

Dr. Duke's Phytochemical and Ethnobotanical Databases

Chemicals found in Viburnum opulus

| Activities Count | Chemical            | Plant Part | Low PPM | High PPM | StdDev              | Reference Citation   |
|------------------|---------------------|------------|---------|----------|---------------------|--|
| 0                | 2-CARBOXYARABINITOL | Leaf       |         | 26.0     | -0.8084354957974759 | Moore, B. D., Isidoro, E., Seemann, J. R. 1993. Distribution of 2-Carboxyarabinitol Among Plants. Phytochemistry 34 3: 703-707. Dept. Biochem. Univ. Nevada Reno 89557, USA.                     |
| 16               | ACETIC-ACID         | Root Bark  |         |          |                     | --   |
| 16               | ACETIC-ACID         | Bark       |         |          |                     | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.   |
| 32               | AESCULETIN          | Bark       |         |          |                     | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.   |
| 10               | ALPHA-AMYRIN        | Root Bark  |         |          |                     | --   |
| 10               | ALPHA-AMYRIN        | Bark       |         |          |                     | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.   |
| 5                | ALUMINUM            | Bark       |         | 702.0    | 2.1099902097575876  | Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.  |
| 15               | ARBUTIN             | Leaf       |         | 200.0    | -0.7732537920967253 | --   |
| 15               | ARBUTIN             | Plant      |         |          |                     | 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. |
| 112              | ASCORBIC-ACID       | Fruit      |         | 126100.0 | 7.556029777700852   | --   |
| 7                | ASTRAGALIN          | Flower     |         | 900.0    |                     | --   |
| 0                | BALDRIANIC-ACID     | Bark       |         |          |                     | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.   |

| Activities Count | Chemical         | Plant Part | Low PPM | High PPM | StdDev              | Reference Citation   |
|------------------|------------------|------------|---------|----------|---------------------|--|
| 9                | BETA-AMYRIN      | Bark       |         |          |                     | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 9                | BETA-AMYRIN      | Root Bark  |         |          |                     | --   |
| 53               | BETA-CAROTENE    | Fruit      |         | 6400.0   | 12.220284060630327  | --   |
| 47               | BETA-SITOSTEROL  | Fruit      |         |          |                     | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 47               | BETA-SITOSTEROL  | Root Bark  |         |          |                     | --   |
| 102              | CAFFEIC-ACID     | Branches   |         |          |                     | --   |
| 28               | CALCIUM          | Bark       |         | 23540.0  | 0.46526131569268436 | Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.                                    |
| 3                | CAPRIC-ACID      | Bark       |         |          |                     | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 1                | CAPROIC-ACID     | Root Bark  |         |          |                     | --   |
| 5                | CAPRYLIC-ACID    | Root Bark  |         |          |                     | --   |
| 0                | CEROTIC-ACID     | Root Bark  |         |          |                     | --   |
| 77               | CHLOROGENIC-ACID | Branches   |         |          |                     | --   |
| 77               | CHLOROGENIC-ACID | Fruit      |         |          |                     | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 24               | CHROMIUM         | Bark       |         | 21.0     | 1.416729279304621   | Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.                                    |
| 18               | CINNAMIC-ACID    | Fruit      |         |          |                     | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |

| Activities Count | Chemical             | Plant Part | Low PPM | High PPM | StdDev              | Reference Citation   |
|------------------|----------------------|------------|---------|----------|---------------------|--|
| 23               | CITRIC-ACID          | Bark       |         |          |                     | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 2                | COBALT               | Bark       |         | 115.0    | 3.105040721922236   | Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.                                    |
| 7                | CYANIDIN             | Leaf       |         |          |                     | --   |
| 0                | D,L-CATECHIN         | Bark       |         |          |                     | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 0                | D,L-CATECHIN         | Root Bark  |         | 900.0    |                     | --   |
| 0                | D-GALACTOSE          | Fruit      |         |          |                     | --   |
| 0                | D-GALACTOSE          | Leaf       |         |          |                     | --   |
| 0                | D-GALACTOURONIC-ACID | Leaf       |         |          |                     | --   |
| 0                | D-GALACTOURONIC-ACID | Fruit      |         |          |                     | --   |
| 1                | D-GLUCOSE            | Leaf       |         |          |                     | --   |
| 1                | D-GLUCOSE            | Fruit      |         |          |                     | --   |
| 0                | D-XYLOSE             | Leaf       |         |          |                     | --   |
| 0                | D-XYLOSE             | Fruit      |         |          |                     | --   |
| 0                | EO                   | Bark       | 1000.0  | 3000.0   | -0.7030724101422462 | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes. |
| 40               | EPICATECHIN          | Bark       |         |          |                     | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 30               | ESCULETIN            | Bark       |         |          |                     | --   |
| 13               | FORMIC-ACID          | Root Bark  |         |          |                     | --   |
| 7                | GLUCOSE              | Root Bark  |         |          |                     | --   |

