

Dr. Duke's Phytochemical and Ethnobotanical Databases

Chemicals found in *Abelmoschus esculentus*

| Activities Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|------------------|---------------|------------|---------|----------|--------------------|--|
| 15 | FOLACIN | Fruit | 0.7 | 10.0 | 3.249984323819219 | USDA's Ag Handbook 8 and sequelae) |
| 0 | PROLINE | Fruit | 450.0 | 14930.0 | 2.9987180634006636 | -- |
| 8 | TYROSINE | Fruit | 480.0 | 8700.0 | 2.602797189816478 | -- |
| 0 | VIT-B-6 | Fruit | 2.0 | 22.0 | 2.3189606682135615 | USDA's Ag Handbook 8 and sequelae) |
| 31 | THIAMIN | Fruit | 0.8 | 20.0 | 1.8774907750760779 | -- |
| 2 | PHYTOSTEROLS | Fruit | 240.0 | 2400.0 | 1.8739668130211007 | -- |
| 65 | MAGNESIUM | Fruit | 380.0 | 6000.0 | 1.792156703535766 | -- |
| 4 | THREONINE | Fruit | 650.0 | 6500.0 | 1.4475659616717724 | USDA's Ag Handbook 8 and sequelae) |
| 3 | ALANINE | Fruit | 730.0 | 7300.0 | 1.4119535146978326 | USDA's Ag Handbook 8 and sequelae) |
| 15 | METHIONINE | Fruit | 210.0 | 2100.0 | 1.4056535776128818 | USDA's Ag Handbook 8 and sequelae) |
| 0 | PENTOSANS | Seed | | 142700.0 | 1.33610550594868 | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes. |
| 14 | POTASSIUM | Fruit | 2200.0 | 32500.0 | 1.2902544800325078 | -- |
| 29 | TRYPTOPHAN | Fruit | 170.0 | 1710.0 | 1.2063373108893063 | -- |
| 2 | LEUCINE | Fruit | 1050.0 | 10500.0 | 1.1477318684831908 | USDA's Ag Handbook 8 and sequelae) |
| 14 | ARGININE | Fruit | 840.0 | 8450.0 | 1.1043565641994444 | -- |
| 7 | PHENYLALANINE | Fruit | 650.0 | 6500.0 | 1.100844146055086 | USDA's Ag Handbook 8 and sequelae) |
| 8 | GLUTAMIC-ACID | Fruit | 2710.0 | 27100.0 | 1.0787835766302012 | USDA's Ag Handbook 8 and sequelae) |
| 4 | LYSINE | Fruit | 810.0 | 8100.0 | 1.0322270292855846 | USDA's Ag Handbook 8 and sequelae) |
| 3 | ISOLEUCINE | Fruit | 550.0 | 6900.0 | 0.9797840477819103 | -- |
| 28 | CALCIUM | Fruit | 810.0 | 8100.0 | 0.9792809325023206 | USDA's Ag Handbook 8 and sequelae) |
| 7 | HISTIDINE | Fruit | 310.0 | 3100.0 | 0.9727269415226906 | USDA's Ag Handbook 8 and sequelae) |
| 3 | VALINE | Fruit | 910.0 | 9100.0 | 0.9588044065437552 | USDA's Ag Handbook 8 and sequelae) |
| 4 | PHOSPHORUS | Fruit | 630.0 | 6300.0 | 0.9367351316792745 | USDA's Ag Handbook 8 and sequelae) |

