

Dr. Duke's Phytochemical and Ethnobotanical Databases

List of Plants for BETA-ELEMENE

| Plant                    | Part                | Low PPM | High PPM | StdDev               | Reference   |
|--------------------------|---------------------|---------|----------|----------------------|---|
| Zingiber officinale      | Rhizome             | 2.0     | 500.0    | 0.26691736651361464  | Duke, J. A. Writeups or information summaries on approximately 2,000 economic plants, USDA, ARS, Beltsville, MD 20705.  |
| Zingiber officinale      | Rhizome Essent. Oil |         | 3000.0   |                      | --  |
| Valeriana officinalis    | Root                |         |          |                      | --  |
| Umbellularia californica | Plant               | 280.0   | 1120.0   | 3.6705249758440224   | --  |
| Thymus funkii            | Shoot               |         | 0.0      | -0.3400141894894808  | Vila, R., et al. 1995. Composition and study of the variability of the essential oil of Thymus funkii Cousson. Flav. & Fragr. J. 10(6): 379-383.                              |
| Thymus funkii            | Shoot               |         | 0.0      | -0.3400141894894808  | Vila, R., et al. 1995. Composition and study of the variability of the essential oil of Thymus funkii Cousson. Flav. & Fragr. J. 10(6): 379-383.                              |
| Tanacetum vulgare        | Plant               |         |          |                      | --  |
| Tamarindus indica        | Fruit Essent. Oil   |         | 3000.0   | -0.6796110268758718  | --  |
| Tagetes lucida           | Shoot               |         | 18.0     | -0.27895733922858784 | Bicchi, C., Fresia, M., Rubiolo, P., Monti, D., Franz, C., Goehler, I. 1997. Constituents of Tagetes lucida Cav. ssp. lucida essential oil. Flavor & Fragrance, 12(1): 47-52. |
| Stevia rebaudiana        | Leaf                |         | 6.0      | -0.38846248968370406 | Kinghorn, A. D. (Ed.) 2002. Medicinal and Aromatic Plants - Industrial Profiles. Stevia. The genus Stevia. Taylor & Francis. New York, NY. 211 pp.                            |
| Stevia rebaudiana        | Flower              |         | 110.0    | 1.0                  | Kinghorn, A. D. (Ed.) 2002. Medicinal and Aromatic Plants - Industrial Profiles. Stevia. The genus Stevia. Taylor & Francis. New York, NY. 211 pp.                            |
| Scutellaria baicalensis  | Root Essent. Oil    |         |          |                      | --  |
| Scutellaria lateriflora  | Essential Oil       |         | 92000.0  | 1.3931411017295305   | --  |
| Saussurea lappa          | Root                |         |          |                      | --  |
| Salvia gilliesii         | Shoot               |         | 5.5      | -0.3213579296875413  | Velasco-Negueruela, A. et al. 1993. The Essential Oil of Salvia gilliesii Benth. J. Ess. Oil Res. 5: 319-320.   |
| Rosmarinus officinalis   | Resin, Exudate, Sap |         |          |                      | --  |

