

Dr. Duke's Phytochemical and Ethnobotanical Database

Chemicals Found in *Levisticum officinale*

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|------------------------------|------------|---------|----------|---------------------|---|
| 0 | (+)-FALCARINDIOL | Root | -- | 600 | | |
| 67 | 1,8-CINEOLE | Root | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | 2-METHYL-BUTANAL | Root | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | 2-OCTANONE | Root | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | 3-BUTYL-4,5-DIHYDROPHthalIDE | Root | -- | -- | | |
| 0 | 3-BUTYLPHthalIDE | Root | 600 | 5440 | | Bisset, N.G., ed. 1994. Herbal Drugs and Phytopharmaceuticals. CRC Press. Boca Raton, FL. 566 pp. |
| 0 | 4-OCTANONE | Root | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 10 | 5-METHOXY-PSORALEN | Fruit | 6 | 6 | -0.5570860145311556 | Abstract (See species file) |
| 21 | 8-METHOXY-PSORALEN | Fruit | -- | 1 | -0.7071067811865476 | Abstract (See species file) |
| 16 | ACETIC-ACID | Root | -- | -- | | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 0 | ALKYL-PHthalIDES | Root | 1400 | 11900 | | |
| 0 | ALPHA-FENCHYL-ALCOHOL | Root | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | ALPHA-P-DIMETHYL-STYRENE | Root | 3 | 30 | | 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 |
|----------------|------------------------|------------|---------|----------|----------------------|--|
| 11 | ALPHA-PHELLANDRENE | Root | 1 | 10 | | |
| 28 | ALPHA-PINENE | Root | 20 | 200 | -0.691320833774299 | |
| 3 | ALPHA-SELINENE | Root | 10 | 100 | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 13 | ALPHA-TERPINENE | Root | 1 | 10 | -0.621095587088787 | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 23 | ALPHA-TERPINEOL | Root | 8 | 80 | -0.48963525535860764 | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | ALPHA-TERPINYL-ACETATE | Leaf | -- | -- | | Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp. |
| 1 | ANGELIC-ACID | Root | -- | -- | | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 0 | ANGEOLIDE | Root | -- | -- | | Bisset, N.G., ed. 1994. Herbal Drugs and Phytopharmaceuticals. CRC Press. Boca Raton, FL. 566 pp. |
| 20 | APIOLE | Seed | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | APTERIN | Root | -- | -- | | |
| 3 | AR-CURCUMENE | Root | 1 | 13 | 1 | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 3 | BENZENE | Root | -- | -- | | 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 |
|----------------|----------------------------------|------------|---------|----------|---------------------|--|
| 20 | BENZOIC-ACID | Root | -- | -- | | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 9 | BENZYL-ALCOHOL | Root | 3 | 30 | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 26 | BERGAPTEN | Root | -- | -- | | |
| 0 | BETA-CHAMIGRENE | Root | 1 | 13 | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 5 | BETA-ELEMENE | Root | 12 | 125 | 1 | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 3 | BETA-PHELLANDRENE | Root | 24 | 240 | -1 | |
| 13 | BETA-PINENE | Root | 21 | 210 | -0.4535265537017665 | |
| 3 | BETA-SELINENE | Root | 10 | 100 | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 47 | BETA-SITOSTEROL | Root | -- | -- | | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 4 | BETA-SITOSTEROL-BETA-D-GLUCOSIDE | Root | -- | -- | | Bisset, N.G., ed. 1994. Herbal Drugs and Phytopharmaceuticals. CRC Press. Boca Raton, FL. 566 pp. |
| 35 | BORNEOL | Root | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | BUTYL-DIHYDROPHthalIDE | Root | -- | -- | | |
| 0 | BUTYL-HEXAHYDROPHthalIDE | Root | -- | -- | | 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 |
|----------------|-----------------------|------------|---------|----------|---------------------|---|
| 10 | BUTYL-PHTHALIDE | Root | 153 | 1535 | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 10 | BUTYLIDENE-PHTHALIDE | Root | 153 | 1535 | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | BUTYLIDENE-PHTHALIDES | Root | 700 | 7000 | | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 102 | CAFFEIC-ACID | Root | -- | -- | | Bisset, N.G., ed. 1994. Herbal Drugs and Phytopharmaceuticals. CRC Press. Boca Raton, FL. 566 pp. |
