
13	FALCARINDIOL	Root	--	3.3	-1.0293857207627424	
3	FALCARINONE	Root	--	1.7	-1	
61	FERULIC-ACID	Root	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
15	FIBER	Pt	6900	158000	-0.42530368144617087	
15	FIBER	Seed	106750	138586	0.03006212223460727	USDA's Ag Handbook 8 and sequelae)
12	FORMALDEHYDE	Plant	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
12	FORMALDEHYDE	Shoot	--	--		
8	FRUCTOSE	Plant	--	--		
8	FRUCTOSE	Shoot	--	--		
7	FUMARIC-ACID	Pt	--	--		
7	FUMARIC-ACID	Root	--	--		
1	GALACTOSE	Plant	--	--		Pakistan Encyclopedia Planta Medica. 1986.
3	GAMMA-DECALACTONE	Seed	--	--		Charalambous, G. (Ed.). 1994. Spices, Herbs and Edible Fungi. Elsevier Science B. V. Amsterdam. 764 pp.
11	GAMMA-TERPINENE	Leaf Essent. Oil	--	--		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
11	GAMMA-TERPINENE	Seed	7	10	-0.8268964662241418	Charalambous, G. (Ed.). 1994. Spices, Herbs and Edible Fungi. Elsevier Science B. V. Amsterdam. 764 pp.
8	GENTISIC-ACID	Leaf	--	--		Griffiths, L. A. 1959. On the Distribution of Gentisic Acid in Green Plants. J. Exp. Biol. 10: 437.
5	GERANYL-ACETATE	Leaf	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
3	GERANYL-BUTYRATE	Leaf	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
7	GLUCOSE	Plant	--	--		
7	GLUCOSE	Shoot	--	--		
8	GLUTAMIC-ACID	Pt	860	18285		USDA's Ag Handbook 8 and sequelae)
8	GLUTAMIC-ACID	Shoot	--	--		
5	GLUTAMINE	Root	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
12	GLYCINE	Pt	210	4290		USDA's Ag Handbook 8 and sequelae)
4	GLYCOLIC-ACID	Root	--	--		
18	GUAIACOL	Leaf	--	--		
18	GUAIACOL	Seed	--	--		
18	GUAIACOL	Essential Oil	--	--		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
18	GUAIACOL	Shoot	--	--		
12	HERNIARIN	Leaf	--	--		Jeffery B. Harborne and H. Baxter, eds. 1983. Phytochemical Dictionary. A Handbook of Bioactive Compounds from Plants. Taylor & Frost, London. 791 pp.
5	HEXANAL	Leaf	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
3	HEXANOL	Leaf	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
7	HISTIDINE	Pt	110	2425		USDA's Ag Handbook 8 and sequelae)
2	HUMULENE	Leaf Essent. Oil	--	--		
2	HUMULENE	Seed Essent. Oil	--	--		
25	IMPERATORIN	Seed	--	--		Wealth of India.
25	IMPERATORIN	Root	--	--		
25	IMPERATORIN	Leaf	--	--		
8	INOSINE	Plant	--	--		
8	INOSINE	Shoot	--	--		
8	INOSITOL	Leaf	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
6	IRON	Pt	3	347	1.289042144893524	