| Plant                    | Part              | Low PPM | High PPM | StdDev               | Reference   |
|--------------------------|-------------------|---------|----------|----------------------|---|
| Rosmarinus officinalis   | Shoot             | 3.0     | 200.0    | 0.33839525785377406  | Bandoni, A.L., Mizrahi, I., and Juarez, M.A. 1991. The Essential Oil of Rosmarinus officinalis Growing in Argentina. J. Ess. Oil Res., 3: 11. |
| Rheum palmatum           | Rhizome           |         | 0.5      | -1.3361915461944083  | --  |
| Pycnanthemum pilosum     | Flower            | 28.0    | 105.0    | -1.0                 | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.  |
| Pycnanthemum virginianum | Shoot             | 240.0   | 1160.0   | 3.5947606051013974   | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.  |
| Pycnanthemum incanum     | Shoot             | 22.0    | 190.0    | 0.30447478548661133  | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.  |
| Pycnanthemum tenuifolium | Shoot             | 16.0    | 1600.0   | 5.087261389256558    | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.  |
| Pycnanthemum pilosum     | Leaf              | 28.0    | 105.0    | 0.13152257278002671  | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.  |
| Pogostemon cablin        | Plant             |         |          |                      | --  |
| Piper nigrum             | Fruit             |         |          |                      | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.                    |
| Piper cubeba             | Fruit Essent. Oil |         | 10000.0  | -0.16391702274241896 | --  |
| Piper nigrum             | Fruit Essent. Oil |         | 900.0    | -0.8343192281159078  | --  |
| Piper cubeba             | Fruit             | 1200.0  | 2400.0   | 2.7200166626234608   | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.  |
| Pinus sylvestris         | Essential Oil     |         |          |                      | --  |
| Pimpinella anisum        | Seed Essent. Oil  |         |          |                      | --  |
| Pimenta dioica           | Plant             |         |          |                      | --  |
| Petroselinum crispum     | Leaf              |         | 5.4      | -0.39161391430469633 | --  |
| Petasites hybridus       | Rhizome           |         |          |                      | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.                    |

| Plant                  | Part               | Low PPM | High PPM | StdDev               | Reference   |
|------------------------|--------------------|---------|----------|----------------------|---|
| Perilla frutescens     | Shoot Essent. Oil  |         | 4000.0   | -0.6678588061133466  | Nguyen, X. D., La, D. M., Lu'u, D. C., Leclercq, P. A. 1995. Essential Oil Constituents from the Aerial Parts of Perilla frutescens (L.) Britton. J. Essent. Oil Res., 7(4): 429-432.                             |
| Pelargonium graveolens | Essential Oil      |         |          |                      | --  |
| Panax ginseng          | Shoot              |         |          |                      | --  |
| Panax ginseng          | Root               |         |          |                      | --  |
| Panax ginseng          | Root Essent. Oil   |         | 150000.0 | 1.0                  | --  |
| Panax ginseng          | Flower Essent. Oil |         | 29000.0  |                      | --  |
| Panax quinquefolius    | Plant              |         |          |                      | --  |
| Origanum vulgare       | Plant              | 6.0     | 30.0     | -0.3646462028448172  | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.  |
| Origanum vulgare       | Shoot Essent. Oil  |         | 1100.0   | -0.7456415586325718  | --  |
| Opopanax chironium     | Essential Oil      |         |          |                      | --  |
| Ocimum basilicum       | Shoot Essent. Oil  | 4900.0  | 81600.0  | 1.4135003647459183   | --  |
| Ocimum gratissimum     | Shoot              |         | 425.0    | 1.1016058861149356   | Vostrowsky, O., Garbe, W., Bestmann, H.J. and Maia, J.G.S. 1990. Essential Oil of Alfavaca, Ocimum gratissimum, from Brazilian Amazon. Zeitschr. Naturforschung 45(C): 1073-6.                                    |
| Ocimum gratissimum     | Plant              | 5.0     | 65.0     | -0.23507648609792783 | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.  |
| Ocimum basilicum       | Essential Oil      |         | 16100.0  | -0.9072086362241611  | --  |
| Ocimum basilicum       | Plant              |         | 12.0     | -0.43128205717178886 | Die Nahrung. Pino, J., Rosado, A., Goire, I., Roncal, E., and Garcia, I. 1993. Analysis of the Essential Oil from Cuban Basil. Die Nahrung 37:(5): 501-504.   |
| Ocimum tenuiflorum     | Leaf               | 120.0   | 1080.0   | 5.252587581892528    | --  |
| Nepeta cataria         | Plant              | 4.0     | 155.0    | 0.09810278553693051  | Bourrel, C., Perineau, F., Michel, G., Bessiere, J.M. 1993. Catnip (Nepeta cataria L.) Essential Oil: Analysis of Chemical Constituents, Bacteriostatic and Fungistatic Properties. J. Ess. Oil Res., 5: 159-167. |
| Myrtus communis        | Plant              | 3.0     | 4.0      | -0.4608979924282207  | --  |

