

P Piper nigrum

Common Name(s)

Black Pepper, Pepper, White Pepper

How Used

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Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
0	(+)-LIMONENE	Seed Essent. Oil	--	--	
0	(+)-LIMONENE	Essential Oil	--	--	
0	(-)-3,4-DIMETHOXY-3,4-DEMETHYLENEDIOXY-CUBEBIN	Leaf	--	--	
0	(-)-CUBEBIN	Leaf	--	--	
0	(-)-PHELLANDRENE	Seed Essent. Oil	--	--	
0	(Z)-OCIMENOL	Fruit	--	135	
0	1(7),2-P-MENTHADIEN-4-OL	Fruit	--	--	
0	1(7),2-P-MENTHADIEN-6-OL	Fruit	--	--	
0	1,1,4-TRIMETHYLCYCLOHEPTA-2,4-DIEN-6-ONE	Fruit	--	--	
0	1,8(9)-P-MENTHADIEN-4-OL	Fruit	--	--	
0	1,8(9)-P-MENTHADIEN-5-OL	Fruit	--	--	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
67	1,8-CINEOLE	Fruit	--	--	
0	1,8-MENTHADIEN-2-OL	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	1-(2,4-DECADIENOYL)-PYRROLIDINE	Fruit	--	30	
0	1-(2,4-DODECADIENOYL)-PYRROLIDINE	Fruit	--	10	
0	1-ALPHA-PHELLANDRENE	Essential Oil	--	--	
0	1-PIPERYL-PYRROLIDINE	Fruit	--	--	
0	1-TERPINEN-4-OL	Fruit	--	--	
0	1-TERPINEN-5-OL	Fruit	--	--	
0	2,8-P-MENTHADIEN-1-OL	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	2-METHYL-PENTANOIC-ACID	Fruit	--	--	
0	2-TRANS-4-TRANS-8-TRANS-PIPERAMIDE-C-9-3	Fruit	--	69	
0	2-TRANS-6-TRANS-PIPERAMIDE-C-7-2	Fruit	--	80	
0	2-TRANS-8-TRANS-PIPERAMIDE-C-9-2	Fruit	--	5	
0	2-TRANS-PIPERAMIDE-C-5-1	Fruit	--	75	
4	2-UNDECANONE	Fruit	--	--	
0	3,4-DIHYDROXY-6-(N-ETHYL-AMINO)-BENZAMIDE	Fruit	--	--	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
0	3,8(9)-P-MENTHADIEN-1-OL	Fruit	--	--	
0	3-METHYL-BUTYRIC-ACID	Fruit	--	--	
0	4,10,10-TRIMETHYL-7-METHYLENE-BICYCLO-(6.2.0)DECANE-4-CAR...	Plant	--	--	
0	4-METHYL-TRIACONTANE	Plant	--	--	=ICMR(Indian Council of Medical Research).1976.Medicinal Plants of India.Vol.1.Indian Council of Med. Res.Cambridge Printing Works, New Delhi.487 pp;ICMR.1987.Medicinal Plants of India.Vol.2.Indian Council of Med. Res.Cambr. Printing Works,New Delhi.600pp
0	4-METHYL-TRITRIACONTANE	Leaf	--	--	
0	5,10(15)-CADINEN-4-OL	Fruit	--	--	
0	6-TRANS-PIPERAMIDE-C-7-1	Fruit	--	98	
0	8-TRANS-PIPERAMIDE-C-9-1	Fruit	--	197	
6	ACETOPHENONE	Fruit Essent. Oil	--	5000	
19	ACETYL-CHOLINE	Seed	--	23	-1.1887435300844578
0	ALPHA-AMORPHENE	Fruit Essent. Oil	--	15100	
0	ALPHA-BISABOLENE	Fruit Essent. Oil	--	21200	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
0	ALPHA-BULNESENE	Fruit Essent. Oil	--	8200	-1
0	ALPHA-CIS-BERGAMOTENE	Fruit	--	--	
0	ALPHA-CIS-BERGAMOTENE	Fruit Essent. Oil	--	--	
0	ALPHA-CIS-BERGAMOTENE	Seed Essent. Oil	--	--	
0	ALPHA-COPAENE	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	ALPHA-COPAENE	Fruit Essent. Oil	8200	15800	1
0	ALPHA-CUBEBENE	Fruit Essent. Oil	--	16200	-1
0	ALPHA-CUBEBINE	Fruit	--	--	
0	ALPHA-GUAIENE	Fruit	--	--	
0	ALPHA-GUAIENE	Fruit Essent. Oil	--	1100	-1
0	ALPHA-GURJUNENE	Fruit Essent. Oil	--	7800	
2	ALPHA-HUMULENE	Fruit	--	--	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation	
2	ALPHA-HUMULENE	Leaf Essent. Oil	--	--		
2	ALPHA-HUMULENE	Fruit Essent. Oil	2100	19500	-1	
15	ALPHA-LINOLENIC-ACID	Fruit	2200	2458	-0.03933424045785113	USDA's Ag Handbook 8 and sequelae)
11	ALPHA-PHELLANDRENE	Fruit Essent. Oil	6800	36000	-0.5597624933275978	
11	ALPHA-PHELLANDRENE	Seed Essent. Oil	--	--		
28	ALPHA-PINENE	Fruit	--	3810	0.2759330241103953	
28	ALPHA-PINENE	Essential Oil	--	--		
28	ALPHA-PINENE	Fruit Essent. Oil	45000	94000	0.39522346445492856	
28	ALPHA-PINENE	Seed Essent. Oil	--	--		
0	ALPHA-SANTALENE	Fruit	--	--		
0	ALPHA-SANTALENE	Fruit Essent. Oil	--	--		
3	ALPHA-SELINENE	Fruit	--	--		
3	ALPHA-SELINENE	Fruit Essent. Oil	--	700		
13	ALPHA-TERPINENE	Fruit	--	--		

