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Volatile Chemical Emissions from Essential Oils with Therapeutic Claims

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Abstract

Essential oils emit many volatile organic compounds (VOCs), with some considered potentially hazardous. However, little is known about specific emissions from essential oils that make therapeutic claims for health and well-being. This study investigated VOCs emitted from 14 commercially available essential oils with therapeutic claims, such as beneficial for coughs, colds, flus, relaxation, sleep, tension, headaches, stress, or skin irritation. The essential oils were selected from different brands and types, such as tea tree oil, lavender oil, eucalyptus oil, geranium oil, peppermint oil, bergamot oil, orange oil, and oil blends. Analyses were performed using headspace gas chromatography/mass spectrometry (GC/MS). The analyses found 1,034 VOCs emitted from the 14 essential oils, representing 378 VOC identities. The most prevalent VOCs (in more than 90% of the oils) were acetaldehyde, alpha-phellandrene, alpha-pinene, camphene, limonene, methanol, terpinolene, 3-carene, acetone, beta-phellandrene, ethanol, and gamma-terpinene. Among the 1,034 VOCs emitted, 251 VOCs, representing 60 VOCs identities, are classified as potentially hazardous. The most prevalent potentially hazardous VOCs were acetaldehyde, limonene, methanol, acetone, ethanol, and 3-carene. Toluene was found in more than 70% of the essential oils. Each of the essential oils emitted 9 or more potentially hazardous VOCs. Fewer than 1% of all VOCs identified and fewer than 1% of all potentially hazardous VOCs were listed on any essential oil label, safety data sheet, or website. Results from this study provide new findings on VOC emissions from essential oils with therapeutic claims, which can help to improve public awareness about potential exposures and risks.

Keywords: essential oils, therapeutic, emissions, volatile organic compounds, hazardous compounds, fragrance, ingredients

Introduction

Essential oils with therapeutic claims are widely used in many public and private places for different purposes, such as aromatherapy, antibacterial effects, and alleviation of cold and flu symptoms. Essential oils, such as tea tree oil, lavender oil, eucalyptus oil, peppermint oil, and orange oil, are complex mixtures of many different compounds (e.g., Milhem et al. 2020; Nematollahi et al. 2018a; Huang et al. 2012).

Numerous studies have examined potential health benefits of essential oils. For example, Shaaban et al. (2012) reviewed bioactivities associated with essential oils, including antibacterial, antiviral, anti-inflammatory, and additional properties. More specifically, Cavanagh and Wilkinson (2002) reviewed the physiological and psychological effects associated with lavender oil.

However, relatively few studies have examined potential hazards of essential oils. Exposure to essential oils has been associated with adverse health effects such as skin irritation and allergic contact dermatitis (Sarkic and Stappen 2018). Milhem et al. (2020) detailed negative effects of essential oils on indoor air quality.

Further, relatively few studies have analyzed VOCs emitted from commercially available essential oils. In prior analyses of essential oils, Nematollahi et al. (2018a) found the most prevalent VOCs (emitted from more than 70% of 24 oils) were alpha-pinene, limonene, and acetone. Chiang et al. (2010) found the most prevalent (>40% of 5 oils) were limonene, eucalyptol, and camphor. Francis and Stusdal (2014) found the most prevalent (>70% of 3 oils) were beta-pinene, p-cymene, limonene, menthone, menthofuran, neomenthol, menthol, 4-terpineol, menthyl acetate, and β-bourbonene. Chiu et al. (2009) found the most prevalent (>60% of 5 oils) were limonene, eucalyptol, heneicosane, and alpha-terpineol. Thus, commonly emitted compounds were terpenes (e.g., limonene, beta-pinene, and alpha-pinene).

Despite this prior work, little information exists on the specific VOCs, including potentially hazardous compounds, emitted from commercially available essential oils that make therapeutic claims for health and well-being.