| Plant                    | Part          | Low PPM | High PPM | StdDev               | Reference  |
|--------------------------|---------------|---------|----------|----------------------|--|
| Myroxylon balsamum       | Plant         |         |          |                      | --   |
| Murraya koenigii         | Leaf          | 5.0     | 155.0    | 0.3941412911960524   | --   |
| Moldavica thymiflora     | Plant         |         | 148.0    | 0.07218884218755264  | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.   |
| Micromeria varia         | Shoot         | 0.0     |          |                      | --   |
| Micromeria varia         | Shoot         |         | 0.0      | -0.3400141894894808  | Pedro, L.G., et al. 1995. Composition of the Essential oil of <i>Micromeria varia</i> Benth. ssp. <i>thymoides</i> (Sol. ex Lowe) Perez var. <i>thymoides</i> , and endemic species of the Madeira Archipelago. <i>flav. &amp; Fragr. J.</i> 10(3): 199-202. |
| Metrosideros sclerocarpa | Leaf          | 47.0    | 188.0    | 0.5674696453506294   | --   |
| Mentha spicata           | Essential Oil |         |          |                      | --   |
| Mentha aquatica          | Shoot         |         | 29.0     | -0.24164481962470882 | Umemoto, K., Arai, T., Nii, H. and Furukawa, K. 1993. A New Chemotype of <i>Mentha aquatica</i> Containing Sesquiterpene Alcohols as Major Components. <i>Nippon Nogeikagaku Kaishi</i> 67(10): 1417-1419.   |
| Mentha aquatica          | Shoot         |         | 65.0     | -0.11953111910292297 | Umemoto, K., Arai, T., Nii, H. and Furukawa, K. 1993. A New Chemotype of <i>Mentha aquatica</i> Containing Sesquiterpene Alcohols as Major Components. <i>Nippon Nogeikagaku Kaishi</i> 67(10): 1417-1419.   |
| Mentha aquatica          | Shoot         |         | 55.0     | -0.1534515914700857  | Umemoto, K., Arai, T., Nii, H. and Furukawa, K. 1993. A New Chemotype of <i>Mentha aquatica</i> Containing Sesquiterpene Alcohols as Major Components. <i>Nippon Nogeikagaku Kaishi</i> 67(10): 1417-1419.   |
| Mentha spicata           | Leaf          |         |          |                      | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.   |
| Mentha aquatica          | Shoot         |         | 29.0     | -0.24164481962470882 | Umemoto, K., Arai, T., Nii, H. and Furukawa, K. 1993. A New Chemotype of <i>Mentha aquatica</i> Containing Sesquiterpene Alcohols as Major Components. <i>Nippon Nogeikagaku Kaishi</i> 67(10): 1417-1419.   |