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
13	ALPHA-TERPINENE	Fruit Essent. Oil	--	3000	-0.5711872077128709
13	ALPHA-TERPINENE	Seed Essent. Oil	--	--	
23	ALPHA-TERPINEOL	Fruit	--	--	
23	ALPHA-TERPINEOL	Fruit Essent. Oil	--	1000	-0.910301229242406
0	ALPHA-TERPINEOL ACETATE	Fruit Essent. Oil	--	8600	-1
0	ALPHA-THUJENE	Fruit	--	--	
0	ALPHA-THUJENE	Fruit Essent. Oil	7300	29000	-0.22630241280017493
32	ALPHA-TOCOPHEROL	Resin, Exudate, Sap	--	1000	
32	ALPHA-TOCOPHEROL	Fruit	--	0.054	-1.1207877074947452 Charalambous, G. (Ed.). 1994. Spices, Herbs and Edible Fungi. Elsevier Science B. V. Amsterdam. 764 pp.
0	ALPHA-TRANS-BERGAMOTENE	Fruit	--	--	
1	ALPHA-ZINGIBERENE	Fruit Essent. Oil	--	50100	
3	AR-CURCUMENE	Fruit	--	--	
3	AR-CURCUMENE	Fruit Essent. Oil	--	2600	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
0	ARACHIDIC-ACID	Fruit	--	--	=ICMR(Indian Council of Medical Research).1976.Medicinal Plants of India.Vol.1.Indian Council of Med. Res.Cambridge Printing Works, New Delhi.487 pp;ICMR.1987.Medicinal Plants of India.Vol.2.Indian Council of Med. Res.Cambr. Printing Works,New Delhi.600pp
112	ASCORBIC-ACID	Fruit	10	10	-0.2838672355464054 ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
0	ASH	Fruit	42932	60000	0.08639308861203618
7	ASTRAGALIN	Fruit	--	--	
1	BEHENIC-ACID	Fruit	--	--	=ICMR(Indian Council of Medical Research).1976.Medicinal Plants of India.Vol.1.Indian Council of Med. Res.Cambridge Printing Works, New Delhi.487 pp;ICMR.1987.Medicinal Plants of India.Vol.2.Indian Council of Med. Res.Cambr. Printing Works,New Delhi.600pp
20	BENZOIC-ACID	Fruit	--	--	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
6	BETA-BISABOLENE	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
6	BETA-BISABOLENE	Fruit Essent. Oil	21200	111600	1
0	BETA-BISABOLOL	Fruit Essent. Oil	--	2000	
53	BETA-CAROTENE	Fruit	0.114	0.128	-0.1505532074368425
0	BETA-CARYOPHYLLENE	Fruit	--	--	Chemical Constituents of Oriental Herbs (3 diff. books)
0	BETA-CARYOPHYLLENE	Seed	--	--	
0	BETA-CARYOPHYLLENE	Leaf Essent. Oil	--	30000	-0.22730263739281492
0	BETA-CARYOPHYLLENE	Fruit Essent. Oil	160000	352000	2.205325345517652
0	BETA-CARYOPHYLLENE	Essential Oil	--	--	
0	BETA-CARYOPHYLLENE-ALCOHOL	Fruit	--	--	
0	BETA-CUBEBENE	Fruit Essent. Oil	--	--	
0	BETA-CUBEBINE	Fruit	--	--	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
5	BETA-ELEMENE	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
5	BETA-ELEMENE	Fruit Essent. Oil	--	900	-0.8343192281159078
0	BETA-FARNESENE	Fruit	--	--	
0	BETA-FARNESENE	Fruit Essent. Oil	--	--	
3	BETA-PHELLANDRENE	Seed Essent. Oil	--	--	
3	BETA-PHELLANDRENE	Fruit Essent. Oil	--	41000	-0.47230877878271366
13	BETA-PINENE	Fruit	--	2355	-0.2223943577434541
13	BETA-PINENE	Essential Oil	--	--	
13	BETA-PINENE	Fruit Essent. Oil	85000	138000	0.9556217102868814
13	BETA-PINENE	Seed Essent. Oil	--	--	
0	BETA-PINONE	Plant	--	--	J.S. Glasby Dict.Pls Containing 2ndary Metabolite. 1991.