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|------------------|----------------|------------|---------|----------|----------------------|--|
| 0                | HYDROQIONONE   | Plant      |         |          |                      | 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. |
| 6                | IRON           | Bark       |         | 880.0    | 3.0560740291801767   | Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.  |
| 75               | KAEMPFEROL     | Leaf       |         |          |                      | --   |
| 0                | L-ARABINOSE    | Leaf       |         |          |                      | --   |
| 0                | L-ARABINOSE    | Fruit      |         |          |                      | --   |
| 0                | L-RHAMNOSE     | Fruit      |         |          |                      | --   |
| 0                | L-RHAMNOSE     | Leaf       |         |          |                      | --   |
| 27               | LINOLEIC-ACID  | Root Bark  |         |          |                      | --   |
| 27               | LINOLEIC-ACID  | Seed       |         |          |                      | --   |
| 27               | LINOLEIC-ACID  | Fruit      |         |          |                      | --   |
| 27               | LINOLEIC-ACID  | Bark       |         |          |                      | --   |
| 0                | LINOLENIC-ACID | Leaf       |         |          |                      | --   |
| 65               | MAGNESIUM      | Bark       |         | 3110.0   | 0.9274461605911677   | Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.  |
| 15               | MALIC-ACID     | Bark       |         |          |                      | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.   |
| 14               | MANGANESE      | Bark       |         | 49.0     | -0.34875097941765754 | Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.  |
| 0                | METHYL-ARBUTIN | Plant      |         |          |                      | 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. |

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|------------------|--------------------------|------------|---------|----------|----------------------|--|
| 0                | MYRICYL-ALCOHOL          | Root Bark  |         |          |                      | --   |
| 0                | MYRICYL-ALCOHOL          | Bark       |         |          |                      | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 2                | NEO-CHLOROGENIC-ACID     | Branches   |         |          |                      | --   |
| 0                | OLEANOLIC ACID GLUCOSIDE | Plant      |         |          |                      | --   |
| 18               | OLEIC-ACID               | Root Bark  |         |          |                      | --   |
| 18               | OLEIC-ACID               | Fruit      |         |          |                      | --   |
| 18               | OLEIC-ACID               | Seed       |         |          |                      | --   |
| 0                | OPULUS IRIDOID I         | Leaf       | 3000.0  | 7300.0   |                      | --   |
| 0                | OPULUS IRIDOID II        | Leaf       |         | 700.0    |                      | --   |
| 0                | OPULUS IRIDOID III       | Leaf       |         | 800.0    |                      | --   |
| 0                | OPULUS IRIDOID IV        | Leaf       |         | 200.0    |                      | --   |
| 0                | PAEONISIDE               | Fruit      |         |          |                      | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 1                | PAEONOSIDE               | Flower     |         | 1200.0   |                      | --   |
| 13               | PALMITIC-ACID            | Root Bark  |         |          |                      | --   |
| 13               | PALMITIC-ACID            | Bark       |         |          |                      | --   |
| 24               | PECTIN                   | Fruit      |         | 50000.0  | -0.03661673030520101 | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 24               | PECTIN                   | Bark       |         |          |                      | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 4                | PHOSPHORUS               | Bark       |         | 650.0    | -0.46815956974940875 | Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.                                    |

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|------------------|----------------------|------------|---------|----------|---------------------|--|
| 14               | POTASSIUM            | Bark       |         | 7360.0   | 0.2937629021909361  | Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.  |
| 0                | PROTEIN              | Bark       |         | 86000.0  | 0.2524208249192275  | Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.  |
| 176              | QUERCETIN            | Leaf       |         |          |                     | --   |
| 0                | QUERCETIN-GLYCOSIDES | Fruit      |         |          |                     | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.   |
| 44               | SCOPOLETIN           | Root Bark  |         | 7.5      | -1.0                | --   |
| 44               | SCOPOLETIN           | Bark       |         |          |                     | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.   |
| 0                | SCOPOLINE            | Plant      |         |          |                     | 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. |
| 60               | SELENIUM             | Bark       |         | 23.0     | 2.6167352397960517  | Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.  |
| 4                | SILICON              | Bark       |         | 99.0     | 1.9960039711313557  | Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.  |
| 1                | SODIUM               | Bark       |         | 184.0    | -0.2785736779761555 | Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.  |
| 14               | SUCROSE              | Root Bark  |         |          |                     | --   |
| 14               | SUCROSE              | Fruit      |         | 16600.0  | -0.6291173949832924 | --   |
| 35               | TANNIN               | Fruit      |         | 30000.0  | -0.6222515111796854 | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.   |

| Activities Count | Chemical                  | Plant Part | Low PPM | High PPM | StdDev              | Reference Citation   |
|------------------|---------------------------|------------|---------|----------|---------------------|--|
| 4                | TIN                       | Bark       |         | 18.0     | 0.668849450963278   | Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.                                    |
| 0                | URSOLIC ACID<br>GLUCOSIDE | Plant      |         |          |                     | --   |
| 89               | URSOLIC-ACID              | Fruit      |         |          |                     | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 1                | VALERIANIC-ACID           | Plant      |         |          |                     | Duke, J. A. Writeups or information summaries on approximately 2,000 economic plants, USDA, ARS, Beltsville, MD 20705.     |
| 9                | VALERIC-ACID              | Root Bark  |         |          |                     | --   |
| 0                | VIBURNITAL                | Leaf       |         |          |                     | --   |
| 0                | WATER                     | Bark       |         | 782000.0 | 0.4581878715921525  | Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.                                    |
| 77               | ZINC                      | Bark       |         | 17.0     | 0.40123557571247687 | Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.                                    |