

Dr. Duke's Phytochemical and Ethnobotanical Database

Chemicals Found in *Boswellia sacra*

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|--|---------------------------|---------|----------|--------|--|
| 0 | (S)-1-ISOPROPYL-4,8,12-TRIMETHYLCYCLOTETRADECA-3E,7,11E-TRIEN-1-OL | Plant | -- | -- | | J.S. Glasby Dict.Pls Containing 2ndary Metabolite. 1991. |
| 0 | 1,8-CINEOL | Resin Essent. Oil | -- | 1.6 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 0 | 1-OCTANOL | Resin, Exudate, Sap | 3810 | 12700 | | |
| 0 | 1-OCTYL-ACETATE | Resin, Exudate, Sap | 18000 | 60000 | | |
| 0 | 11-KETO-ALPHA-BOSWELLIC-ACID | Plant | -- | -- | | J.S. Glasby Dict.Pls Containing 2ndary Metabolite. 1991. |
| 0 | 11-KETO-BETA-BOSWELLIC-ACID | Resin, Exudate, Sap | -- | 253.3 | -1 | Han, B. H., Kim, K. M., Park, J. H., Park, M. H., Kim, T. H., Han, Y. N. 1985. Studies on Triterpenoid Corticomimetics (III). Arch. Pharm. Res. 8 4: 213-220. |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|---|---------------------|---------|----------|--------|---|
| 0 | 3-ACETYL-BETA-BOSWELLIC-ACID | Latex Exudate | -- | -- | | Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980. |
| 0 | 3-ACETYL-BETA-BOSWELLIC-ACID-METHYL-ESTER | Resin, Exudate, Sap | -- | -- | | |
| 0 | 4,23-DIHYDROROBURIC-ACID | Plant | -- | -- | | J.S. Glasby Dict.Pls Containing 2ndary Metabolite. 1991. |
| 0 | 4-O-METHYL-GLUCURONIC-ACID | Resin, Exudate, Sap | -- | -- | | Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980. |
| 0 | 4-O-METHYL-GLUCURONIC-ACID | Latex Exudate | -- | -- | | |
| 4 | ACETYL-11-KETO-BETA-BOSWELLIC-ACID | Resin, Exudate, Sap | -- | 166.7 | | Han, B. H., Kim, K. M., Park, J. H., Park, M. H., Kim, T. H., Han, Y. N. 1985. Studies on Triterpenoid Corticomimetics (III). Arch. Pharm. Res. 8 4: 213-220. |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|-----------------------------|---------------------|---------|----------|--------|---|
| 0 | ACETYL-ALPHA-BOSWELLIC-ACID | Resin, Exudate, Sap | -- | 2166.7 | | Han, B. H., Kim, K. M., Park, J. H., Park, M. H., Kim, T. H., Han, Y. N. 1985. Studies on Triterpenoid Corticomimetics (III). Arch. Pharm. Res. 8 4: 213-220. |
| 5 | ACETYL-BETA-BOSWELLIC-ACID | Resin, Exudate, Sap | -- | 4333 | | Han, B. H., Kim, K. M., Park, J. H., Park, M. H., Kim, T. H., Han, Y. N. 1985. Studies on Triterpenoid Corticomimetics (III). Arch. Pharm. Res. 8 4: 213-220. |
| 5 | ACETYL-BETA-BOSWELLIC-ACID | Plant | -- | -- | | J.S. Glasby Dict.Pls Containing 2ndary Metabolite. 1991. |
| 0 | ALLO-AROMADENDRENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 10 | ALPHA-BOSWELLIC-ACID | Resin, Exudate, Sap | -- | 106.7 | | Han, B. H., Kim, K. M., Park, J. H., Park, M. H., Kim, T. H., Han, Y. N. 1985. Studies on Triterpenoid Corticomimetics (III). Arch. Pharm. Res. 8 4: 213-220. |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|----------------------|---------------|---------|----------|--------|--|
| 10 | ALPHA-BOSWELLIC-ACID | Latex Exudate | -- | -- | | Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980. |
| 0 | ALPHA-CALACORENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | ALPHA-COPAENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | ALPHA-CUBEBENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | ALPHA-GUAIENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | ALPHA-GURJUNENE | Essential Oil | -- | -- | | 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 |
|----------------|--------------------|---------------------|---------|----------|---------------------|--|
| 2 | ALPHA-HUMULENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | ALPHA-MUUROLENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | ALPHA-MUUROLENE | Resin, Exudate, Sap | -- | 66800 | | Chiavari, G., Gtalletti, G. C., Piccaglia, R., Mohamud, M. A. 1991. Differentiation Between Resins Boswellia carterii and Boswellia frereana (Frankincense) of Somali Origin. J. Essent. Oil Res. 3 (3):185-186. |
| 11 | ALPHA-PHELLANDRENE | Resin, Exudate, Sap | -- | 0.6 | | Chiavari, G., Gtalletti, G. C., Piccaglia, R., Mohamud, M. A. 1991. Differentiation Between Resins Boswellia carterii and Boswellia frereana (Frankincense) of Somali Origin. J. Essent. Oil Res. 3 (3):185-186. |
| 11 | ALPHA-PHELLANDRENE | Essential Oil | -- | 24000 | -0.1285055418541296 | |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|-----------------|---------------------------|---------|----------|---------------------|---|
| 28 | ALPHA-PINENE | Resin Essent. Oil | -- | 35000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 28 | ALPHA-PINENE | Essential Oil | -- | 410000 | 3.047713203652598 | Wang, W., Zhu, Y. X., Liu, L. Z., Ling, D. K., Qin, X. L., Tian, J. G. 1993. Analysis of the Chemical Constitutents of Essential Oil of Boswellia carterii Birdwood from Somali. Yaowu Fenxi Zazhi 13 3: 170-173. |