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
6	IRON	Root	3.6	47	-0.3733720521591977	ACTA AGRIC SCAND SUPPL 22: 1980
6	IRON	Seed	25	571	1.9524099785593705	
6	IRON	Fruit	25	120	-0.051480525146559	
3	ISOAMYL-ALCOHOL	Leaf	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
3	ISOAMYL-ALCOHOL	Shoot	--	--		
2	ISOBUTYRIC-ACID	Leaf	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
2	ISOBUTYRIC-ACID	Plant	--	--		
2	ISOBUTYRIC-ACID	Shoot	--	--		
4	ISOCHLOROGENIC-ACID	Leaf	--	--		
8	ISOIMPERATORIN	Seed	--	--		
3	ISOLEUCINE	Pt	200	4290		USDA's Ag Handbook 8 and sequelae)
15	ISOPIMPINELLIN	Plant	--	--		
15	ISOPIMPINELLIN	Pt	0.05	0.41		
15	ISOPIMPINELLIN	Root	--	--		
15	ISOPIMPINELLIN	Shoot	--	122	1	
15	ISOPIMPINELLIN	Seed	--	--		
15	ISOPIMPINELLIN	Petiole	0.05	0.41		
4	ISOPULEGONE	Seed Essent. Oil	--	1600		
22	ISOQUERCITRIN	Seed	--	--		
5	ISOVALERIC-ACID	Seed	1	1		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
1	ISOVALERIC-ACID-ETHYL-ESTER	Plant	--	--		
1	ISOVALERIC-ACID-ETHYL-ESTER	Shoot	--	--		
75	KAEMPFEROL	Leaf	--	--	-0.755027215594713	
7	LAURIC-ACID	Seed	200	213	-0.5104209587903109	USDA's Ag Handbook 8 and sequelae)
2	LEUCINE	Pt	310	6530		USDA's Ag Handbook 8 and sequelae)
7	LIGUSTILIDE	Essential Oil	2000	5000	-1	
7	LIGUSTILIDE	Leaf Essent. Oil	--	2000		
7	LIGUSTILIDE	Seed Essent. Oil	--	24100		
7	LIGUSTILIDE	Stem Essent. Oil	--	2000		
7	LIGUSTILIDE	Root Essent. Oil	--	5000	-1	
60	LIMONENE	Fruit Essent. Oil	350000	706000	0.5704970731129614	
60	LIMONENE	Root Essent. Oil	--	117000	0.2687678089626183	
60	LIMONENE	Et	--	695000	1	
60	LIMONENE	Seed	530	24000	0.9558696966291022	
60	LIMONENE	Essential Oil	--	--		
60	LIMONENE	Seed Essent. Oil	350000	721600	2.1440076891973874	
60	LIMONENE	Leaf Essent. Oil	--	621000	2.0668254322619717	

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
60	LIMONENE	Stem Essent. Oil	--	695000		
53	LINALOOL	Seed	1	90	-0.4729972748643267	
53	LINALOOL	Seed Essent. Oil	--	14800	-0.5026656132656973	
7	LINALYL-ACETATE	Leaf	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
27	LINOLEIC-ACID	Leaf	60	1132	-1.1912413119904384	USDA's Ag Handbook 8 and sequelae)
27	LINOLEIC-ACID	Pt	690	12875		USDA's Ag Handbook 8 and sequelae)
27	LINOLEIC-ACID	Seed	178000	41592	-0.5189029132357875	
78	LUTEOLIN	Leaf	--	80	-0.5838472995588694	
78	LUTEOLIN	Pt	--	400		
78	LUTEOLIN	Seed	--	--		
5	LUTEOLIN-7-O-BETA-GLUCOSIDE	Plant	--	--		
4	LYSINE	Pt	260	5410		USDA's Ag Handbook 8 and sequelae)
65	MAGNESIUM	Leaf	99	2650	-0.5698349070295108	USDA's Ag Handbook 8 and sequelae)
65	MAGNESIUM	Root	140	1635	-0.4930193973019779	ACTA AGRIC SCAND SUPPL 22: 1980
65	MAGNESIUM	Seed	155	4903	0.7731568198649487	
65	MAGNESIUM	Fruit	153	730	-0.648159482294604	
15	MALIC-ACID	Pt	--	--		
15	MALIC-ACID	Root	--	--		
15	MALIC-ACID	Shoot	--	--		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
1	MALONIC-ACID	Root	--	--		Jeffery B. Harborne and H. Baxter, eds. 1983. Phytochemical Dictionary. A Handbook of Bioactive Compounds from Plants. Taylor & Frost, London. 791 pp.
14	MANGANESE	Pt	1	33	-1	USDA's Ag Handbook 8 and sequelae)
14	MANGANESE	Root	0.74	23	-0.27123195934439603	ACTA AGRIC SCAND SUPPL 22: 1980
14	MANGANESE	Seed	1.3	76	0.28001116376454066	
14	MANGANESE	Fruit	1.3	6.3	-0.3619961117886394	
18	MANNITOL	Root	--	50000	0.23330584134440507	
18	MANNITOL	Stem	--	20000		
18	MANNITOL	Leaf	--	--		
18	MANNITOL	Shoot	--	--		
18	MANNITOL	Plant	--	--		
30	MENTHONE	Essential Oil	--	--		
30	MENTHONE	Seed Essent. Oil	--	--		
1	MERCURY	Root	--	0.027	-0.41503552911844144	ACTA AGRIC SCAND SUPPL 22: 1980
15	METHIONINE	Pt	50	1120		USDA's Ag Handbook 8 and sequelae)
1	METHYL-AMINE	Pt	--	6.4		
1	METHYL-AMINE	Stem	--	6.4		
2	METHYL-PHTHALIDES	Seed	--	--		Bisset, N.G., ed. 1994. Herbal Drugs and Phytopharmaceuticals. CRC Press. Boca Raton, FL. 566 pp.
2	MOLYBDENUM	Root	--	0.1	-0.46089530570591497	ACTA AGRIC SCAND SUPPL 22: 1980