This study investigates VOCs emitted from 14 therapeutic essential oils, with four main objectives: (1) to analyze VOC emissions from individual essential oils with therapeutic claims, (2) to identify VOCs classified as potentially hazardous, (3) to determine the most prevalent VOCs and potentially hazardous VOCs, and (4) to compare differences between the VOCs emitted and the ingredients listed on essential oil labels, safety data sheets, and manufacturers' websites.

Materials and Methods

For this study, a set of 14 essential oils were analyzed, representing different brands and aromas, including lavender oil, eucalyptus oil, tea tree oil, geranium oil, peppermint oil, bergamot oil, orange oil, and oil blends. Essential oils were selected based on claims of therapeutic benefits, such as the following: alleviates symptoms of colds, coughs, and flus; provides calming and relaxing effects; eases tension, headaches, stress, anxiety, depression, and anger; offers a natural antiseptic; soothes irritated skin; and promotes peaceful sleep for both adults and babies. Essential oils in this study were purchased from aromatherapy stores, supermarkets, pharmacies, and organic stores, in both Australia and the United States.

Headspace GC/MS was used to analyze VOCs emitted from the essential oils using a capillary column and an automated injection system. Details about the analytic methods are provided in Nematollahi et al. (2018b).

"Potentially hazardous VOCs were identified according to classifications of (i) hazardous air pollutants (HAPs), United States Environmental Protection Agency (EPA 2017), including carcinogenic HAPs (EPA 2018), (ii) Hazardous Chemical Information System (HCIS), Safe Work Australia (SWA 2020), and (iii) asthmagens, Association of Occupational and Environmental Clinics (AOEC 2020)" following Steinemann (et al. 2020). This classification approach, however, is not intended as an assessment of safety or hazard from use of the essential oils.

Results and Discussion

VOCs emitted

The VOCs emitted from this group of essential oils are summarized in Table 1. In this paper: "The term 'VOC occurrences' refers to the number of individual VOCs emitted from the products, such that each VOC occurrence represents a single volatile ingredient in a single product. The term 'VOC identities' refers to the number of distinctly named VOCs emitted from the products, such that each VOC identity represents a compound, according to name and CAS number, that occurs in one or more of the products" following Steinemann et al. (2020).

Among the 14 essential oils, 1,034 VOC occurrences, representing 378 VOC identities, were emitted. Each essential oil emitted between 40 to 116 VOCs. Detailed information about the VOCs emitted from each of the essential oils is provided in Supplementary Tables 1 and 2.

Most prevalent VOCs

Among the 14 essential oils, the most prevalent VOCs (in more than 90% of all essential oils) were acetaldehyde, alpha-phellandrene, alpha-pinene, camphene, limonene, methanol, terpinolene, 3-carene, acetone, beta-phellandrene, ethanol, and gamma-terpinene (Table 2).

Potentially hazardous emissions

All essential oils emitted at least 9 VOCs classified as potentially hazardous, and 50% of the oils emitted at least 20 potentially hazardous VOCs (Supplementary Table 1). Among the 14 essential oils, the most prevalent potentially hazardous VOCs (in more than 90% of all essential oils) were acetaldehyde, limonene, methanol, acetone, ethanol, and 3-carene (Table 3). To note, acetaldehyde, limonene and methanol were emitted from all of the essential oils.

Regulatory classifications

Among the 1,034 VOCs emitted, 251 VOC occurrences (60 VOC identities) are classified as potentially hazardous under one or more criteria (Table 3). Specifically, among the 251 VOCs: 225 VOCs (56 identities) are classified as potentially hazardous under Safe Work Australia (SWA 2020); 65 VOCs (11 identities) under California Proposition 65 (OEHHA 2020); 55 VOCs (8 identities) as Hazardous Air Pollutants (EPA 2017), including 15 VOCs (2 identities) as carcinogenic HAPs (EPA 2018); and 15 VOCs (2 identities) as asthmagens under the Association of Occupational and Environmental Clinics (AOEC 2020).