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
3	BETA-SELINENE	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
3	BETA-SELINENE	Fruit Essent. Oil	--	6400	-1
47	BETA-SITOSTEROL	Fruit	380	650	0.059781582959947475 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	Leaf	--	--	
47	BETA-SITOSTEROL	Stem	--	160	-1.327402794862025
35	BORNEOL	Fruit	--	--	
35	BORNEOL	Fruit Essent. Oil	--	--	
4	BORON	Fruit	0.5	18	-0.44149735010956404 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).
6	BUTYRIC-ACID	Fruit	--	--	
102	CAFFEIC-ACID	Fruit	--	6	-0.33780275264769194

Chemical Plant Part	Low PPM	High PPM	StdDev	Reference Citation
0 CALAMENE	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0 CALAMENENE	Fruit	--	--	
0 CALAMENENE	Fruit Essent. Oil	--	--	
28 CALCIUM	Fruit	2700	4989	0.26138541132704457
2 CAMPESTEROL	Fruit	30	60	-0.14986892201478846 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	Fruit	--	120	-0.3020426178192843
9 CAMPHENE	Fruit Essent. Oil	1000	1400	-1.0221892865520528
9 CAMPHENE	Seed Essent. Oil	--	--	
41 CAMPHOR	Fruit	--	--	
0 CAR-3-ENE	Seed Essent. Oil	--	--	
0 CAR-3-ENE	Fruit Essent. Oil	28200	151000	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
0	CARBOHYDRATE	Fruit	648100	648100	-0.7817175730480762	USDA's Ag Handbook 8 and sequelae)
0	CARBOHYDRATES	Fruit	--	648100	-0.7207468961442081	
37	CARVACROL	Fruit	--	--		
0	CARVETONACETONE	Fruit	--	--		
19	CARVONE	Fruit	--	--		
19	CARVONE	Fruit Essent. Oil	--	50	-0.7219111602348719	
0	CARVONE-OXIDE	Fruit Essent. Oil	--	100		
0	CARYOPHYLLA-2,7(15)-DIEN-4-BETA-OL	Fruit	--	--		
0	CARYOPHYLLA-2,7(15)-DIEN-4-OL	Fruit	--	--		
0	CARYOPHYLLA-3(12),7(15)DIEN-4-BETA-OL	Fruit	--	--		
31	CARYOPHYLLENE	Seed Essent. Oil	--	--		
31	CARYOPHYLLENE	Fruit	1000	6000	-0.21726348790373295	
1	CARYOPHYLLENE-ALCOHOL	Fruit Essent. Oil	--	700		
0	CARYOPHYLLENE-KETONE	Fruit	--	--		
8	CARYOPHYLLENE-OXIDE	Fruit	--	--		Chemical Constituents of Oriental Herbs (3 diff. books)
8	CARYOPHYLLENE-OXIDE	Fruit Essent. Oil	--	9000	1	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
3	CEDROL	Fruit Essent. Oil	--	700	
1	CHAVICINE	Fruit	--	--	
7	CHLORINE	Fruit	2700	5100	2.9820406376676973 ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
20	CHOLINE	Seed	--	1642	-0.028583716787024864
24	CHROMIUM	Fruit	3	3.5	-0.01602978329031414
18	CINNAMIC-ACID	Fruit	--	--	
0	CIS-2,8-MENTHADIEN-2-OL	Fruit	--	--	
0	CIS-CARVEOL	Fruit	--	--	
0	CIS-CARVEOL	Fruit Essent. Oil	--	50	-1
0	CIS-NEROLIDOL	Fruit Essent. Oil	--	2000	
3	CIS-OCIMENE	Fruit	--	--	
0	CIS-P-2-MENTHEN-1-OL	Fruit	--	--	
0	CIS-SABINENE-HYDRATE	Fruit	--	--	
0	CIS-TRANS-PIPERINE	Fruit	--	--	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
53	CITRAL	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
20	CITRONELLAL	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
15	CITRONELLOL	Essential Oil	--	--	
15	CITRONELLOL	Fruit Essent. Oil	--	200	-1
2	CITRONELLYL-ACETATE	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	CLOVENE	Fruit Essent. Oil	--	1400	
2	COBALT	Fruit	0.3	0.4	-0.48669151400918487
12	COPPER	Fruit	9	20	0.5588968590110831