| Plant                  | Part             | Low PPM | High PPM | StdDev               | Reference  |
|------------------------|------------------|---------|----------|----------------------|--|
| Mentha aquatica        | Shoot            |         | 65.0     | -0.11953111910292297 | Umamoto, K., Arai, T., Nii, H. and Furukawa, K. 1993. A New Chemotype of Mentha aquatica Containing Sesquiterpene Alcohols as Major Components. Nippon Nogeikagaku Kaishi 67(10): 1417-1419.               |
| Mentha longifolia      | Shoot            | 0.0     | 275.0    | 0.5927988006074945   | --   |
| Melissa officinalis    | Shoot            | 4.0     | 32.0     | -0.23146867791456002 | Deutsche Apot. Ziti. 129(4):155-163. W. Schulze et al. Die Melisse.  |
| Melaleuca alternifolia | Leaf             |         | 0.001    | -0.4199714835192588  | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.   |
| Marrubium vulgare      | Plant            |         |          |                      | --   |
| Magnolia denudata      | Twig             |         |          |                      | --   |
| Magnolia denudata      | Bark             |         |          |                      | --   |
| Magnolia denudata      | Leaf             |         |          |                      | --   |
| Magnolia denudata      | Bulb             |         |          |                      | --   |
| Lycium chinense        | Fruit            |         | 360.0    | -0.07364556191036901 | Hansel, R., Keller, K., Rimpler, H., and Schneider, G. eds. 1992. Hager's Handbuch der Pharmazeutischen Praxis, Drogen (A-D), 1209 pp., 1993 (E-O), 970 pp., 1994 (P-Z), 1196 pp. Springer-Verlag, Berlin. |
| Lindera benzoin        | Fruit            | 50.0    | 105.0    | -0.4228533399770978  | --   |
| Lindera benzoin        | Leaf             |         | 0.5      | -0.41735054870946686 | --   |
| Levisticum officinale  | Root             | 12.0    | 125.0    | 1.0                  | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952.   |
| Laurus nobilis         | Leaf Essent. Oil |         |          |                      | --   |
| Laurus nobilis         | Plant            |         |          |                      | --   |
| Juniperus communis     | Fruit            | 10.0    | 100.0    | -0.4297005513117395  | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.   |
| Illicium verum         | Fruit            | 1.0     | 650.0    | 0.32349269549885196  | --   |
| Hyssopus officinalis   | Shoot            |         | 42.0     | -0.19754820554739727 | Tsankova, E.T., Konatchiev, A.N. and Genova, E.M. 1993. Chemical Composition of the Essential Oils of Two Hyssopus officinalis cultivars. J. Ess. Oil Res. 5: 609-611.                                     |

| Plant                 | Part  | Low PPM | High PPM | StdDev               | Reference  |
|-----------------------|-------|---------|----------|----------------------|--|
| Hyssopus officinalis  | Plant |         |          |                      | --   |
| Hyssopus officinalis  | Shoot |         | 42.0     | -0.19754820554739727 | Tsankova, E.T., Konatchiev, A.N. and Genova, E.M. 1993. Chemical Composition of the Essential Oils of Two Hyssopus officinalis cultivars. J. Ess. Oil Res. 5: 609-611.   |
| Hypericum perforatum  | Plant | 0.25    | 4.5      | -0.4590469964746937  | --   |
| Hedera helix          | Leaf  |         |          |                      | --   |
| Glechoma hederacea    | Plant | 9.0     | 53.0     | -0.2795003889825756  | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.   |
| Eucalyptus botryoides | Shoot |         | 0.1      | -0.3396749847658091  | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.   |
| Eucalyptus astringens | Shoot |         | 85.0     | -0.05169017436859748 | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.   |
| Eucalyptus odorata    | Leaf  |         | 4.4      | -0.3968662886730168  | Bignell, C.M., Dunlop, P.J., Brophy, J.J., and Jackson, J.F. 1995. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus. Part VI. Subgenus Symphyomyrtus, Section Adnataria. Flavour and Fragrance J. 10(6):359-364                |
| Eucalyptus tetraptera | Leaf  |         | 120.0    | 0.21030818830483441  | Bignell, C.M., Dunlop, P.J., Brophy, J. J., and Jackson, J.F. 1994. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus. Part I. Subgenus Symphyomyrtus, Section Dumaria, Series Incrassatae. Flavour and Fragrance J. 9(3):113-7 |