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
3	MUCILAGE	Plant	--	--		Pakistan Encyclopedia Planta Medica. 1986.
13	MUFA	Pt	270	5035		USDA's Ag Handbook 8 and sequelae)
22	MYRCENE	Fruit Essent. Oil	2000	61000	0.9225422159382141	
22	MYRCENE	Leaf Essent. Oil	--	14000	-0.31228842453179745	
22	MYRCENE	Root Essent. Oil	--	18000	-0.4151337923775443	
22	MYRCENE	Et	--	18000	1	
22	MYRCENE	Seed	40	300	-0.02492651845909201	
22	MYRCENE	Seed Essent. Oil	2000	61000	-0.07142759971351088	
22	MYRCENE	Stem Essent. Oil	--	18000	1	
22	MYRCENE	Shoot	--	--		
6	MYRISTIC-ACID	Pt	10	190		USDA's Ag Handbook 8 and sequelae)
6	MYRISTIC-ACID	Seed	125	213	-0.2932148633872675	
31	MYRISTICIN	Plant	--	--		
31	MYRISTICIN	Seed	230	360	-0.9910907272077998	
5	MYRTENAL	Seed	--	--		Charalambous, G. (Ed.). 1994. Spices, Herbs and Edible Fungi. Elsevier Science B. V. Amsterdam. 764 pp.
2	MYRTENOL	Seed	--	--		Charalambous, G. (Ed.). 1994. Spices, Herbs and Edible Fungi. Elsevier Science B. V. Amsterdam. 764 pp.

