

# What's in an apple?

This is an example of the many elements and compounds that have been identified in a domestic apple:



ABSCISIC ACID	DIPHOSPHATIDYL GLYCEROL	LAURIC ACID	PEROXIDASE
CIS-2,TRANS-4-ABSCISIC ACID	ESSENTIAL OIL	LEAD	2-PHENETHYLACETATE
TRANS-ABSCISIC ACID	L-EPICATECHIN	LECITHIN	PHENOLICS
ACETIC ACID	5,6-EPOXY-10',APO-5,6-DIHYDRO-	LEUCINE	PHENYLALANINE
ACETIC ACID-AMYL ESTER	BETA-CAROTENE-3,10'DIOL	LINOLENIC ACID	PHLORETAMIDE
ACETALDEHYDE	ETHANOL	ALPHA-LINOLENIC ACID	PHLORETIN-4'-O-BETA-D-GLUCOPY-
ACETONE	ETHYL ACETATE	LITHIUM	RANOSIDE
ALPHA-ALANINE	ETHYLAMINE	LUTEIN	PHLORETIN-XYGLOUCOSIDE
BETA-ALANINE	ETHYL BUTYRATE	LUTEOXANTHIN	PHLORIZIN GLYCOSURIC PHOS-
ALANINE	ETHYL CAPROATE	LYSINE	PHATIDYLIC ACID
ALUMINIUM	ETHYL CROTONATE	MAGNESIUM	PHOSPHATIDYL-CHOLINE
ALPHA-AMINOBUTYRIC ACID	ETHYL DECENOATE	L-MALIC ACID	PHOSPHATIDYL-ETHANOLAMINE
AMMONIA	ETHYL DODECANOATE	MALVIDIN-MONOGLYCOSIDE	PHOSPHATIDYL GLYCEROL
AMYL ACETATE	ETHYL HEXANOATE	MANGANESE	PHOSPHATIDYL-INOSITOL
AMYL BUTYRATE	ETHYL ISOBUTYRATE	MANNOSE	PHOSPHATIDYL-SERINE
AMYL PROPIONATE	ETHYL METHYLBUTYRATE	MERCURY	PHOSPHORUS
ANILINE	ETHYL NONANOATE	METHANOL	PHYTOSTEROLS
ARABINOSE	ETHYL OCTANOATE	METHIONINE	PIPECOLINIC ACID
ARGININE	ETHYL PENTANOATE	METHYL ACETATE	POLYGALACTOSYL-DIGLYCERIDE
ARSENIC	ETHYL PHENACETATE	METHYL-2-XI-ACETOXY-20-BETA-	POLYGLACTURONASE
ASCORBIC ACID	ETHYL PROPIONATE	HYDROXY-URSONATE	POLYPHENOLASE
ASCORBIDASE	ETHYL VALERIANATE	METHYLAMINE	POTASSIUM
ASH	FARNESENE	2-METHYL-BUT-2-EN-1-AL	PROLINE
ASPARAGINE	FAT	2-METHYL-BUT-3-EN-1-OL	PROPANOL
ASPARTIC ACID	FERULIC ACID	D-2-METHYLBUTAN-1-OL	2-PROPANOL
AVICULARIN	FIBER	2-METHYLBUTAN-2-OL	N-PROPANOL
BARIUM	FLUORINE	METHYL-BUTYRATE	I-PROPANOL
BENZOIC ACID	ROLATE	METHYL-CAPROATE	N-PROPIONIC ACID
3,4-BENZOPYRENE	FORMIC ACID	2-METHYL-2,3-EPOXY-PENTANE	PROPYL ACETATE
BENZYL ACETATE	FRUCTOSE	METHYL-FORMATE	PROPYL BUTYRATE
BENZYL-AMINE	FUMARIC ACID	6-METHYL-HEPTEN-5-EN-2-ONE	PROPYL-FORMATE
BIOTIN	GALACTANASE	METHYL-HEXANOATE	PROPYL-2-METHYLBUTYRATE
BORON	GALACTARIC ACID	N-METHYL-BETA-PHENETHYLAMINE	PROPYL-N-PENTANOATE
BROMINE	D-GALACTURONIC ACID	METHYL-PROPIONATE	PROPYL-PROPIONATE
BUTANOL	CERANIOL	METHYL-2-METHYL-BUTYRATE	PROTEIN
N-BUTANOL	D-GLUCITOL	METHYL-1-PENTANOATE	PROTocatechuic ACID
1-BUTANOL	GLUCOCEREBROSIDE	METHYL-N-PENTANOATE	RUJA
2-BUTANOL	D-GLUCONIC ACID	2-METHYLPENTAN-2-OL	PYRROLIDINE
BUTYL ACETATE	GLUCOSE	N-METHYL-PHENETHYLAMINE	PYROXIDINE
BUTYL BUTYRATE	GLUTAMIC ACID	GAMMA-METHYL-PROLINE	PYRUVIC ACID
BUTYL CAPROATE	GLUTAMINE	2-METHYL-PROPEN-1-AL	QUERCETIN
BUTYL PROPIONATE	GLYCERIC ACID	METHYL-VINYL KETONE	QUERCETIN-ARABINOSIDE
BUTYL VALERIANATE	GLYCINE	MEVALONIC ACID	QUERCETIN-3-O-ALPHA-GALACTO-