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
0	CRYPTONE	Fruit	--	--	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
0	CRYPTONE	Fruit Essent. Oil	--	--	
0	CRYPTONE	Essential Oil	--	--	
0	CUBEBINE	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	CUMAPERINE	Fruit	--	--	
1	CUPARENE	Fruit Essent. Oil	--	13800	
19	D-LIMONENE	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
8	DELTA-3-CARENE	Fruit	500	2000	2.7325194789368674

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
9	DELTA-CADINENE	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
9	DELTA-CADINENE	Leaf Essent. Oil	--	--	
9	DELTA-CADINENE	Fruit Essent. Oil	--	1200	
0	DELTA-ELEMENE	Fruit	--	--	
0	DELTA-ELEMENE	Fruit Essent. Oil	--	16200	
2	DIHYDROCARVEOL	Fruit	--	--	
2	DIHYDROCARVEOL	Fruit Essent. Oil	--	100	-1
2	DIHYDROCARVEOL	Essential Oil	--	--	
0	DIHYDROCARVONE	Fruit	--	--	
0	DIHYDROPIPERCIDE	Fruit	--	--	
0	DL-LIMONENE	Essential Oil	--	--	
3	ELEMENE	Fruit	--	225	
2	ELEMOL	Fruit Essent. Oil	--	1100	
0	EO	Fruit	--	15000	-0.5284067258944188

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
0	EPOXYDIHYDROCARYOPHYLLENE	Fruit	--	--	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
0	EPOXYDIHYDROCARYOPHYLLENE	Essential Oil	--	--	
76	EUGENOL	Fruit	--	--	
76	EUGENOL	Leaf Essent. Oil	--	--	
5	EUGENOL-METHYL-ETHER	Leaf Essent. Oil	--	--	
5	EUGENOL-METHYL-ETHER	Fruit Essent. Oil	--	--	
0	FAT	Fruit	30940	77000	0.12253986651771635
0	FERUPERINE	Fruit	--	17	
15	FIBER	Fruit	130056	148449	0.06390968642828075 USDA's Ag Handbook 8 and sequelae)

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
3	FLUORIDE	Fruit	--	3.6	1.4608696696245176 =ICMR(Indian Council of Medical Research).1976.Medicinal Plants of India.Vol.1.Indian Council of Med. Res.Cambridge Printing Works, New Delhi.487 pp;ICMR.1987.Medicinal Plants of India.Vol.2.Indian Council of Med. Res.Cambr. Printing Works,New Delhi.600pp
22	GABA	Fruit	--	--	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
0	GAMMA-CADINENE	Fruit	--	--	
0	GAMMA-CADINENE	Fruit Essent. Oil	--	--	
0	GAMMA-MUUROLENE	Fruit	--	--	
0	GAMMA-MUUROLENE	Fruit Essent. Oil	--	7300	
11	GAMMA-TERPINENE	Fruit	--	--	
11	GAMMA-TERPINENE	Seed Essent. Oil	--	--	
11	GAMMA-TERPINENE	Fruit Essent. Oil	100	11000	-0.34330658093433575