Listing of ingredients

Among all the 1,034 VOC occurrences, only 9 VOCs were listed on any essential oil label, safety data sheet, or website. Thus, fewer than 1% of all identified VOCs were disclosed. Moreover, among all the 251 VOCs classified as potentially hazardous, only 1 VOC was listed, on a website. Thus, fewer than 1% of all identified potentially hazardous VOCs were disclosed.

Conclusions

This study analyzed VOC emissions from a variety of 14 essential oils that make therapeutic claims. The analyses found the oils collectively emitted 1,034 VOCs, representing 378 VOC identities. Among these emissions, 251 VOCs, representing 60 VOC identities, are classified as potentially hazardous. The most prevalent VOCs emitted (in all 14 oils) were acetaldehyde, alpha-phellandrene, alpha-pinene, camphene, limonene, methanol, and terpinolene. The most prevalent potentially hazardous VOCs emitted (in all 14 oils) were acetaldehyde, limonene, and methanol. Results from this study provide new information on volatile compounds emitted from therapeutic essential oils, which can help to improve public awareness about potential exposures and risks.

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Table 1: VOCs emitted from the 14 essential oils *

	Emitted		Listed (on product label, safety data sheet, or website)	
Number of essential oils	All emitted VOCs	Potentially hazardous VOCs	All listed VOCs	Potentially hazardous VOCs
14	1,034 occurrences 378 identities	251 occurrences 60 identities	9 occurrences 8 identities	1 occurrence 1 identity

*"VOC occurrences" refers to the number of individual VOCs emitted from the essential oils.
"VOC identities" refers to the number of unique VOCs emitted from one or more of the essential oils.

Table 2: Most prevalent VOCs emitted from the 14 essential oils

Compound	CAS #	Prevalence (# of Products)
Acetaldehyde*	75-07-0	14
alpha-Phellandrene	99-83-2	14
alpha-Pinene	80-56-8	14
Camphene	79-92-5	14
Limonene*	138-86-3	14
Methanol*	67-56-1	14
Terpinolene	586-62-9	14
3-Carene*	13466-78-9	13
Acetone*	67-64-1	13
beta-Phellandrene	555-10-2	13
Ethanol*	64-17-5	13
gamma-Terpinene	99-85-4	13
alpha-Terpineol	98-55-5	12
beta-Pinene	127-91-3	12
Isovaleraldehyde	590-86-3	12
Linalool	78-70-6	12
beta-Myrcene*	123-35-3	11
Isobutyraldehyde	78-84-2	11
1,1-Dimethylallyl alcohol	115-18-4	10
2-Methylfuran	534-22-5	10
3-Methylfuran	930-27-8	10
beta-trans-Ocimene	3779-61-1	10
Toluene*	108-88-3	10
Caryophyllene	87-44-5	9
Eucalyptol	470-82-6	9
Pentane*	109-66-0	9

*Classified as potentially hazardous

Table 3: Potentially hazardous VOCs emitted from the 14 essential oils

Compound	CAS #	Prevalence (# of Products)	SWA	Prop65	HAPs	Asthmagens
Acetaldehyde**	75-07-0	14	✓	✓	✓	
Limonene	138-86-3	14	✓			
Methanol	67-56-1	14	✓	✓	✓	
Acetone	67-64-1	13	✓			
Ethanol	64-17-5	13	✓			
3-Carene	13466-78-9	13				✓
beta-Myrcene	123-35-3	11		✓		
Toluene	108-88-3	10	✓	✓	✓	
Pentane	109-66-0	9	✓			
2-Methylpropan-1-ol	78-83-1	8	✓			
Butanone	78-93-3	8	✓			
Ethyl acetate	141-78-6	8	✓			
2-Methyl-1-propene	115-11-7	7	✓			
Isopropyl alcohol	67-63-0	7	✓			
Methyl acetate	79-20-9	7	✓			
1-Hexanol	111-27-3	6	✓			
Methyl isobutyl ketone	108-10-1	6	✓	✓	✓	
Propanal	123-38-6	6	✓		✓	
Butyl butyrate	109-21-7	5	✓			
Methyl formate	107-31-3	5	✓			
Ethyl formate	109-94-4	4	✓			
Fenchyl alcohol	1632-73-1	4	✓			
2,4-Dimethylhexane	589-43-5	3	✓			
2-Methylpropyl ester	110-19-0	3	✓			
3-Methylhexane	589-34-4	3	✓			
Butane	106-97-8	3	✓			
Butyl acetate	123-86-4	3	✓			
Hexane	110-54-3	3	✓	✓	✓	
Isopentane	78-78-4	3	✓			
(Z)-but-2-ene	590-18-1	2	✓			
2-Butanol	78-92-2	2	✓			
2-Butene	107-01-7	2	✓			
2-Methylpentane	107-83-5	2	✓			
Isoamyl acetate	123-92-2	2	✓			
Isoprene (stabilised)	78-79-5	2	✓	✓		
Tetracarbonylnickel	13463-39-3	2	✓	✓		✓
(E)-citral	141-27-5	1	✓			
(R)-(−)-2-butanol	14898-79-4	1	✓			
1-Heptanol	111-70-6	1	✓			