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
1	N-BUTYLPHTHALIDE	Fruit Essent. Oil	50000	72000		
1	N-BUTYLPHTHALIDE	Root	--	30		
1	N-BUTYLPHTHALIDE	Seed	190	1800		
1	N-BUTYLPHTHALIDE	Seed Essent. Oil	25600	72000		
2	NEOCNIDOLIDE	Root	--	17		
4	NERAL	Leaf	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
4	NERAL	Shoot	--	--		
5	NERYL-ACETATE	Leaf	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
39	NIACIN	Pt	3	57	0.7071067811865468	
39	NIACIN	Fruit	3	12	-0.6510092608917062	
39	NIACIN	Seed	2.5	12	-0.9245464566376991	Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.
3	NICKEL	Root	0.04	0.9	-0.6636456003542591	ACTA AGRIC SCAND SUPPL 22: 1980
21	NICOTINE	Plant	--	--		Pakistan Encyclopedia Planta Medica. 1986.
1	NODAKENIN	Seed	--	--		
18	OLEIC-ACID	Pt	230	4850		USDA's Ag Handbook 8 and sequelae)
18	OLEIC-ACID	Seed	73200	162560	0.3572384351765495	
18	OLEIC-ACID	Seed Oil	--	--		
15	OSTHOL	Leaf	--	--		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
9	OXALIC-ACID	Plant	--	--		Pakistan Encyclopedia Planta Medica. 1986.
25	P-COUMARIC-ACID	Root	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
16	P-CYMENE	Fruit Essent. Oil	2000	31000	1.1182650591230865	
16	P-CYMENE	Root Essent. Oil	--	31000	1.4362919950712267	
16	P-CYMENE	Et	--	17000	1	
16	P-CYMENE	Seed	20	775	-0.49278287384619057	
16	P-CYMENE	Seed Essent. Oil	2000	31000	-0.0997830422638124	
16	P-CYMENE	Leaf Essent. Oil	--	4000	-0.7192886194278051	
16	P-CYMENE	Stem Essent. Oil	--	17000	-1	
1	P-HYDROXYCINNAMIC-ACID	Plant	--	--		Pakistan Encyclopedia Planta Medica. 1986.
5	P-METHOXY-CINNAMIC-ACID	Seed	--	7.5		
13	PALMITIC-ACID	Pt	280	5970		USDA's Ag Handbook 8 and sequelae)
13	PALMITIC-ACID	Seed	9470	17375	-0.02365595254605948	
13	PALMITIC-ACID	Essential Oil	--	--		
2	PALMITOLEIC-ACID	Pt	10	190		USDA's Ag Handbook 8 and sequelae)
11	PANTOTHENIC-ACID	Pt	1	36	0.9999999999999997	USDA's Ag Handbook 8 and sequelae)

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
24	PECTIN	Leaf	3000	3000	-1.5086314748174974	Pakistan Encyclopedia Planta Medica. 1986.
11	PERILLALDEHYDE	Seed	1	1	-0.8994543025293285	
2	PHELLOPTERIN	Leaf	--	--		
7	PHENYLALANINE	Leaf	190	4105	-1.592673637880879	USDA's Ag Handbook 8 and sequelae)
4	PHOSPHORUS	Pt	201	6849	1.363371911682067	
4	PHOSPHORUS	Root	470	7900	0.7700033948467552	USDA's Ag Handbook 8 and sequelae)
4	PHOSPHORUS	Seed	980	6843	0.3936525339343855	
4	PHOSPHORUS	Fruit	979	4660	0.4386018787156484	
2	PHYTOSTEROLS	Pt	60	1120		
2	PHYTOSTEROLS	Seed	--	600	-0.4861647488503628	Spiller, G. A. 1996 (Spiller, G. A. Ed. 1996. CRC Handbook of Lipids in Human Nutrition. CRC Press. Boca Raton, FL. 233 pp.)
10	PIPERIDINE	Pt	--	1		
7	PIPERITONE	Fruit	--	--		
7	PIPERITONE	Seed Essent. Oil	--	--		
7	PIPERITONE	Seed	--	--		Charalambous, G. (Ed.). 1994. Spices, Herbs and Edible Fungi. Elsevier Science B. V. Amsterdam. 764 pp.
14	POTASSIUM	Pt	2689	57800	0.5197113646473143	
14	POTASSIUM	Root	3900	56360	2.9714959220635757	ACTA AGRIC SCAND SUPPL 22: 1980
14	POTASSIUM	Seed	1210	15330	0.24271923351356245	
14	POTASSIUM	Fruit	1210	5760	-1.0755302557669684	