| Activities Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|------------------|------------------|------------|----------|----------|---------------------|--|
| 2 | CYSTINE | Fruit | 180.0 | 1900.0 | 0.9062078723935358 | -- |
| 77 | ZINC | Fruit | 6.0 | 60.0 | 0.8935039976101535 | USDA's Ag Handbook 8 and sequelae) |
| 4 | PHOSPHORUS | Seed | | 7900.0 | 0.6729743152569793 | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes. |
| 13 | PALMITIC-ACID | Seed | 33920.0 | 66440.0 | 0.6712717296107207 | -- |
| 3 | ASPARTIC-ACID | Fruit | 1450.0 | 14820.0 | 0.6124010179892998 | -- |
| 15 | FIBER | Seed | | 210200.0 | 0.5955384973174893 | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes. |
| 0 | WATER | Fruit | 880000.0 | 895000.0 | 0.5410083440065604 | -- |
| 39 | NIACIN | Fruit | 10.0 | 100.0 | 0.525398020316708 | USDA's Ag Handbook 8 and sequelae) |
| 15 | RIBOFLAVIN | Fruit | 0.6 | 7.0 | 0.42634167420268376 | -- |
| 11 | PANTOTHENIC-ACID | Fruit | 2.0 | 24.0 | 0.3760561207523544 | USDA's Ag Handbook 8 and sequelae) |
| 0 | ASH | Fruit | 7000.0 | 70000.0 | 0.3453465628728832 | USDA's Ag Handbook 8 and sequelae) |
| 12 | GLYCINE | Fruit | 440.0 | 4400.0 | 0.30769740137959467 | USDA's Ag Handbook 8 and sequelae) |
| 1 | SERINE | Fruit | 440.0 | 4510.0 | 0.30609586354325435 | -- |
| 14 | MANGANESE | Fruit | 10.0 | 100.0 | 0.2558494650725795 | USDA's Ag Handbook 8 and sequelae) |
| 32 | ALPHA-TOCOPHEROL | Seed | | 304.0 | 0.23458917070322294 | Wealth of India. |
| 14 | GAMMA-TOCOPHEROL | Oil | | 430.0 | 0.23400336123986246 | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes. |
| 0 | KILOCALORIES | Fruit | 180.0 | 3800.0 | 0.21179742548842775 | -- |
| 0 | PROTEIN | Fruit | 2000.0 | 122000.0 | 0.16758750745380976 | -- |
| 0 | CARBOHYDRATE | Fruit | 76300.0 | 760000.0 | 0.16728374427310336 | USDA's Ag Handbook 8 and sequelae) |
| 31 | THIAMIN | Seed | | 6.9 | 0.07535737236571377 | Wealth of India. |
| 6 | IRON | Fruit | 8.0 | 150.0 | 0.06752138925955396 | -- |

| Activities Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|------------------|------------------|------------|----------|----------|-----------------------|--|
| 14 | SULFUR | Fruit | 140.0 | 1400.0 | -0.010141453327068681 | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes. |
| 0 | ASH | Seed | | 47400.0 | -0.014440680295344115 | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes. |
| 5 | PHYLLOQUINONE | Plant | | 0.4 | -0.0356363719455349 | Booth, S. L., Suttie, J. W. 1998. Dietary intake and adequacy of vitamin K. J. Nutrition, 128(5): 785-788. |
| 112 | ASCORBIC-ACID | Plant | 190.0 | 2340.0 | -0.044349356222101836 | -- |
| 1 | SODIUM | Fruit | 10.0 | 1000.0 | -0.08912190953477618 | -- |
| 0 | CARBOHYDRATES | Fruit | 76300.0 | 760000.0 | -0.12236009010138874 | -- |
| 112 | ASCORBIC-ACID | Fruit | 130.0 | 2340.0 | -0.13899484248695484 | -- |
| 27 | LINOLEIC-ACID | Seed | 32575.0 | 89760.0 | -0.1487610244098318 | -- |
| 18 | OLEIC-ACID | Seed | 43920.0 | 100190.0 | -0.15547958517496932 | -- |
| 13 | MUFA | Fruit | 170.0 | 1700.0 | -0.22925702420668695 | USDA's Ag Handbook 8 and sequelae) |
| 0 | FAT | Seed | 160000.0 | 220000.0 | -0.23907267817038622 | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes. |
| 32 | ALPHA-TOCOPHEROL | Oil | | 310.0 | -0.2423137964331492 | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes. |
| 28 | CALCIUM | Seed | 2100.0 | 2820.0 | -0.24360731908228206 | -- |
| 6 | MYRISTIC-ACID | Seed | 360.0 | 1540.0 | -0.2758432857450111 | -- |
| 2 | PALMITOLEIC-ACID | Seed | 730.0 | 880.0 | -0.27734359101749956 | Wealth of India. |
| 0 | PROTEIN | Seed | 193800.0 | 200600.0 | -0.2952962121414026 | -- |
| 12 | COPPER | Fruit | 1.0 | 9.0 | -0.2972270275515491 | USDA's Ag Handbook 8 and sequelae) |
| 9 | OXALIC-ACID | Fruit | 8.0 | 103.0 | -0.30066937175115394 | -- |
| 0 | SFA | Fruit | 260.0 | 2600.0 | -0.32206148620495856 | USDA's Ag Handbook 8 and sequelae) |