1-Methoxy-2-propanol	107-98-2	1		✓		
1-Octanol	111-87-5	1		✓		
2,2-Dimethylbutane	75-83-2	1		✓		
2,3,4-Trimethylpentane	565-75-3	1		✓		
2-Methoxy-1-methylethyl acetate	108-65-6	1		✓		
2-Methylbutyl acetate	624-41-9	1		✓		
3-Ethyl-3-methylpentane	1067-08-9	1		✓		
3-Methylpentane	96-14-0	1		✓		
3-Pentanone	96-22-0	1		✓		
Acetaldehyde diethyl acetal	105-57-7	1		✓		
Benzene***	71-43-2	1		✓	✓	✓
Butyl formate	592-84-7	1		✓		
Butyraldehyde	123-72-8	1		✓		
Furan	110-00-9	1		✓	✓	
Isobutyl methacrylate	97-86-9	1		✓		
Isopentyl formate	110-45-2	1		✓		
Isopropyl propionate	637-78-5	1		✓		
Methyl isopropyl ketone	563-80-4	1		✓		
sec-Butyl acetate	105-46-4	1		✓		
(R)-(+)-pulegone	89-82-7	1			✓	
Dimethyl phthalate	131-11-3	1				✓

SWA: Safe Work Australia (SWA) contains a Hazardous Chemical Information System ("HCIS") with a database of chemicals and hazard classifications (SWA 2020).

Prop65: California Proposition 65 (OEHHA 2020)

HAPs: Hazardous Air Pollutants (HAPs), United States Environmental Protection Agency (EPA 2017), including carcinogenic HAPs (EPA 2018)
**Classified as possibly carcinogenic (2B) (EPA 2018)
*** Classified as carcinogenic (1) (EPA 2018)

Asthmagens: Association of Occupational and Environmental Clinics (AOEC 2020)

Supplementary Table 1: VOC occurrences among essential oils (n=14)

1. Lavender essential oil

Compounds	**CAS#**
Linalool	78-70-6
Limonene*	138-86-3
Linalyl acetate	115-95-7
(Z)-beta-ocimene	3338-55-4
3-Octanone	106-68-3
Acetone*	67-64-1
beta-Myrcene*	123-35-3
(−)-Terpinen-4-ol	20126-76-5
Hexyl methyl ether	4747-07-3
alpha-Pinene	80-56-8
Isovaleraldehyde	590-86-3
Methanol*	67-56-1
Hexyl acetate	142-92-7
Lavandulyl acetate	25905-14-0
Camphene	79-92-5
1-Octen-3-yl-acetate	2442-10-6
alpha-Phellandrene	99-83-2
beta-Phellandrene	555-10-2
Caryophyllene	87-44-5
Isobutyraldehyde	78-84-2
3-Carene*	13466-78-9
2-Methylbutyraldehyde	96-17-3
3-Methylfuran	930-27-8
Acetaldehyde*	75-07-0
2-Methyl-1-propene*	115-11-7
2,3-Pentadiene	591-96-8
gamma-Terpinene	99-85-4
o-Cymene	527-84-4
Ethanol*	64-17-5
alpha-Terpineol	98-55-5
2-Methyl-1-butene	563-46-2
Butyl butyrate*	109-21-7
2-Methylfuran	534-22-5
1-Octen-3-ol	3391-86-4
Neryl acetate	141-12-8
1,1-Dimethylallyl alcohol	115-18-4
Butyl methyl ether	628-28-4
Hexyl butyrate	2639-63-6
Borneol	10385-78-1
Terpinolene	586-62-9
Butyl acetate*	123-86-4
beta-trans-Ocimene	3779-61-1
3-Octanol	589-98-0