| 28 | ALPHA-PINENE | Resin, Exudate, Sap | 1050 | 71600 | -1.0059071766104755 | |
| 3 | ALPHA-SELINENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 13 | ALPHA-TERPINENE | Resin Essent. Oil | -- | -- | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|------------------------|---------------------|---------|----------|--------------------|---|
| 23 | ALPHA-TERPINEOL | Essential Oil | -- | 29000 | 0.5112270450486063 | Wang, W., Zhu, Y. X., Liu, L. Z., Ling, D. K., Qin, X. L., Tian, J. G. 1993. Analysis of the Chemical Constitutents of Essential Oil of <i>Boswellia carterii</i> Birdwood from Somali. <i>Yaowu Fenxi Zazhi</i> 13 3: 170-173. |
| 23 | ALPHA-TERPINEOL | Resin Essent. Oil | -- | 1000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of <i>Olibanum</i> . <i>Plant Med.</i> 53 (4): 382-384. |
| 0 | ALPHA-TERPINYL-ACETATE | Essential Oil | -- | -- | | Lawrence, B.M., <i>Essential Oils</i> 1976-1977, <i>Essential Oils</i> 1978, <i>Essential Oils</i> 1979-1980. |
| 0 | ALPHA-THUJENE | Resin, Exudate, Sap | -- | 192300 | 1 | Chiavari, G., Gtalletti, G. C., Piccaglia, R., Mohamud, M. A. 1991. Differentiation Between Resins <i>Boswellia carterii</i> and <i>Boswellia frereana</i> (Frankincense) of Somali Origin. <i>J. Essent. Oil Res.</i> 3 (3):185-186. |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|----------------|---------------------|---------|----------|--------|--|
| 0 | ALPHA-THUJENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | ALPHA-YLANGENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 7 | ANISALDEHYDE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | ARABIN | Resin, Exudate, Sap | -- | -- | | |
| 0 | ARABINOSE | Latex Exudate | -- | -- | | Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980. |
| 3 | AROMADENDRENE | Essential Oil | -- | -- | | 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 | BASSORIN | Latex Exudate | 50000 | 80000 | | Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980. |
| 0 | BETA-1-CADINENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 9 | BETA-BOSWELLIC-ACID | Resin, Exudate, Sap | -- | 426.7 | -1.000000000000000002 | |
| 0 | BETA-BOURBONENE | Resin, Exudate, Sap | -- | 10000 | | Chiavari, G., Gtalletti, G. C., Piccaglia, R., Mohamud, M. A. 1991. Differentiation Between Resins Boswellia carterii and Boswellia frereana (Frankincense) of Somali Origin. J. Essent. Oil Res. 3 (3):185-186. |
| 0 | BETA-BOURBONENE | Essential Oil | -- | -- | | 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 | BETA-CARYOPHYLLENE | Essential Oil | -- | -- | | |
| 0 | BETA-CARYOPHYLLENE | Resin, Exudate, Sap | -- | 49100 | | Chiavari, G., Gtalletti, G. C., Piccaglia, R., Mohamud, M. A. 1991. Differentiation Between Resins Boswellia carterii and Boswellia frereana (Frankincense) of Somali Origin. J. Essent. Oil Res. 3 (3):185-186. |
| 0 | BETA-COPAENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 5 | BETA-ELEMENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | BETA-GUAIENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | BETA-HUMULENE | Essential Oil | -- | -- | | 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 |
|----------------|-------------------|-------------------|---------|----------|--------|--|
| 3 | BETA-PHELLANDRENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 13 | BETA-PINENE | Resin Essent. Oil | -- | 4000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 3 | BETA-SELINENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | BETA-YLANGENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 35 | BORNEOL | Essential Oil | -- | -- | | 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 | BORNEOL-ACETATE | Resin Essent. Oil | -- | 1.1 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 4 | CADINENE | Essential Oil | -- | -- | | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 0 | CALAMENENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 9 | CAMPHENE | Resin Essent. Oil | -- | 0.7 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 19 | CARVONE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 31 | CARYOPHYLLENE | Essential Oil | -- | -- | | |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|---------------------|---------------------|---------|----------|--------|--|
| 8 | CARYOPHYLLENE-OXIDE | Resin, Exudate, Sap | -- | 32900 | | Chiavari, G., Gtalletti, G. C., Piccaglia, R., Mohamud, M. A. 1991. Differentiation Between Resins <i>Boswellia carterii</i> and <i>Boswellia frereana</i> (Frankincense) of Somali Origin. J. Essent. Oil Res. 3 (3):185-186. |
| 0 | CEMBRENE | Resin Essent. Oil | -- | 14000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of <i>Olibanum</i> . Plant Med. 53 (4): 382-384. |