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
0	GERANIOL-ACETATE	Fruit Essent. Oil	--	1200	
5	GERANYL-ACETATE	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	GERMACRENE-B	Fruit Essent. Oil	--	18300	
2	GERMACRENE-D	Fruit Essent. Oil	400	49300	
0	GLOBULOL	Fruit Essent. Oil	--	26200	
0	GUINEENSINE	Fruit	--	31	
0	HELIOTROPIN	Fruit	--	--	Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952.
0	HENTRIACONTAN-16-OL	Stem	--	40	
0	HENTRIACONTAN-16-ONE	Plant	--	--	Jeffery B. Harborne and H. Baxter, eds. 1983. Phytochemical Dictionary. A Handbook of Bioactive Compounds from Plants. Taylor & Frost, London. 791 pp.
0	HENTRIACONTAN-16-ONE	Leaf	--	--	
0	HENTRIACONTAN-16-ONE	Stem	--	40	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
0	HENTRIACONTANE	Stem	--	--	=ICMR(Indian Council of Medical Research).1976.Medicinal Plants of India.Vol.1.Indian Council of Med. Res.Cambridge Printing Works, New Delhi.487 pp;ICMR.1987.Medicinal Plants of India.Vol.2.Indian Council of Med. Res.Cambr. Printing Works,New Delhi.600pp
0	HENTRIACONTANOL	Stem	--	--	=ICMR(Indian Council of Medical Research).1976.Medicinal Plants of India.Vol.1.Indian Council of Med. Res.Cambridge Printing Works, New Delhi.487 pp;ICMR.1987.Medicinal Plants of India.Vol.2.Indian Council of Med. Res.Cambr. Printing Works,New Delhi.600pp

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
0	HENTRIACONTANONE	Stem	--	--	=ICMR(Indian Council of Medical Research).1976.Medicinal Plants of India.Vol.1.Indian Council of Med. Res.Cambridge Printing Works, New Delhi.487 pp;ICMR.1987.Medicinal Plants of India.Vol.2.Indian Council of Med. Res.Cambr. Printing Works,New Delhi.600pp
2	HEXANOIC-ACID	Fruit	--	--	
30	HYPEROSIDE	Fruit	--	--	
12	IODINE	Fruit	0.09	0.09	-0.2902538943414157 ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
6	IRON	Fruit	24	407	1.0869711226719216
0	ISOBUTYL-CAPROATE	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	ISOBUTYL-ISOVALERATE	Fruit	--	--	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
1	ISOCARYOPHYLLENE	Fruit	--	--	
1	ISOCARYOPHYLLENE	Fruit Essent. Oil	--	--	
0	ISOCHAVICINE	Fruit	--	--	
0	ISOCHAVINIC-ACID	Fruit	--	--	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
0	ISOPIPERINE	Fruit	--	--	
3	ISOPULEGOL	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
22	ISOQUERCITRIN	Fruit	--	--	
75	KAEMPFEROL	Fruit	--	--	Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp.
0	KAEMPFEROL-3-O-ARABINOSYL-7-O-RHAMNOSIDE	Fruit	--	--	
0	KILOCALORIES	Fruit	2550	2856	-1.2219755197031514 USDA's Ag Handbook 8 and sequelae)
0	L-ALPHA-PHELLANDRENE	Fruit	--	--	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
2	L-LIMONENE	Fruit	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
7	LAURIC-ACID	Fruit	400	447	-0.44001415319735687	USDA's Ag Handbook 8 and sequelae)
0	LIMONEN-4-OL	Fruit	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
60	LIMONENE	Fruit	1500	8000	0.397130905101767	
60	LIMONENE	Seed Essent. Oil	--	--		
60	LIMONENE	Fruit Essent. Oil	130500	210600	-0.6891296619826244	
0	LINALOL	Fruit	--	--		
53	LINALOOL	Fruit	--	90	-0.5606025868093102	
53	LINALOOL	Fruit Essent. Oil	--	2200	-0.6866142547714452	
7	LINALYL-ACETATE	Fruit	--	--		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
27	LINOLEIC-ACID	Fruit	13200	14750	-0.1472997456034458 USDA's Ag Handbook 8 and sequelae)
0	LIPASE	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	M-MENTHA-3(8),6-DIENE	Seed Essent. Oil	--	--	
0	M-METHYL-ACETOPHENONE	Fruit	--	--	
65	MAGNESIUM	Fruit	1809	2319	0.08763983825273146 USDA's Ag Handbook 8 and sequelae)
14	MANGANESE	Fruit	19	56	-0.03428079513973251
0	METHYL-CAFFEIC-ACID-PIPERIDIDE	Fruit	--	--	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
0	METHYL-CARVACROL	Fruit	--	--	
5	METHYL-CINNAMATE	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	METHYL-CYCLOHEPTA-2,4-DIEN-6-ONE	Plant	--	--	J.S. Glasby Dict.Pls Containing 2ndary Metabolite. 1991.
20	METHYL-EUGENOL	Fruit	--	--	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
0	METHYL-HEPTANOATE	Fruit	--	--		
0	METHYL-OCTANOATE	Fruit	--	--		
0	MONOTERPENES	Fruit	7000	20800		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
22	MYRCENE	Fruit	--	--		
22	MYRCENE	Fruit Essent. Oil	22300	64000	1.0393197116265955	
22	MYRCENE	Seed Essent. Oil	--	--		
6	MYRISTIC-ACID	Fruit	700	782	-0.23225222845607665	USDA's Ag Handbook 8 and sequelae)
31	MYRISTICIN	Fruit	--	--		
31	MYRISTICIN	Fruit Essent. Oil	--	--		
5	MYRTENAL	Fruit	--	--		
2	MYRTENOL	Fruit	--	--		
2	MYRTENOL	Fruit Essent. Oil	--	2000		
0	N-(2-METHYLPROPYL)-DECA-TRANS-2-TRANS-4-DIENAMIDE	Fruit	--	--		
0	N-5-(4-HYDROXY-3-METHOXY-PHENYL)-PENT-TRANS-2-DIENOYL-PIPERIDINE	Fruit	--	9		
0	N-BUTYOPHENONE	Fruit	--	--		