trans-β-Farnesene	18794-84-8
2-Ethylfuran	3208-16-0
(+)-Camphor	464-49-3
Sabinene	3387-41-5
(4E,6Z)-2,6-dimethylocta-2,4,6-triene	7216-56-0
Toluene*	108-88-3
trans-2-Methyl-1,3-pentadiene	926-54-5
Dimethyl sulfide	75-18-3
cis-1,2-Dimethylcyclopropane	930-18-7
(E)-linalool oxide (furanoid)	34995-77-2
1-Hexanol*	111-27-3
Pentane*	109-66-0
alpha-Santalene	512-61-8
Geranyl acetate	105-87-3
Isopropyl alcohol*	67-63-0
Methyl acetate*	79-20-9
4-Isopropyl-2-cyclohexenone	500-02-7
Bornyl acetate	76-49-3
Isoamyl alcohol	123-51-3
Iso-propylcyclopropane	3638-35-5
Butanone*	78-93-3
cis-3-Hexene-1-ol	928-96-1
3,7-dimethyl-2,6-octadienyl isobutyrate	2345-26-8
Hexyl isobutyrate	2349-07-7
(E)-sabinene hydrate	17699-16-0
2-Octynoic acid	5663-96-7
Propanal*	123-38-6
8-Isopropyl-1-methyl-5-methylene-1,6-cyclodecadiene	23986-74-5
2,7-Dimethyloxepine	1487-99-6
Hexyl propionate	2445-76-3
Butyl isobutyrate	97-87-0
2-Methylpropan-1-ol*	78-83-1
cis-3-Hexenyl butyrate	16491-36-4
2-Methyl-1-butanol	34713-94-5
Methyl isobutyl ketone*	108-10-1
Methacrolein	78-85-3
(E,E)-1,3,5-Undecatriene	19883-29-5
(Z)-sabinene hydrate	15537-55-0
2,5-Dimethylfuran	625-86-5
alpha-Bergamotene	17699-05-7
Ethyl acetate*	141-78-6
2,3-Dimethylcyclohexan-1-ol	1502-24-5
Butylbenzene	104-51-8
Butyl propionate	590-01-2
(Z)-1-methoxyhex-3-ene	70220-06-3
cis-4-Methyl-2-Pentene	691-38-3
Butyraldehyde*	123-72-8

2,2,3-Trimethylhexane	16747-25-4
gamma-Muurolene	30021-74-0
Nerol oxide	1786-08-9
3,4-Dimethyl-2,4,6-octatriene	57396-75-5
cis-Hexatriene	2612-46-6
3-Hexanone	589-38-8
Hexyl 2-methylbutanoate	10032-15-2
Phenyl butyrate	4346-18-3
alpha-Humulene	6753-98-6
3,4,4-Trimethyl-2-cyclopenten-1-one	30434-65-2
1-Butyne	107-00-6
Cyclobutane	287-23-0
p,α-Dimethylstyrene	1195-32-0
Tetracarbonylnickel*	13463-39-3
1-Pentene	109-67-1