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
2	PROPIONALDEHYDE	Leaf	3	1050		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
2	PROPIONALDEHYDE	Shoot	--	--		
43	PROTocatechuic-acid	Plant	--	--		Pakistan Encyclopedia Planta Medica. 1986.
31	PSORALEN	Plant	--	--		
31	PSORALEN	Pt	0.03	0.15		
31	PSORALEN	Leaf	--	--	-0.7114864882774733	
31	PSORALEN	Stem	--	--		
31	PSORALEN	Seed	--	--		
4	PUFA	Pt	690	12875		USDA's Ag Handbook 8 and sequelae)
1	PYRROLIDINE	Pt	--	2.6		
1	PYRROLIDINE	Stem	--	0.4		
1	PYRUVIC-ACID	Plant	--	--		
1	PYRUVIC-ACID	Shoot	--	--		
176	QUERCETIN	Pt	--	--		
2	QUERCETIN-3-O-GALACTOSIDE	Plant	--	--		Jim Duke's personal files.
1	QUINIC-ACID	Pt	--	--		
1	QUINIC-ACID	Root	--	--		
15	RIBOFLAVIN	Pt	--	34	1.3317125985137388	
15	RIBOFLAVIN	Fruit	0.1	0.6	-0.9443248460470646	
15	RIBOFLAVIN	Seed	0.1	0.6	-1.1207183689683347	Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.
87	RUTIN	Plant	--	170	-0.6792061954574901	
87	RUTIN	Shoot	--	170	-0.5604271785023887	

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
5	SABINENE	Seed	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
5	SABINENE	Seed Essent. Oil	--	7600	-0.46016340929144367	
5	SABINENE	Leaf Essent. Oil	--	--		
7	SALICYLATES	Pt	--	--		
7	SALICYLATES	Seed	--	100	0.19635197050159953	
2	SANTALOL	Seed	874	1150		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
22	SCOPARONE	Leaf	--	--		
44	SCOPOLETIN	Plant	--	--		
44	SCOPOLETIN	Leaf	--	--		
3	SCOPOLIN	Leaf	--	--		
1	SEDANENOLIDE	Seed	90	900		
1	SEDANENOLIDE	Seed Essent. Oil	--	--		
3	SEDANOLIDE	Seed	435	900		
3	SEDANOLIDE	Essential Oil	--	--		
3	SEDANOLIDE	Seed Essent. Oil	--	--		
60	SELENIUM	Root	--	0.002	-0.3623106990048751	ACTA AGRIC SCAND SUPPL 22: 1980
60	SELENIUM	Fruit	--	0.2	-0.3365919582076448	

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
60	SELENIUM	Seed	--	0.2	-0.26179413521870387	Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.
1	SENKYUNOLIDE-J	Seed	--	--		
1	SENKYUNOLIDE-N	Seed	--	--		
1	SERINE	Pt	200	4105		USDA's Ag Handbook 8 and sequelae)
1	SERINE	Shoot	--	--		
3	SESELIN	Seed	--	--		
14	SHIKIMIC-ACID	Root	--	--		
4	SILICON	Root	2	2	-0.33371737669722845	ACTA AGRIC SCAND SUPPL 22: 1980
4	SILICON	Fruit	1	4.5	-0.5938225414098025	
9	SINAPIC-ACID	Plant	--	--		Pakistan Encyclopedia Planta Medica. 1986.
1	SODIUM	Pt	774	17135	1.413860124765121	
1	SODIUM	Seed	445	1900	2.6496100162265814	
1	SODIUM	Fruit	445	2120	0.01708643261806833	
8	STEARIC-ACID	Pt	30	560		USDA's Ag Handbook 8 and sequelae)
8	STEARIC-ACID	Seed	3100	5000	-0.456907018776356	USDA's Ag Handbook 8 and sequelae)
12	STIGMASTEROL	Pt	--	30		Spiller, G. A. 1996 (Spiller, G. A. Ed. 1996. CRC Handbook of Lipids in Human Nutrition. CRC Press. Boca Raton, FL. 233 pp.)
12	STIGMASTEROL	Seed	--	300	-0.1490513045808515	Spiller, G. A. 1996 (Spiller, G. A. Ed. 1996. CRC Handbook of Lipids in Human Nutrition. CRC Press. Boca Raton, FL. 233 pp.)