Chemical Plant Part	Low PPM	High PPM	StdDev	Reference Citation
0 N-FORMYLPYPERIDINE	Fruit	--	--	Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp.
3 N-HENTRIACONTANE	Leaf	--	--	
3 N-HENTRIACONTANE	Stem	--	110	
0 N-HEPTADECANE	Fruit Essent. Oil	--	56600	
0 N-HEPTADECENE	Fruit Essent. Oil	--	25300	
0 N-ISOBUTYL-11-(3,4-METHYLENEDIOXY-PHENYL)-UNDECA-TRANS-2-TRANS-4-TRANS-10-TRIENAMIDE	Fruit	--	7	
0 N-ISOBUTYL-11-(3,4-METHYLENEDIOXY-PHENYL)-UNDECA-TRANS-2-TRANS-4-TRANS-10-TRIENAMIDE	Seed	--	--	
0 N-ISOBUTYL-13-(3,4-METHYLENEDIOXY-PHENYL)-TRIDECA-TRANS-2-TRANS-4-TRANS-12-TRIENAMIDE	Fruit	--	--	
0 N-ISOBUTYL-EICOSA-TRANS-2-TRANS-4-CIS-8-TRIENAMIDE	Fruit	--	105	
0 N-ISOBUTYL-EICOSA-TRANS-2-TRANS-4-DIENAMIDE	Fruit	--	190	
2 N-ISOBUTYL-OCTADECANE-TRANS-2-TRANS-4-DIENAMIDE	Fruit	--	--	
0 N-METHYL-PYRROLINE	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0 N-NONADECANE	Fruit	--	--	
0 N-NONANE	Fruit	--	--	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
0	N-PENTADECANE	Fruit Essent. Oil	--	177800		
0	N-PENTADECENE	Fruit Essent. Oil	--	17900		
0	N-TRANS-FERULOYL-PIPERIDINE	Fruit	--	11		
0	N-TRIDECANE	Fruit	--	--		
0	N-TRIDECANE	Fruit Essent. Oil	--	67800		
0	NEROL-ACETATE	Fruit Essent. Oil	--	2000		
11	NEROLIDOL	Fruit	--	--		
11	NEROLIDOL	Fruit Essent. Oil	--	--		
39	NIACIN	Fruit	2	14.541	-0.6175885994937399	
3	NICKEL	Fruit	0.7	2.4	-0.04957166517347313	
2	OCIMENE	Seed Essent. Oil	--	--		
2	OCIMENE	Fruit Essent. Oil	--	1000		
18	OLEIC-ACID	Fruit	13700	15309	-0.3627535701002104	USDA's Ag Handbook 8 and sequelae)