*Classified as potentially hazardous

2. Geranium essential oil

Compounds	**CAS#**
alpha-Pinene	80-56-8
Citronellyl formate	105-85-1
Menthone	10458-14-7
Linalool	78-70-6
β-Citronellol	106-22-9
Acetone*	67-64-1
Geranyl acetate	105-87-3
Aristolene	6831-16-9
7-Methyl-1,6-octadiene	42152-47-6
Geraniol	106-24-1
(+)-Isomenthone	1196-31-2
Limonene*	138-86-3
Isoprene (stabilised)*	78-79-5
Dimethyl sulfide	75-18-3
3-Methyl-1-cyclopentene	1120-62-3
beta-Myrcene*	123-35-3
3-Methylfuran	930-27-8
2-Methylfuran	534-22-5
Methyl formate*	107-31-3
(Z)-rose oxide	16409-43-1
alpha-Phellandrene	99-83-2
beta-Bourbonene	5208-59-3
Caryophyllene	87-44-5
(Z)-beta-ocimene	3338-55-4
2,5-Dimethylhex-5-en-3-yn-2-ol	2696-26-6
2-Pentanone	107-87-9
o-Cymene	527-84-4
Isobutyraldehyde	78-84-2
beta-Phellandrene	555-10-2
alpha-Pinene oxide	1686-14-2
trans-2-Methyl-1,3-pentadiene	926-54-5
alpha-Copaene	3856-25-5
Cyclofenchene	488-97-1
Ethyl formate*	109-94-4
cis-4-Methyl-2-Pentene	691-38-3
Isovaleraldehyde	590-86-3
Butyl propionate	590-01-2
Neryl acetate	141-12-8
3-Allylcyclohexene	15232-95-8
Acetaldehyde*	75-07-0
2,4-Dimethylhexane*	589-43-5
Pentane*	109-66-0
8-Isopropyl-1-methyl-5-methylene-1,6-cyclodecadiene	23986-74-5
2,2,6-Trimethyl-6-vinyltetrahydropyran	7392-19-0

5-Methyl-1,4-hexadiene	763-88-2
Isopentyl formate*	110-45-2
3-Carene*	13466-78-9
1-Cyclopropyl-1-pentanol	4379-16-2
Toluene*	108-88-3
6-Methyl-5-hepten-2-one	110-93-0
2,7-Dimethyloxepine	1487-99-6
2-Methyl-1-propene*	115-11-7
cis-3,7-Dimethyl-2,6-octadien-1-ol	106-25-2
1-Methyl-3-isopropylcyclopentane	53771-88-3
alpha-Gurjunene	489-40-7
Methanol*	67-56-1
3-Undecyne	60212-30-8
2,6-Dimethyl-3-heptene	2738-18-3
(E)-linalool oxide (furanoid)	34995-77-2
Vinylcyclohexane	695-12-5
trans-3,4-Dimethyl-2-pentene	4914-92-5
Acetylcyclohexane	823-76-7
2-(1,1-Dimethyl-2-propenyl)-1,1-dimethylcyclopropane	81051-15-2
beta-Cadinene	523-47-7
Terpinolene	586-62-9
Geranyl propionate	105-90-8
Ethanol*	64-17-5
3-Methyl-1-pentanol	589-35-5
Methyl isobutyl ketone*	108-10-1
Acetaldol	107-89-1
alpha-Terpineol	98-55-5
1-Methyl-3-propylcyclooctane	255885-37-1
alpha-Bergamotene	17699-05-7
alpha-Terpinene	99-86-5
Isoamyl alcohol	123-51-3
Camphene	79-92-5
Citronellyl acetate	150-84-5
3-Methylcrotonaldehyde	107-86-8
Butanone*	78-93-3
Carane, 4,5-epoxy-, trans	6909-20-2
Isopropylidenecyclohexane	5749-72-4
2,5-Dimethylfuran	625-86-5
D,L-Menthol	15356-70-4
alpha-Humulene	6753-98-6
Butyl formate*	592-84-7
1,2,3-Trimethylcyclopentene	473-91-6
Isopentane*	78-78-4
(+)-Sativene	3650-28-0
3-Methyl-2-cyclopenten-1-one	2758-18-1
2-Methyl-2-butene	513-35-9
Hexane*	110-54-3