| Plant                   | Part  | Low PPM | High PPM | StdDev               | Reference   |
|-------------------------|-------|---------|----------|----------------------|---|
| Eucalyptus ochrophloia  | Leaf  |         | 0.5      | -0.41735054870946686 | Bignell, C.M., Dunlop, P.J., Brophy, J.J., and Jackson, J.F. 1995. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus. Part VI. Subgenus Symphyomyrtus, Section Adnataria. Flavour and Fragrance J. 10(6):359-364 |
| Eucalyptus sideroxylon  | Shoot |         | 40.0     | -0.20433230002082983 | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.  |
| Eucalyptus melanophloia | Leaf  |         | 1.0      | -0.4147243615253066  | Bignell, C.M., Dunlop, P.J., Brophy, J.J., and Jackson, J.F. 1995. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus. Part VI. Subgenus Symphyomyrtus, Section Adnataria. Flavour and Fragrance J. 10(6):359-364 |
| Eucalyptus punctata     | Shoot |         | 0.1      | -0.3396749847658091  | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.  |
| Eucalyptus porosa       | Leaf  |         | 10.0     | -0.367452992210422   | Bignell, C.M., Dunlop, P.J., Brophy, J.J., and Jackson, J.F. 1995. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus. Part VI. Subgenus Symphyomyrtus, Section Adnataria. Flavour and Fragrance J. 10(6):359-364 |
| Eucalyptus largisparsa  | Leaf  |         | 85.0     | 0.026475085413616428 | Bignell, C.M., Dunlop, P.J., Brophy, J.J., and Jackson, J.F. 1995. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus. Part VI. Subgenus Symphyomyrtus, Section Adnataria. Flavour and Fragrance J. 10(6):359-364 |
| Eucalyptus oviformis    | Shoot |         | 0.1      | -0.3396749847658091  | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.  |

| Plant                  | Part  | Low PPM | High PPM | StdDev              | Reference  |
|------------------------|-------|---------|----------|---------------------|--|
| Eucalyptus erythrandra | Leaf  |         | 44.0     | -0.1888722636875245 | Bignell,C.M.,Dunlop,P.J.,Brophy,J. J.,and Jackson, J.F.1994.Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus.Part I.Subgenus Symphyomyrtus,Section Dumaria,Series Incrassatae.Flavour and Fragrance J.9(3):113-7 |
| Eucalyptus melliodora  | Shoot |         | 0.1      | -0.3396749847658091 | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.   |
| Eucalyptus incrassata  | Leaf  |         | 240.0    | 0.8405931125032962  | Bignell,C.M.,Dunlop,P.J.,Brophy,J. J.,and Jackson, J.F.1994.Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus.Part I.Subgenus Symphyomyrtus,Section Dumaria,Series Incrassatae.Flavour and Fragrance J.9(3):113-7 |
| Eucalyptus dealbata    | Shoot |         | 0.1      | -0.3396749847658091 | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.   |
| Eucalyptus ceratocorys | Leaf  |         | 26.0     | -0.2834150023172938 | Bignell,C.M.,Dunlop,P.J.,Brophy,J. J.,and Jackson, J.F.1994.Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus.Part I.Subgenus Symphyomyrtus,Section Dumaria,Series Incrassatae.Flavour and Fragrance J.9(3):113-7 |
| Eucalyptus bosistoana  | Shoot |         | 0.1      | -0.3396749847658091 | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.   |



| Plant                   | Part  | Low PPM | High PPM | StdDev               | Reference  |
|-------------------------|-------|---------|----------|----------------------|--|
| Eucalyptus angulosa     | Leaf  |         | 22.0     | -0.30442449979057584 | Bignell, C.M., Dunlop, P.J., Brophy, J. J., and Jackson, J.F. 1994. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus. Part I. Subgenus Symphyomyrtus, Section Dumaria, Series Incrassatae. Flavour and Fragrance J. 9(3):113-7 |
| Eucalyptus lansdowneana | Leaf  |         | 2.4      | -0.40737103740965785 | Bignell, C.M., Dunlop, P.J., Brophy, J.J., and Jackson, J.F. 1995. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus. Part VI. Subgenus Symphyomyrtus, Section Adnataria. Flavour and Fragrance J. 10(6):359-364                |
| Eucalyptus tereticornis | Shoot |         | 35.0     | -0.2212925362044112  | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.   |
| Eucalyptus leucoxydon   | Leaf  | 0.0     | 5.5      | -0.3910886768678643  | Bignell, C.M., Dunlop, P.J., Brophy, J.J., and Jackson, J.F. 1995. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus. Part VI. Subgenus Symphyomyrtus, Section Adnataria. Flavour and Fragrance J. 10(6):359-364                |
| Eucalyptus intertexta   | Leaf  |         | 5.5      | -0.3910886768678643  | Bignell, C.M., Dunlop, P.J., Brophy, J.J., and Jackson, J.F. 1995. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus. Part VI. Subgenus Symphyomyrtus, Section Adnataria. Flavour and Fragrance J. 10(6):359-364                |
| Eucalyptus siderophloia | Shoot |         | 0.1      | -0.3396749847658091  | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.   |