| 0 | CALAMENENE | Root | -- | 5 | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 9 | CAMPHENE | Root | 7 | 70 | -0.6207659127814102 | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 41 | CAMPHOR | Root | 1 | 10 | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 37 | CARVACROL | Root | -- | -- | | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 19 | CARVONE | Root | 10 | 100 | -0.6407782732096975 | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | CARVOTANACETONE | Root | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | CIS-3-HEXENYL | Root | -- | -- | | Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp. |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|-------------------|------------|---------|----------|---------------------|--|
| 0 | CIS-LIGUSTILIDE | Root | 240 | 2040 | | Bisset, N.G., ed. 1994. Herbal Drugs and Phytopharmaceuticals. CRC Press. Boca Raton, FL. 566 pp. |
| 0 | CIS-OCIMENEN | Root | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 20 | CITRONELLAL | Plant | -- | -- | | |
| 1 | COPAENE | Root | 29 | 290 | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 57 | COUMARIN | Root | -- | -- | | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 0 | COUMARINS | Root | 1000 | 43000 | | Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980. |
| 1 | CUPARENE | Root | -- | 5 | -1 | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | CUPARENENE | Root | 1 | 13 | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | D-ALPHA-TERPINEOL | Root | -- | -- | | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 8 | DELTA-3-CARENE | Root | 1 | 10 | -0.6900357033009535 | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 9 | DELTA-CADINENE | Root | -- | 5 | -0.7293152632519274 | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | DELTA-SELINENE | Root | -- | -- | | 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 |
|----------------|-----------------------------|------------|---------|----------|----------------------|---|
| 0 | DIHYDROBUTYLIDENE-PHTHALIDE | Root | -- | -- | | Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp. |
| 5 | DIPHENYL | Root | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | E-LIGUSTILIDE | Root | -- | -- | | Bisset, N.G., ed. 1994. Herbal Drugs and Phytopharmaceuticals. CRC Press. Boca Raton, FL. 566 pp. |
| 0 | EO | Seed | 8000 | 11000 | -0.41143918923758516 | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 0 | EO | Plant | 500 | 2450 | -0.553932933543244 | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 0 | EO | Root | 1000 | 18000 | 0.19305478891253464 | |
| 76 | EUGENOL | Root | -- | -- | | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 0 | FAT | Fruit | 147000 | 147000 | 0.48152208598971263 | CRC Handbook of Medicinal Herbs and/or CRC Handbook of Proximate Analyses |
| 61 | FERULIC-ACID | Fruit | -- | -- | | Bisset, N.G., ed. 1994. Herbal Drugs and Phytopharmaceuticals. CRC Press. Boca Raton, FL. 566 pp. |
| 6 | FURFURAL | Root | 2 | 20 | 1 | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | FURFUROL | Root | 1 | 10 | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | GAMMA-CADINENE | Root | -- | 5 | -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 |
|----------------|----------------------|------------|---------|----------|---------------------|--|
| 11 | GAMMA-TERPINENE | Root | 3 | 30 | -0.6072624134245684 | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 35 | GERANIOL | Root | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | HEPTANAL | Root | -- | -- | | Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp. |
| 3 | HEXANOL | Root | 61 | 610 | 1 | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | HYDROPHTHALIDE-ACIDS | Root | -- | -- | | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 25 | IMPERATORIN | Fruit | 13 | 13 | -0.3654800233022117 | Abstract (See species file) |
| 0 | ISOSENKYUNOLIDE | Root | -- | -- | | Williamson, E. M. and Evans, F. J., Potter's New Cyclopaedia of Botanical Drugs and Preparations, Revised Ed., Saffron Walden, the C. W. Daniel Co., Ltd., Essex UK, 362 pp, 1988, reprint 1989. |
| 5 | ISOVALERIC-ACID | Root | -- | -- | | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 0 | LEVISTOLIDE-A | Root | -- | -- | | Bisset, N.G., ed. 1994. Herbal Drugs and Phytopharmaceuticals. CRC Press. Boca Raton, FL. 566 pp. |
| 0 | LEVISTOLIDE-B | Root | -- | -- | | Bisset, N.G., ed. 1994. Herbal Drugs and Phytopharmaceuticals. CRC Press. Boca Raton, FL. 566 pp. |