| 0 | CIS-BETA-OCIMENE | Resin Essent. Oil | -- | 2000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of <i>Olibanum</i> . Plant Med. 53 (4): 382-384. |
| 0 | CITRONELLOL-ACETATE | Resin Essent. Oil | -- | -- | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of <i>Olibanum</i> . Plant Med. 53 (4): 382-384. |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|--------------------|-------------------|---------|----------|--------|--|
| 4 | D-BORNEOL | Essential Oil | -- | -- | | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 0 | DECAN-1-OL | Resin Essent. Oil | -- | 4000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 0 | DECAN-1-OL-ACETATE | Resin Essent. Oil | -- | 3000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 9 | DELTA-CADINENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | DELTA-ELEMENE | Essential Oil | -- | -- | | 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 | DELTA-GUAIENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 7 | DIPENTENE | Essential Oil | 3925 | 3925 | | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 0 | EO | Latex Exudate | 30000 | 100000 | | Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980. |
| 1 | ETHYL-LAURATE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | FARNESANE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 2 | FARNESENE | Essential Oil | -- | -- | | 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 |
|----------------|-----------------|-------------------|---------|----------|--------|--|
| 17 | FARNESOL | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 1 | GALACTOSE | Latex Exudate | -- | -- | | Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980. |
| 0 | GAMMA-CADINENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | GAMMA-MUUROLENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 11 | GAMMA-TERPINENE | Resin Essent. Oil | -- | 1000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|----------------------|-------------------|---------|----------|--------|--|
| 11 | GAMMA-TERPINENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | GERANIOL-ACETATE | Resin Essent. Oil | -- | 3000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 0 | HEXAN-1-OL-ACETATE | Resin Essent. Oil | -- | 1000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 0 | HEXAN-1-OL-HEXANOATE | Resin Essent. Oil | -- | 1000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|-----------------|---------------------------|---------|----------|--------|--|
| 0 | HEXYL-OCTANOATE | Resin Essent. Oil | -- | 2000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 0 | HOMOMYRCENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | INCENSOLE | Resin Essent. Oil | -- | 27000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 0 | INCENSOLE | Essential Oil | -- | -- | | Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980. |
| 0 | INCENSOLE | Resin, Exudate, Sap | 810 | 2700 | | |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|-------------------|---------------------|---------|----------|--------|--|
| 0 | INCENSOLE-ACETATE | Essential Oil | -- | -- | | Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980. |
| 0 | INCENSOLE-OXIDE | Resin, Exudate, Sap | -- | -- | | |
| 0 | INCENSOLE-OXIDE | Essential Oil | -- | -- | | Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980. |
| 0 | ISOCEMBRENE | Resin Essent. Oil | -- | 18000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|--------------------|---------------------|---------|----------|--------|--|
| 0 | ISOINCENSOLE | Essential Oil | -- | -- | | Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980. |
| 0 | ISOINCENSOLE | Resin Essent. Oil | -- | 8000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 0 | ISOINCENSOLE-OXIDE | Essential Oil | -- | -- | | Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980. |
| 0 | ISOINCENSOLE-OXIDE | Resin, Exudate, Sap | -- | -- | | Forcellese, M. L., Nicoletti, R., Petrossi, U. 1972. The Structure of Isoincensole-Oxide. Tetrahedron 28: 325-. |
| 0 | L-ALPHA-PINENE | Essential Oil | -- | -- | | 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 |
|----------------|----------|---------------------|---------|----------|-------------------------|--|
| 60 | LIMONENE | Resin, Exudate, Sap | -- | 78200 | | Chiavari, G., Gtalletti, G. C., Piccaglia, R., Mohamud, M. A. 1991. Differentiation Between Resins <i>Boswellia carterii</i> and <i>Boswellia frereana</i> (Frankincense) of Somali Origin. J. Essent. Oil Res. 3 (3):185-186. |
| 60 | LIMONENE | Essential Oil | -- | 128000 | -0.00031356999051470447 | |
| 60 | LIMONENE | Resin Essent. Oil | -- | 1.7 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of <i>Olibanum</i> . Plant Med. 53 (4): 382-384. |