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
7	SUCCINIC-ACID	Pt	--	--		
7	SUCCINIC-ACID	Root	--	--		
14	SUCROSE	Plant	--	--		
14	SUCROSE	Shoot	--	--		
14	SULFUR	Root	100	1000	-0.5087729499120315	ACTA AGRIC SCAND SUPPL 22: 1980
6	TARTARIC-ACID	Pt	--	--		
6	TARTARIC-ACID	Root	--	--		
23	TERPINEN-4-OL	Leaf Essent. Oil	--	1000	-0.5406868834711872	
23	TERPINEN-4-OL	Seed	1	1400	0.06885583974834963	
2	TERPINEOL-ACETATE	Shoot	--	--		
9	TERPINOLENE	Fruit Essent. Oil	--	2000	-0.6853536216871218	
9	TERPINOLENE	Leaf Essent. Oil	--	2000	-0.5940205732207128	
9	TERPINOLENE	Seed Essent. Oil	--	2000	-0.6238102957663303	
9	TERPINOLENE	Root Essent. Oil	--	33000	-0.6841134180353257	
31	THIAMIN	Pt	--	10	1.2611720796963626	
4	THREONINE	Pt	190	4105		USDA's Ag Handbook 8 and sequelae)
71	THYMOL	Plant	--	--		
71	THYMOL	Seed	--	--		Charalambous, G. (Ed.). 1994. Spices, Herbs and Edible Fungi. Elsevier Science B. V. Amsterdam. 764 pp.

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
71	THYMOL	Seed Essent. Oil	--	1700	-0.683300111818577	
1	TIGLIC-ACID	Plant	--	--		
1	TRANS-2-HEXENOL	Essential Oil	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
8	TRANS-ANETHOLE	Plant	1	1	-0.45718340800114365	Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
1	TRANS-CARVEOL	Fruit Essent. Oil	--	1000	1	
1	TRANS-CARVEOL	Essential Oil	--	--		
1	TRANS-CARVEOL	Seed Essent. Oil	--	1000		
29	TRYPTOPHAN	Pt	90	1865		USDA's Ag Handbook 8 and sequelae)
8	TYROSINE	Pt	90	1865		USDA's Ag Handbook 8 and sequelae)
22	UMBELLIFERONE	Seed	--	--		
2	UNDECANAL	Leaf	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
1	URANIUM	Root	--	0.09	-1	
9	VALERIC-ACID	Flower	--	--		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
3	VALINE	Pt	260	5600		USDA's Ag Handbook 8 and sequelae)

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
3	VALINE	Shoot	--	--		
43	XANTHOTOXIN	Plant	6	183		
43	XANTHOTOXIN	Pt	0.04	0.61		
43	XANTHOTOXIN	Shoot	--	183	0.21179380895139957	
43	XANTHOTOXIN	Stem	--	--		
43	XANTHOTOXIN	Root	--	--		
43	XANTHOTOXIN	Seed	--	--		
3	XYLOSE	Plant	--	--		Pakistan Encyclopedia Planta Medica. 1986.
2	Z-LIGUSTILIDE	Plant	1	5		Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
2	ZEATIN	Seed	--	--		
77	ZINC	Leaf	1	44	-0.2567393296527067	USDA's Ag Handbook 8 and sequelae)
77	ZINC	Root	2.8	70	2.0068925301263634	ACTA AGRIC SCAND SUPPL 22: 1980
77	ZINC	Seed	0.2	89	1.2454197651166274	
77	ZINC	Fruit	0.3	1.2	-0.8755455941178387	