| Activities Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|------------------|-----------------|------------|---------|----------|----------------------|--|
| 7 | SALICYLATES | Fruit | | 5.0 | -0.3224047195908981 | -- |
| 8 | STEARIC-ACID | Seed | 7200.0 | 10120.0 | -0.34582040476667064 | -- |
| 0 | PHYTATE | Fruit | 50.0 | 2900.0 | -0.36066152801713924 | -- |
| 14 | POTASSIUM | Seed | | 8200.0 | -0.3843179358862292 | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes. |
| 24 | PECTIN | Seed | | 21500.0 | -0.39959623198666455 | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes. |
| 2 | CAMPESTEROL | Fruit | | 30.0 | -0.4046460894399287 | Spiller, G. A. 1996 (Spiller, G. A. Ed. 1996. CRC Handbook of Lipids in Human Nutrition. CRC Press. Boca Raton, FL. 233 pp.) |
| 15 | FIBER | Fruit | 9400.0 | 94000.0 | -0.4498972510420309 | USDA's Ag Handbook 8 and sequelae) |
| 0 | SUGAR | Seed | | 40300.0 | -0.45814866271946514 | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes. |
| 0 | FLAVONOIDS | Flower | 4800.0 | 25000.0 | -0.4636926248936486 | Wealth of India. |
| 12 | STIGMASTEROL | Root | | 60.0 | -0.4716637501266192 | Spiller, G. A. 1996 (Spiller, G. A. Ed. 1996. CRC Handbook of Lipids in Human Nutrition. CRC Press. Boca Raton, FL. 233 pp.) |
| 0 | WATER | Seed | | 98900.0 | -0.49390282770605765 | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes. |
| 54 | GOSSYPOL | Seed | 32.0 | 70.0 | -0.5463535177026004 | -- |
| 0 | FAT | Fruit | 1000.0 | 10000.0 | -0.5648728941733404 | USDA's Ag Handbook 8 and sequelae) |
| 47 | BETA-SITOSTEROL | Fruit | | 150.0 | -0.5971588891273873 | Spiller, G. A. 1996 (Spiller, G. A. Ed. 1996. CRC Handbook of Lipids in Human Nutrition. CRC Press. Boca Raton, FL. 233 pp.) |
| 4 | PUFA | Fruit | 270.0 | 2700.0 | -0.6462376868898586 | USDA's Ag Handbook 8 and sequelae) |
| 3 | MUCILAGE | Fruit | | 6000.0 | -0.7970811413304553 | Wealth of India. |