| Plant                            | Part  | Low PPM | High PPM | StdDev               | Reference  |
|----------------------------------|-------|---------|----------|----------------------|--|
| <i>Eucalyptus viridis</i>        | Leaf  | 0.0     | 0.5      | -0.41735054870946686 | Bignell, C.M., Dunlop, P.J., Brophy, J.J., and Jackson, J.F. 1995. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus <i>Eucalyptus</i> . Part VI. Subgenus <i>Symphomyrtus</i> , Section <i>Adnataria</i> . Flavour and Fragrance J. 10(6):359-364                       |
| <i>Eucalyptus polyanthemos</i>   | Shoot |         | 0.1      | -0.3396749847658091  | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven <i>Eucalyptus</i> Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.  |
| <i>Eucalyptus sparsa</i>         | Leaf  |         | 25.0     | -0.28866737668561426 | Bignell, C.M., Dunlop, P.J., Brophy, J.J., and Jackson, J.F. 1995. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus <i>Eucalyptus</i> . Part VI. Subgenus <i>Symphomyrtus</i> , Section <i>Adnataria</i> . Flavour and Fragrance J. 10(6):359-364                       |
| <i>Eucalyptus occidentalis</i>   | Shoot |         | 0.1      | -0.3396749847658091  | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven <i>Eucalyptus</i> Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.  |
| <i>Eucalyptus globulus</i>       | Shoot |         | 0.1      | -0.3396749847658091  | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven <i>Eucalyptus</i> Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.  |
| <i>Eucalyptus dolichorhyncha</i> | Leaf  |         | 65.0     | -0.0785724019527937  | Bignell, C.M., Dunlop, P.J., Brophy, J. J., and Jackson, J.F. 1994. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus <i>Eucalyptus</i> . Part I. Subgenus <i>Symphomyrtus</i> , Section <i>Dumaria</i> , Series <i>Incrassatae</i> . Flavour and Fragrance J.9(3):113-7 |
| <i>Eucalyptus maideni</i>        | Shoot |         | 0.1      | -0.3396749847658091  | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven <i>Eucalyptus</i> Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.  |

| Plant                    | Part  | Low PPM | High PPM | StdDev              | Reference   |
|--------------------------|-------|---------|----------|---------------------|---|
| Eucalyptus cladocalyx    | Shoot |         | 0.1      | -0.3396749847658091 | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.  |
| Eucalyptus camaldulensis | Shoot |         | 0.1      | -0.3396749847658091 | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.  |
| Eucalyptus blakelyi      | Shoot |         | 0.1      | -0.3396749847658091 | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.  |
| Eucalyptus albens        | Shoot |         | 0.1      | -0.3396749847658091 | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.  |
| Eucalyptus cuprea        | Leaf  |         | 10.0     | -0.367452992210422  | Bignell, C.M., Dunlop, P.J., Brophy, J.J., and Jackson, J.F. 1995. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus. Part VI. Subgenus Symphyomyrtus, Section Adnataria. Flavour and Fragrance J. 10(6):359-364               |
| Eucalyptus fasciculosa   | Leaf  | 0.0     | 1.3      | -0.4131486492148104 | Bignell, C.M., Dunlop, P.J., Brophy, J.J., and Jackson, J.F. 1995. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus. Part VI. Subgenus Symphyomyrtus, Section Adnataria. Flavour and Fragrance J. 10(6):359-364               |
| Eucalyptus stoatei       | Leaf  |         | 150.0    | 0.36787941935444984 | Bignell, C.M., Dunlop, P.J., Brophy, J.J., and Jackson, J.F. 1994. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus. Part I. Subgenus Symphyomyrtus, Section Dumaria, Series Incrassatae. Flavour and Fragrance J. 9(3):113-7 |