I-BUTYL OCTANOATE	GLYCOLIC ACID	MOLYBDENUM	SIDE
I-BUTYL PROPIOANTE	GLYOXYLIC ACID	MONOGALACTOSYL-DIGLYCERIDE	QUERCETIN-3-RHAMNOGLUCOSIDE
N-BUTYL-DECANOATE	HEMICELLULOSE	MUFA	QUERCETIN-3-RUTINOSIDE
N-BUTYL-FORMATE	HEPTACOSANE	MYRISTIC ACID	QUERCETIN-3-O-XYLOSIDE
N-BUTYL-N-HEXANOATE	N-HEPTANOIC ACID	NEOCHLOROGENIC ACID	QUERCITRIN
N-BUTYL-OCTANOATE	HEPTENOIC ACID	NEOXANTHIN	L-QUINIC ACID
N-BUTYL-PROPIONATE	2-HEPTANOL	NIACIN	REYNOUTRIN
CADMIUM	N-HEPTANOL	NICKEL	RIBOFLAVIN
CAFFEETANNIN	N-HEX-1-EN-3-OL	NITROGEN	RUBIDIUM
CAFFEIC ACID	CIS-N-HEX-3-EN-1-OL	NONA-COSANE	RUTIN
CALCIUM	TRANS-N-HEX-2-EN-1-OL	D-L-NONACOSANOL	SELENIUM
CALCIUM-OXALATE	TRANS-N-HEX-3-EN-1-OL	N-NONANOIC ACID	SERINE
CAPROALDEHYDE	HEXACOSANOL	N-NONANOL-2-NONANOL	SFA
CAPROIC ACID-AMYL-ESTER	2-HEXENAL	NONENOIC ACID	SHIKIMIC ACID
CAPRYLIC-ESTER	TRANS-2-HEXENOIC ACID	1-NONYL ACETATE	SILICON
CARBOHYDRATE	HEXYL ACETATE	OCTACOSANOL	SILVER
BETA-CAROTENE	HEXYL BUTYRATE	N-OCTANONE	SINAPIC ACID
CAROTENOIDS	HEXYL FORMATE	N-OCTANOL-2-OCTANOL	SODIUM
CATALASE	N-HEXYL-N-HEXANOATE	OCTENOIC ACID	STEARIC ACID
D-CATECHIN	N-HEXYL OCTANOATE	1-OCTYL ACETATE	STRONTIUM
CHLOROGENIC ACID	N-HEXYL PROPIONATE	OLEIC ACID	SUCCINIC ACID
CHLOROPHYLL	HISTIDINE	OXALIC ACID	SUCROSE
CHROMIUM	P-HYDROXYBENZOIC ACID	OXALOOACETIC ACID	SUGAR
CITRIC ACID	HYDROXYCINNAMIC ACID	ALPHA-OXOGLUTARIC ACID	SULFUR
CITRAMALIC ACID	4-HYDROXYMETHYLPROLINE	PALMITIC ACID	THIAMIN
COBALT	3-HYDROXYOCTYL-BETA-D-GLUCO-	PALMITOLEIC ACID	THREONINE
COPPER	SIDE	PANTOTHENIC ACID	TITANIUM
COUMARIC ACID	HYPERIN	PECTASE	ALPHA-TOCOPHEROL
P-COUMARIC ACID	HYPEROSIDE	PECTIN	TRIACOTANOL
N-COUMARYL-QUINIC ACID	IDAENIN	PECTIN-DEMETHOXYXYLASE	TRIGLYCERIDE
P-COUMARYL-QUINIC ACID	INOSITOL	N-PENTANOIC ACID	1,3,3-TRIMETHYL-DIOXA-2,7-BICY-
CUTIN	IODINE	1-PENTANOIC ACID	CLO(2,2,1)HEPTANE
CYANIDIN-3-ARABINOSIDE	IRON	PENTANOL	TRYPTOPHAN
CYANIDIN-7-ARABINOSIDE	ISOAMYL BUTYRATE	1-PENTANOL	TYROSINE
CYANIDIN-3-GALACTOSIDE	ISOAMYL PROPIONATE	2-PENTANOL	URONIC ACID
CYSTINE	ISOBUTYL ACETATE	3-PENTANOL	URSOLIC ACID
I-DECANOIC ACID	ISOBUTYL BUTYRATE	N-PENTENOIC ACID	VALINE
N-DECANOL	ISOBUTYL-FORMATE	N-PENTYL-AMINE	VITAMIN B6
DECENOIC ACID	ISOCITRIC ACID	PENTYL-BUTYRATE	VOMIROLLOL-1-O-BETA-D-GLUCOPY-
I-DECYL ACETATE	ISOLEUCINE	N-PENTYL-FORMATE	RANOSIDE
DEHYDROASCORBIC ACID	ISOPROPYL BUTYRATE	1-PENTYL-FORMATE	WATER
DIASTASE	ISOQUERCITRIN	PENTYL-HEXANOATE	XYLOSE
DIETHYLAMINE	JASMONIC ACID	N-PENTYL-2-METHYLBUTYRATE	ZINC
DIGALACTOSYL-DIGLYCERIDE	KILOCALORIES	1-PENTYL-1-PENTANOATE	ZIRCONIUM
DIHYDROXYTRICARBALLYLIC ACID	LACTIC ACID	N-PENTYL-OCTANOATE	

Reference: Duke, J.A., *Malus domestica* Borkh. *Handbook of Phytochemical Constituents of GRAS Herbs and Other Economic Plants*, CRC Press, 2001, Boca Raton, FL.