| Activities Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|------------------|---|------------|---------|----------|---------------------|--|
| 15 | RIBOFLAVIN | Seed | | 1.4 | -0.8141150164097362 | Wealth of India. |
| 5 | STARCH | Seed | | 89200.0 | -0.8947625059380864 | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes. |
| 7 | CHLORINE | Plant | | 410.0 | -1.3865978906762788 | Wealth of India. |
| 0 | 3,5,3',4',5-PENTAHYDROXY-7-METHOXYFLAVONOL-5'-DIGLUCOSIDE | Flower | | | | Wealth of India. |
| 0 | 2-O-(D-GALACTOPYRANOSYLURONIC-ACID)-L-RHAMOSE | Fruit | | | | Wealth of India. |
| 0 | QUERCETIN-3-TRIGLUCOSIDE | Flower | | | | Wealth of India. |
| 0 | 4-O-BETA-D-GALACTOPYRANOSYL-D-GALACTOSE | Fruit | | | | Wealth of India. |
| 0 | PHENYALANINE | Fruit | 650.0 | 6500.0 | | -- |
| 0 | CYANIDIN-4'-GLUCOSIDE | Flower | | | | Rizk, A.F.M. and Al-Nowaihi, A.S., The Phytochemistry of the Horticultural Plants of Qatar, Scientific and Applied Research Centre, University of Qatar. |
| 0 | ARABINOSE | Fruit | | 180.0 | | Wealth of India. |
| 0 | QUERCETIN-5-RHAMNOGLUCOSIDE | Flower | | | | Wealth of India. |
| 176 | QUERCETIN | Flower | | | | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes. |
| 7 | GOSSYPETIN | Flower | | | | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes. |
| 0 | CYANIDIN-3-GLUCOSIDE-4'-GLUCOSIDE | Flower | | | | Rizk, A.F.M. and Al-Nowaihi, A.S., The Phytochemistry of the Horticultural Plants of Qatar, Scientific and Applied Research Centre, University of Qatar. |
| 0 | P-TOLUALDEHYDE | Fruit | | | | Wealth of India. |
| 0 | 3-METHYL-1-BUTANOL | Fruit | | | | Wealth of India. |

| Activities Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|------------------|--|------------|---------|----------|--------|--|
| 0 | QUERCETIN-7-GLUCOSIDE | Flower | | | | Wealth of India. |
| 24 | ETHANOL | Fruit | | | | Wealth of India. |
| 2 | ISOBUTYL-ALCOHOL | Leaf | | | | Wealth of India. |
| 0 | 9-HEXADECENOIC-ACID | Seed | | | | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes. |
| 0 | QUERCETIN-5-GLUCOSIDE | Flower | | | | Wealth of India. |
| 0 | CYCLOHEXANOL | Fruit | | | | Wealth of India. |
| 24 | PECTIN | Fruit | | | | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes. |
| 2 | ISOBUTYL-ALCOHOL | Fruit | | | | Wealth of India. |
| 0 | 12,13-EPOXYOLEIC-ACID | Seed | | | | ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes. |
| 1 | QUERCETIN-4'-GLUCOSIDE | Flower | | | | Wealth of India. |
| 0 | CYANIDIN-3-SAMBUBIOSIDE | Flower | | | | Wealth of India. |
| 0 | ALPHA-TERPENYL-ACETATE | Leaf | | | | Wealth of India. |
| 0 | GOSSYPETIN-8-RHAMNOGLUCOSIDE | Flower | | | | Wealth of India. |
| 0 | QUERCETIN-4'-DIGLUCOSIDE | Flower | | | | Wealth of India. |
| 53 | CITRAL | Leaf | | | | Wealth of India. |
| 0 | GOSSYPETIN-3-GLUCOSIDE-8-RHAMNOGLUCOSIDE | Flower | | | | Wealth of India. |
| 0 | QUERCETIN-3-DIGLUCOSIDE | Flower | | | | Wealth of India. |
| 53 | CITRAL | Fruit | | | | Wealth of India. |
| 2 | GOSSYPETIN-8-GLUCOSIDE | Flower | | | | Wealth of India. |
| 0 | GALACTURONIC-ACID | Fruit | | 360.0 | | Wealth of India. |
| 0 | RHAMNOSE | Fruit | | 600.0 | | Wealth of India. |

| Activities Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Refernce Citation |
|------------------|-----------|------------|---------|----------|--------|-------------------|
| 1 | GALACTOSE | Fruit | | 4800.0 | | Wealth of India. |