

Dr. Duke's Phytochemical and Ethnobotanical Databases

Chemicals found in *Boswellia serrata*

| Activities Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|------------------|---|---------------------|---------|----------|--------------------|---|
| 0 | (+)-ALPHA-PHELLANDRENE | Essential Oil | | | | -- |
| 0 | (+)-LIMONENE | Essential Oil | | 45000.0 | 1.0 | -- |
| 0 | 11-KETO-BETA-BOSWELLIC-ACID | Resin, Exudate, Sap | | 23058.0 | 0.9999999999999999 | -- |
| 0 | 2-ALPHA-3-ALPHA-DIHYDROXY-URS-12-EN-24-OIC-ACID | Resin, Exudate, Sap | | | | -- |
| 0 | 3-ALPHA-HYDROXY-URS-9-12-DIEN-24-OIC-ACID | Resin, Exudate, Sap | | | | -- |
| 0 | 3-ALPHA-HYDROXYTIRUCALL-8,24-DIEN-21-OIC-ACID | Resin, Exudate, Sap | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g. Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 0 | 3-BETA-HYDROXYTIRUCALL-8,24-DIEN-21-OIC-ACID | Resin, Exudate, Sap | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g. Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 0 | 3-KETOTIRUCALL-8,24-DIEN-21-OIC-ACID | Resin, Exudate, Sap | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g. Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 0 | 3-O-ACETYL-11-KETO-BETA-BOSWELLIC-ACID | Resin, Exudate, Sap | | 550.0 | | -- |
| 0 | 3-O-ACETYL-BETA-BOSWELLIC-ACID | Resin, Exudate, Sap | | 150.0 | | -- |
| 4 | ACETYL-11-KETO-BETA-BOSWELLIC-ACID | Resin, Exudate, Sap | | | | -- |
| 5 | ACETYL-BETA-BOSWELLIC-ACID | Resin, Exudate, Sap | | | | -- |
| 10 | ALPHA-AMYRIN | Resin, Exudate, Sap | | | | -- |
| 10 | ALPHA-BOSWELLIC-ACID | Essential Oil | | | | -- |

| Activities Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|------------------|------------------------|---------------------|---------|----------|---------------------|--|
| 10 | ALPHA-BOSWELLIC-ACID | Resin, Exudate, Sap | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 0 | ALPHA-CAMPHOLENIC-ACID | Essential Oil | | | | -- |
| 0 | ALPHA-CAMPHOLYTIC-ACID | Essential Oil | | | | -- |
| 11 | ALPHA-PHELLANDRENE | Resin, Exudate, Sap | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 28 | ALPHA-PINENE | Essential Oil | | | | -- |
| 28 | ALPHA-PINENE | Resin, Exudate, Sap | | 9920.0 | -1.1654001321985943 | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 13 | ALPHA-TERPINENE | Essential Oil | | | | -- |
| 0 | ALPHA-THUJENE | Resin, Exudate, Sap | | 80000.0 | -1.0 | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 0 | ALPHA-THUJENE | Essential Oil | | 500000.0 | 2.8262426673204106 | -- |

| Activities Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|------------------|---|---------------------|---------|----------|--------------------|--|
| 0 | ARABINOSE | Resin, Exudate, Sap | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 0 | BASSORIN | Resin, Exudate, Sap | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 9 | BETA-AMYRIN | Resin, Exudate, Sap | | | | -- |
| 9 | BETA-BOSWELLIC-ACID | Resin, Exudate, Sap | | 63386.0 | 0.9999999999999999 | -- |
| 9 | BETA-BOSWELLIC-ACID | Essential Oil | | | | -- |
| 3 | BETA-PHELLANDRENE | Essential Oil | | | | -- |
| 13 | BETA-PINENE | Essential Oil | | 62000.0 | 0.6462841768599185 | -- |
| 13 | BETA-PINENE | Resin, Exudate, Sap | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 47 | BETA-SITOSTEROL | Bark | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 0 | BORNEOL-ACETATE | Essential Oil | | | | -- |
| 0 | BOSWELLIA-4-O-METHYL-GLUCURONARABINO GALACTAN | Inflorescence | | | | -- |
| 30 | BOSWELLIC-ACID | Resin, Exudate, Sap | | | | -- |