| Plant                  | Part  | Low PPM | High PPM | StdDev               | Reference  |
|------------------------|-------|---------|----------|----------------------|--|
| Eucalyptus behriana    | Leaf  |         | 2.7      | -0.40579532509916183 | Bignell, C.M., Dunlop, P.J., Brophy, J.J., and Jackson, J.F. 1995. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus. Part VI. Subgenus Symphyomyrtus, Section Adnataria. Flavour and Fragrance J. 10(6):359-364              |
| Eucalyptus saligna     | Shoot |         | 0.1      | -0.3396749847658091  | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.   |
| Eucalyptus desquamata  | Leaf  | 0.0     | 15.0     | -0.34119112036881943 | Bignell, C.M., Dunlop, P.J., Brophy, J.J., and Jackson, J.F. 1995. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus. Part VI. Subgenus Symphyomyrtus, Section Adnataria. Flavour and Fragrance J. 10(6):359-364              |
| Eucalyptus paniculata  | Shoot |         | 6.0      | -0.31966190606918315 | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.   |
| Eucalyptus populnea    | Leaf  |         | 8.0      | -0.377957740947063   | Bignell, C.M., Dunlop, P.J., Brophy, J.J., and Jackson, J.F. 1995. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus. Part VI. Subgenus Symphyomyrtus, Section Adnataria. Flavour and Fragrance J. 10(6):359-364              |
| Eucalyptus forrestiana | Leaf  |         | 55.0     | -0.13109614563599886 | Bignell, C.M., Dunlop, P.J., Brophy, J.J., and Jackson, J.F. 1994. Volatile Leaf Oils of Some South-western and Southern Australian Species of the Genus Eucalyptus. Part I. Subgenus Symphyomyrtus, Section Dumaria, Series Incrassatae. Flavour and Fragrance J.9(3):113-7 |
| Eucalyptus moluccana   | Shoot |         | 0.1      | -0.3396749847658091  | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264.   |

| Plant                    | Part                 | Low PPM | High PPM | StdDev               | Reference  |
|--------------------------|----------------------|---------|----------|----------------------|--|
| Eucalyptus maculata      | Shoot                |         | 0.1      | -0.3396749847658091  | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264. |
| Eucalyptus diversicolor  | Shoot                |         | 0.1      | -0.3396749847658091  | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264. |
| Eucalyptus citriodora    | Shoot                |         | 0.1      | -0.3396749847658091  | Zrira, S. S., Benjilali, B. B., Fechtal, M. M., & Richard, H. H. 1991. Essential Oils of Twenty-seven Eucalyptus Species Grown in Morocco. Journal of Essential Oil Res. 4: 259-264. |
| Dracocephalum thymiflora | Plant                |         | 148.0    | 0.07218884218755264  | --   |
| Daucus carota            | Plant                |         |          |                      | --   |
| Cymbopogon winterianus   | Plant                | 40.0    | 70.0     | -0.21656652656265793 | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.   |
| Cuminum cyminum          | Fruit                |         | 30.0     | -0.5255615099967239  | --   |
| Cuminum cyminum          | Seed                 |         | 30.0     | -0.7668490032631218  | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.   |
| Croton lechleri          | Plant                |         |          |                      | Taylor, Leslie. 2005. The Healing Power of Rainforest Herbs. SquareOne Publisher, Garden City Park, NY. 519 pp.  |
| Croton eluteria          | Bark                 |         |          |                      | --   |
| Copaifera spp            | Gum                  | 3900.0  | 14400.0  |                      | --   |
| Collinsonia canadensis   | Plant                |         | 16.0     | -0.41647408954357296 | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.   |
| Coleus barbatus          | Root Essent. Oil     |         | 14000.0  | -1.0                 | Jim Duke's personal files.   |
| Citrus reticulata        | Fruit                | 0.7     | 1.0      | -0.565275335737646   | --   |
| Citrus limon             | Essential Oil        |         |          |                      | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.   |
| Citrus sinensis          | Fruit                | 0.7     | 1.0      | -0.565275335737646   | --   |
| Citrus sinensis          | Pericarp Essent. Oil |         |          |                      | Jim Duke's personal files.   |