| 0 | LIGUSTICIDE | Root | 215 | 2150 | | 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 |
|----------------|--|------------|---------|----------|---------------------|--|
| 0 | LIGUSTICUMLACTONE-E-BUTYLIDENE-PHTHALIDE | Root | -- | -- | | |
| 0 | LIGUSTICUMLACTONE-Z-BUTYLIDENE-PHTHALIDE | Root | -- | -- | | |
| 60 | LIMONENE | Root | 8 | 80 | -0.5781714696190392 | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | LIMONENE-10-OL | Root | 1 | 10 | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 53 | LINALOOL | Root | 3 | 30 | 1.543024243243428 | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | LINALOOL | Root | 3 | 30 | | |
| 0 | MALEIC-ACID | Root | -- | -- | | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 63 | MENTHOL | Root | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 22 | MYRCENE | Root | 6 | 60 | -0.5854605389086612 | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 6 | MYRISTIC-ACID | Root | -- | -- | | |
| 31 | MYRISTICIN | Seed | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 2 | MYRTENOL | Root | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 1 | N-BUTYRIC-ACID | Root | -- | -- | | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|---------------------|------------|---------|----------|----------------------|--|
| 0 | N-PENTYL-BENZENE | Root | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | OCTYL-ALDEHYDE | Root | -- | -- | | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 16 | P-CYMENE | Root | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 13 | PALMITIC-ACID | Root | -- | -- | | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 0 | PENTACYCLOHEXADIENE | Root | -- | -- | | Bisset, N.G., ed. 1994. Herbal Drugs and Phytopharmaceuticals. CRC Press. Boca Raton, FL. 566 pp. |
| 0 | PHTHALIDES | Root | 700 | 12600 | | |
| 5 | PRETAZETTINE | Stem | -- | -- | | |
| 0 | PROTEIN | Fruit | 200000 | 200000 | 1.2132114250920008 | CRC Handbook of Medicinal Herbs and/or CRC Handbook of Proximate Analyses |
| 31 | PSORALEN | Root | -- | -- | | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 31 | PSORALEN | Fruit | 3 | 3 | -0.46474431282748374 | Abstract (See species file) |
| 0 | RESIN | Root | -- | -- | | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 1 | SEDANENOLIDE | Root | -- | -- | | Bisset, N.G., ed. 1994. Herbal Drugs and Phytopharmaceuticals. CRC Press. Boca Raton, FL. 566 pp. |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|-------------------------|------------|---------|----------|--------|--|
| 0 | SEDANOIC-ACID | Root | -- | -- | | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 0 | SEDANOIC-ANHYDRIDE | Root | -- | -- | | Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp. |
| 0 | SENKYUNOLIDE | Root | -- | -- | | Williamson, E. M. and Evans, F. J., Potter's New Cyclopaedia of Botanical Drugs and Preparations, Revised Ed., Saffron Walden, the C. W. Daniel Co., Ltd., Essex UK, 362 pp, 1988, reprint 1989. |
| 5 | STARCH | Root | -- | -- | | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 0 | SUGAR | Root | -- | -- | | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 23 | TERPINEN-4-OL | Root | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 2 | THUJOPSENE | Root | 8 | 80 | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | TRANS-2-NONENAL | Root | -- | -- | | Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp. |
| 0 | TRANS-ALPHA-BERGAMOTENE | Root | 12 | 125 | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 8 | TRANS-ANETHOLE | Root | -- | -- | | 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 |
|----------------|-------------------------------|------------|---------|----------|--------|--|
| 0 | TRANS-LIGUSTILIDE | Root | 240 | 2040 | | Bisset, N.G., ed. 1994. Herbal Drugs and Phytopharmaceuticals. CRC Press. Boca Raton, FL. 566 pp. |
| 0 | TRANS-OCIMENE | Root | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 22 | UMBELLIFERONE | Root | -- | -- | | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 0 | VALIDENE-4,5-DIHYDROPHthalide | Root | -- | -- | | Williamson, E. M. and Evans, F. J., Potter's New Cyclopaedia of Botanical Drugs and Preparations, Revised Ed., Saffron Walden, the C. W. Daniel Co., Ltd., Essex UK, 362 pp, 1988, reprint 1989. |
| 2 | Z-LIGUSTILIDE | Root | -- | -- | | Bisset, N.G., ed. 1994. Herbal Drugs and Phytopharmaceuticals. CRC Press. Boca Raton, FL. 566 pp. |