| Activities Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|------------------|----------------------|---------------------|---------|----------|--------------------|--|
| 4 | CADINENE | Resin, Exudate, Sap | | 6400.0 | | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 4 | CADINENE | Essential Oil | | 40000.0 | 1.396804651753834 | -- |
| 9 | CAMPHENE | Essential Oil | | | | -- |
| 0 | CIS-10-THUJANIC-ACID | Essential Oil | | | | -- |
| 0 | D-FRUCTOSE | Plant | | | | -- |
| 0 | D-GALACTOSE | Plant | | | | -- |
| 1 | D-GLUCOSE | Plant | | | | -- |
| 0 | D-LACTOSE | Plant | | | | -- |
| 19 | D-LIMONENE | Essential Oil | | 45000.0 | 0.8498619428795502 | Jim Duke's personal files. |
| 19 | D-LIMONENE | Resin, Exudate, Sap | | 7200.0 | | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 7 | DIPENTENE | Resin, Exudate, Sap | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 7 | DIPENTENE | Essential Oil | | | | -- |
| 2 | ELEMOL | Resin, Exudate, Sap | | 2080.0 | | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |

| Activities Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|------------------|----------------------|---------------------|---------|----------|---------------------|--|
| 2 | ELEMOL | Essential Oil | | 12000.0 | -1.0 | -- |
| 0 | EO | Resin, Exudate, Sap | | 160000.0 | 0.16915880770206396 | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 12 | ESTRAGOLE | Essential Oil | | 20000.0 | -1.7240124631383356 | -- |
| 8 | FRUCTOSE | Resin, Exudate, Sap | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 1 | GALACTOSE | Resin, Exudate, Sap | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 8 | GAMMA-BOSWELLIC-ACID | Resin, Exudate, Sap | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 0 | GERANIC-ACID | Essential Oil | | | | -- |
| 35 | GERANIOL | Essential Oil | | 8000.0 | -0.590948793183161 | -- |
| 35 | GERANIOL | Resin, Exudate, Sap | | 1280.0 | | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |

| Activities Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|------------------|-----------------|---------------------|---------|----------|---------------------|--|
| 7 | GLUCOSE | Resin, Exudate, Sap | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 4 | GLUCURONIC-ACID | Resin, Exudate, Sap | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 0 | HEMICELLULOSE | Wood | | | | -- |
| 0 | IDOSE | Resin, Exudate, Sap | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 0 | L-SORBOSE | Plant | | | | -- |
| 7 | LAURIC-ACID | Essential Oil | | | | -- |
| 60 | LIMONENE | Essential Oil | | | | -- |
| 53 | LINALOOL | Essential Oil | | 15000.0 | -0.5158876661912609 | -- |
| 6 | METHYL-CHAVICOL | Resin, Exudate, Sap | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g.Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 22 | MYRCENE | Essential Oil | | | | -- |
| 0 | MYRTENIC-ACID | Essential Oil | | | | -- |

| Activities Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|------------------|------------------------------|---------------------|---------|----------|-------------------|--|
| 0 | O-ACETYL-BETA-BOSWELLIC-ACID | Resin, Exudate, Sap | | | | Hairfield, E. M., Hairfield Jr., H. H., McNair, H. M. 1989. GC, GC/MS, and TLC of Beta-Boswellic Acid and O-Acetyl-Beta-Boswellic Acid from B. serrata, B. cartei, and B. papyrifera. J. Chromatogr. Sci. 27 3: 127-133. |
| 16 | P-CYMENE | Essential Oil | | 140000.0 | 0.522446086716829 | -- |
| 16 | P-CYMENE | Resin, Exudate, Sap | | 22400.0 | -1.0 | Sabinsa: A series of well documented proprietary PR booklets, e.g. Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 13 | PALMITIC-ACID | Essential Oil | | | | -- |
| 1 | RAFFINOSE | Plant | | | | -- |
| 0 | RHAMNOSE | Resin, Exudate, Sap | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g. Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 0 | SERRATOL | Resin, Exudate, Sap | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g. Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |
| 23 | TERPINEN-4-OL | Essential Oil | | | | -- |
| 18 | TERPINEOL | Essential Oil | | 10000.0 | 1.0 | -- |
| 18 | TERPINEOL | Resin, Exudate, Sap | | | | Sabinsa: A series of well documented proprietary PR booklets, e.g. Sabinsa Corps. 1998. Bronchial Asthma - Its etiology and control with traditional herbal extracts. Sabinsa Corporation. Piscataway, NJ. 49 pp. |

| Activities Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Refernce Citation |
|------------------|----------------------------|---------------------|---------|----------|--------|-------------------|
| 2 | TERPINEOL-ACETATE | Essential Oil | | 35000.0 | | -- |
| 0 | TRANS-10-THUJANIC-ACID | Essential Oil | | | | -- |
| 0 | URS-12-ENE-3-ALPHA-24-DIOL | Resin, Exudate, Sap | | | | -- |