| Plant                      | Part              | Low PPM | High PPM | StdDev               | Reference   |
|----------------------------|-------------------|---------|----------|----------------------|---|
| Citrus aurantium           | Plant             |         |          |                      | --  |
| Cinnamomum verum           | Leaf              |         | 120.0    | 0.21030818830483441  | Mallavarupu, G. R. et al. 1995. Investigation of the essential oil of cinnamon leaf grown at Bangalore and Hyderabad. Flav. & Fragr. J., 10: 239-242. |
| Cinnamomum camphora        | Leaf              |         |          |                      | --  |
| Chrysanthemum x morifolium | Flower            |         |          |                      | Wealth of India.  |
| Chrysanthemum x morifolium | Plant             | 2.0     | 6.0      | -0.45349400861411276 | Wealth of India.  |
| Centella asiatica          | Leaf              |         |          |                      | Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.   |
| Centella asiatica          | Essential Oil     |         | 30000.0  | -0.48593246550536906 | Jim Duke's personal files.  |
| Carum carvi                | Seed Essent. Oil  |         |          |                      | --  |
| Carum carvi                | Essential Oil     |         |          |                      | --  |
| Boswellia sacra            | Essential Oil     |         |          |                      | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.  |
| Artemisia annua            | Plant             | 3.0     | 80.0     | -0.17954660749211812 | --  |
| Artemisia capillaris       | Essential Oil     |         |          |                      | --  |
| Arctium lappa              | Root              |         |          |                      | Jim Duke's personal files.  |
| Apium graveolens           | Seed              | 1.0     | 875.0    | 1.4124808434543825   | --  |
| Apium graveolens           | Seed Essent. Oil  |         | 35000.0  |                      | --  |
| Apium graveolens           | Leaf Essent. Oil  |         |          |                      | --  |
| Apium graveolens           | Leaf              |         |          |                      | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.  |
| Apium graveolens           | Fruit Essent. Oil |         | 35000.0  | 1.6778472777341984   | --  |
| Aniba rosaeodora           | Essential Oil     |         |          |                      | --  |
| Angelica archangelica      | Root Essent. Oil  |         |          |                      | --  |
| Angelica archangelica      | Root              | 0.0     | 90.0     | -1.0                 | --  |
| Anethum graveolens         | Seed              | 12.0    | 77.0     | -0.6456318401912606  | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.  |
| Anethum graveolens         | Fruit             | 12.0    | 77.0     | -0.4611977234510915  | --  |

| Plant                | Part             | Low PPM | High PPM | StdDev               | Reference  |
|----------------------|------------------|---------|----------|----------------------|--|
| Alpinia officinarum  | Rhizome          |         |          |                      | Wealth of India.   |
| Ageratum conyzoides  | Plant            | 2.0     | 16.0     | -0.41647408954357296 | --   |
| Agathosma betulina   | Leaf Essent. Oil |         |          |                      | --   |
| Agastache rugosa     | Tissue Culture   |         |          |                      | Jim Duke's personal files.   |
| Agastache rugosa     | Essential Oil    |         |          |                      | Jim Duke's personal files.   |
| Acorus calamus       | Rhizome          | 60.0    | 750.0    | 1.0692741796807936   | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.   |
| Acinos alpinus       | Shoot            |         | 10.0     | -0.30609371712231803 | Velasco-Negueruela,A., Perez-Alonso,M.J., Jiminez,S.M. and Garcia,F.M. 1993. The Volatile Constituents of Acinus alpinus (L.) Moench ssp. meridionalis (Nyman). P.W. Ball Growing in Spain. Flav. & Frag. J. 8:127-130.) |
| Achillea millefolium | Leaf             |         |          |                      | --   |