| 53 | LINALOOL | Resin Essent. Oil | -- | 20000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of <i>Olibanum</i> . Plant Med. 53 (4): 382-384. |
| 3 | MUCILAGE | Resin, Exudate, Sap | 120000 | 200000 | | |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|------------------------------|---------------------|---------|----------|---------------------|--|
| 3 | MUCILAGE | Latex Exudate | -- | 120000 | | |
| 22 | MYRCENE | Resin Essent. Oil | -- | 2000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 22 | MYRCENE | Essential Oil | -- | 36000 | 0.02796719068873602 | |
| 0 | NEROL-ACETATE | Resin Essent. Oil | -- | -- | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 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. |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|--------------------|-------------------|---------|----------|--------|--|
| 0 | O-METHYL-ANISOLE | Resin Essent. Oil | -- | -- | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 0 | OCTAN-1-OL | Resin Essent. Oil | -- | 127000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 0 | OCTAN-1-OL-ACETATE | Resin Essent. Oil | -- | 600000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 0 | OCTANOL | Essential Oil | -- | -- | | Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980. |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|------------------------|---------------------|---------|----------|---------------------|--|
| 0 | OCTYL-ACETATE | Essential Oil | -- | -- | | Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980. |
| 16 | P-CYMENE | Resin, Exudate, Sap | -- | 35300 | 1 | Chiavari, G., Gtalletti, G. C., Piccaglia, R., Mohamud, M. A. 1991. Differentiation Between Resins Boswellia carterii and Boswellia frereana (Frankincense) of Somali Origin. J. Essent. Oil Res. 3 (3):185-186. |
| 16 | P-CYMENE | Essential Oil | 3925 | 87000 | 0.08487859835357342 | |
| 16 | P-CYMENE | Resin Essent. Oil | -- | 0.5 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 0 | P-MENTHA-1,4-DIEN-8-OL | Resin, Exudate, Sap | -- | -- | | Maupetit, P. 1985. New Constituents in Olibanum Resinoid and Essential Oil. Parfum Flavor 9 6: 19-37. |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|------------------------|-------------------|---------|----------|-------------------|--|
| 0 | P-MENTHA-1,5-DIEN-7-OL | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 4 | PHELLANDRENE | Essential Oil | -- | -- | | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 0 | RESIN | Latex Exudate | 600000 | 700000 | 0.898643077437173 | Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980. |
| 5 | SABINENE | Resin Essent. Oil | -- | 3000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |

| Activity Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|----------------|----------------------|---------------------|---------|----------|--------|--|
| 5 | SABINENE | Resin, Exudate, Sap | -- | 94400 | | Chiavari, G., Gtalletti, G. C., Piccaglia, R., Mohamud, M. A. 1991. Differentiation Between Resins <i>Boswellia carterii</i> and <i>Boswellia frereana</i> (Frankincense) of Somali Origin. J. Essent. Oil Res. 3 (3):185-186. |
| 5 | SABINENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | SELINA-4,11-DIENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | SELINA-5,7(11)-DIENE | Resin, Exudate, Sap | -- | -- | | Maupetit, P. 1985. New Constituents in Olibanum Resinoid and Essential Oil. <i>Perfum Flavor</i> 9 6: 19-37. |
| 0 | TERPENES | Essential Oil | 785000 | 785000 | | 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 |
|----------------|---------------|-------------------|---------|----------|--------|--|
| 23 | TERPINEN-4-OL | Resin Essent. Oil | -- | 2000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 23 | TERPINEN-4-OL | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 9 | TERPINOLENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 9 | TERPINOLENE | Resin Essent. Oil | -- | 1000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 2 | THUJOPSENE | Essential Oil | -- | -- | | 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-ALPHA-BERGAMOTENE | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | TRANS-BETA-OCIMENE | Resin Essent. Oil | -- | 13000 | | Abdel Wahab, S. M., Aboutabl, E. A., El-Zalabani, S. M., Fouad, H. A., De Pooter, H. L., El-Fallaha, B. 1987. The Essential Oil of Olibanum. Plant Med. 53 (4): 382-384. |
| 2 | TRANS-PINOCARVEOL | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | TRANS-VERBENOL | Essential Oil | -- | -- | | Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980. |
| 0 | VERBENOL | Essential Oil | -- | -- | | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |
| 5 | VERBENONE | Essential Oil | -- | -- | | Guenther, E., The Essential Oils, 6 volumes, D. van Nostrand, New York, 1948-1952. |