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
9	OXALIC-ACID	Fruit	4000	34000	1.5684920731098055	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
25	P-COUMARIC-ACID	Fruit	--	--		
0	P-CYMEN-8-OL	Fruit Essent. Oil	--	--		
16	P-CYMENE	Fruit	--	150	-0.5599100466638004	
16	P-CYMENE	Seed Essent. Oil	--	--		
16	P-CYMENE	Fruit Essent. Oil	--	--		
0	P-CYMENE-8-METHYL-ETHER	Fruit	--	--		
0	P-CYMENE-8-OL	Fruit	--	15	-1	
0	P-MENTH-8-EN-1-OL	Fruit Essent. Oil	--	300		
0	P-MENTH-8-EN-2-OL	Fruit Essent. Oil	--	--		
0	P-MENTH-CIS-2-EN-1-OL	Fruit Essent. Oil	--	200		
0	P-MENTH-CIS-2-EN-1-OL	Seed Essent. Oil	--	--		

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
0	P-MENTH-TRANS-2-EN-1-OL	Fruit Essent. Oil	--	100	
2	P-METHYL-ACETOPHENONE	Fruit	--	--	
13	PALMITIC-ACID	Fruit	12200	13633	-0.1532986318862056 USDA's Ag Handbook 8 and sequelae)
2	PELLITORINE	Fruit	--	--	
11	PERILLALDEHYDE	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
2	PHENYLACETIC-ACID	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
2	PHENYLACETIC-ACID	Essential Oil	--	--	
4	PHOSPHORUS	Fruit	700	2040	-0.3571963668725839
0	PHYTIN-PHOSPHORUS	Fruit	1150	1150	-0.13177293449153588 ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
2	PHYTOSTEROLS	Fruit	550	1028	0.10644427802757993
0	PIPERANINE	Fruit	--	--	
0	PIPERANINE	Seed Oil	--	320	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
0	PIPERCIDE	Fruit	--	13	
0	PIPERETTINE	Fruit	234	8200	
0	PIPERICINE	Fruit	--	0.4	
10	PIPERIDINE	Fruit	606	2700	0.7468101297426346
10	PIPERIDINE	Seed	--	--	
10	PIPERIDINE	Essential Oil	--	--	
61	PIPERINE	Fruit	5000	90000	1
61	PIPERINE	Stem	--	1100	
61	PIPERINE	Seed	--	--	
61	PIPERINE	Seed Essent. Oil	--	--	
61	PIPERINE	Root	--	--	
61	PIPERINE	Leaf Essent. Oil	--	--	
61	PIPERINE	Leaf	--	--	
61	PIPERINE	Seed Oil	--	--	
61	PIPERINE	Shoot	--	--	
7	PIPERITONE	Fruit Essent. Oil	--	400	-1
0	PIPEROLEIN-A	Fruit	--	--	
0	PIPEROLEIN-B	Fruit	--	160	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
0	PIPEROLEIN-C	Fruit	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	PIPEROLEINE-B	Fruit	--	--		
2	PIPERONAL	Fruit	--	--		
2	PIPERONAL	Essential Oil	--	--		
0	PIPERONIC-ACID	Fruit	--	--		
0	PIPERYLIN	Fruit	--	--		
0	PIPERYLINE	Fruit	--	--		
0	POLYSACCHARIDES	Fruit	--	450000	1	
14	POTASSIUM	Fruit	11718	15077	-0.251221490492334	USDA's Ag Handbook 8 and sequelae)
0	PROTEIN	Fruit	108386	123888	0.1928969684345906	USDA's Ag Handbook 8 and sequelae)
1	PYRROLIDINE	Seed	--	--		
0	PYRROPERINE	Seed	--	--		
176	QUERCETIN	Fruit	--	--		Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp.
0	QUERCETIN-3-O-ALPHA-D-GALACTOSIDE	Fruit	--	--		
44	QUERCITRIN	Fruit	--	--		

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
0	RESIN	Fruit	5000	5000	-0.7191073491736661	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	RETROFRACTAMIDE-A	Fruit	--	4		
18	RHAMNETIN	Fruit	--	--		Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp.
0	RHAMNETIN-O-TRIGLUCOSIDE	Fruit	--	--		
15	RIBOFLAVIN	Fruit	0.4	2.827	-0.4731582297112136	
87	RUTIN	Fruit	--	--		
5	SABINENE	Fruit	1500	10000	2.605271050216115	
5	SABINENE	Fruit Essent. Oil	85000	204000	0.47619676977008224	
5	SABINENE	Seed Essent. Oil	--	--		
29	SAFROLE	Fruit	--	--		
29	SAFROLE	Fruit Essent. Oil	--	--		
7	SALICYLATES	Fruit	10	65	-0.1503568703758442	
0	SESQUISABINENE	Plant	--	--		J.S. Glasby Dict.Pls Containing 2ndary Metabolite. 1991.

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference	Citation
0	SESQUISABINENE	Fruit	--	--		
0	SESQUISABINENE	Seed Essent. Oil	--	--		
0	SESQUITERPENES	Fruit	2000	7800		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	SILICA	Fruit	750	3900	1.371867681308522	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
1	SODIUM	Fruit	320	627	-0.1244930806267503	USDA's Ag Handbook 8 and sequelae)
0	SPATHULENOL	Fruit Essent. Oil	--	29600		
5	STARCH	Fruit	280000	490000	0.4063516312545475	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
8	STEARIC-ACID	Fruit	--	--	=ICMR(Indian Council of Medical Research).1976.Medicinal Plants of India.Vol.1.Indian Council of Med. Res.Cambridge Printing Works, New Delhi.487 pp;ICMR.1987.Medicinal Plants of India.Vol.2.Indian Council of Med. Res.Cambr. Printing Works,New Delhi.600pp
12	STIGMASTEROL	Fruit	140	210	1.7404035436813556 Spiller, G. A. 1996 (Spiller, G. A. Ed. 1996. CRC Handbook of Lipids in Human Nutrition. CRC Press. Boca Raton, FL. 233 pp.)
14	SULFUR	Fruit	1750	5760	3.0243404637527247 ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
0	TERPIN-1-EN-4-OL	Fruit Essent. Oil	--	--	
23	TERPINEN-4-OL	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
23	TERPINEN-4-OL	Fruit Essent. Oil	--	1900	-0.669433558721516

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
9	TERPINOLENE	Fruit	--	--	
9	TERPINOLENE	Seed Essent. Oil	--	--	
9	TERPINOLENE	Fruit Essent. Oil	--	1000	-0.7286391135831505
5	TERPINYL-ACETATE	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer- Verlag, Berlin, 1969-1979.
31	THIAMIN	Fruit	0.5	1.644	-0.4778065908058602
0	THUJENE	Seed Essent. Oil	--	--	
0	TOCOPHEROLS	Resin, Exudate, Sap	--	5400	
0	TOCOPHEROLS	Fruit	--	0.3	Charalambous, G. (Ed.). 1994. Spices, Herbs and Edible Fungi. Elsevier Science B. V. Amsterdam. 764 pp.
1	TRANS-CARVEOL	Fruit	--	--	
1	TRANS-CARVEOL	Fruit Essent. Oil	--	100	-1
0	TRANS-CIS-PIPERINE	Fruit	--	--	

Chemical Plant Part		Low PPM	High PPM	StdDev	Reference Citation
0	TRANS-NEROLIDOL	Fruit Essent. Oil	--	1200	
2	TRANS-PINOCARVEOL	Fruit	--	--	
2	TRANS-PINOCARVEOL	Seed Essent. Oil	--	--	
0	TRANS-SABINENE-HYDRATE	Fruit	--	--	
0	TRANS-SABINENE-HYDRATE	Fruit Essent. Oil	--	1400	
0	TRANS-TRANS-PIPERINE	Fruit	--	30000	
0	TRICHOSTACHINE	Fruit	--	--	
8	UBIQUINONE	Fruit	--	--	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
0	WATER	Fruit	103109	107091	-2.8848937391548306 USDA's Ag Handbook 8 and sequelae)
77	ZINC	Fruit	11.2	35.7	0.16241717653889182