Geranyl butyrate	106-29-6
Citronellyl propionate	141-14-0
Phenethyl butyrate	103-52-6
(Z)-linalool oxide (furanoid)	5989-33-3
(−)-α-Cubebene	17699-14-8
cis-3-Hexene-1-ol	928-96-1
2-Bromocyclooctanone	39261-18-2
Bicyclo[4.1.0]hept-2-ene	2566-57-6
Myrtanyl acetate	29021-36-1
gamma-Terpinene	99-85-4
2-Methylpropan-1-ol*	78-83-1
1,3-Cyclohexadiene	592-57-4
Citronellyl butyrate	141-16-2
1-Acetyl-2-methyl-1-cyclopentene	3168-90-9
Hexyl formate	629-33-4
Allyl nonanoate	7493-72-3
β-Selinene	17066-67-0
Perillen	539-52-6
(±)-2-Methyl-1-butanol	137-32-6
Propanal*	123-38-6
(±)-Citronellal	106-23-0
2-Methylpentane*	107-83-5
1-Acetyl-1-cyclohexene	932-66-1
1,3-Dimethyl cyclohexene	2808-76-6
(4E)-4-Hexenyl acetate	72237-36-6

*Classified as potentially hazardous

3. Bergamot essential oil

Compounds	**CAS#**
Limonene*	138-86-3
beta-Pinene	127-91-3
gamma-Terpinene	99-85-4
Linalyl acetate	115-95-7
alpha-Pinene	80-56-8
Linalool	78-70-6
beta-Phellandrene	555-10-2
Vinyl methacrylate	4245-37-8
alpha-Thujene	2867-05-2
2,4,6-Trimethyl-2,4,6-triphenyl-1,3,5,2,4,6-trioxatrisilinane	546-45-2
Terpinolene	586-62-9
beta-trans-Ocimene	3779-61-1
alpha-Terpinene	99-86-5
beta-Thujene	28634-89-1
Camphene	79-92-5
Ethyl acetate*	141-78-6
Acetone*	67-64-1
Lavandulyl acetate	25905-14-0
alpha-Phellandrene	99-83-2
Ethanol*	64-17-5
Isopropyl alcohol*	67-63-0
alpha-Terpineol	98-55-5
(E)-sabinene hydrate	17699-16-0
Octanal	124-13-0
Neryl acetate	141-12-8
Octyl acetate	112-14-1
(E)-citral*	141-27-5
Caryophyllene	87-44-5
6-Methyl-5-hepten-2-one	110-93-0
alpha-Bergamotene	17699-05-7
Nonanal	124-19-6
Acetaldehyde*	75-07-0
(Z)-sabinene hydrate	15537-55-0
4-Terpineol	562-74-3
Decanal	112-31-2
Methanol*	67-56-1
3-Methylhexane*	589-34-4
beta-Bisabolene	495-61-4
1,1-Dimethylallyl alcohol	115-18-4
Hexanal	66-25-1

*Classified as potentially hazardous

4. Tea tree essential oil

Compounds	**CAS#**
Acetone*	67-64-1
alpha-Pinene	80-56-8
beta-Pinene	127-91-3
beta-Myrcene*	123-35-3
Limonene*	138-86-3
beta-Phellandrene	555-10-2
4-Terpineol	562-74-3
gamma-Terpinene	99-85-4
4-Carene	29050-33-7
(S)-cis-Verbenol	18881-04-4
Butyl butyrate*	109-21-7
3-Methylfuran	930-27-8
Eucalyptol	470-82-6
alpha-Phellandrene	99-83-2
Ocimenol	5986-38-9
Hexyl butyrate	2639-63-6
2-Methylfuran	534-22-5
Alloaromadendrene	25246-27-9
(+)-Ledene	21747-46-6
delta-Cadinene	483-76-1
Butane*	106-97-8
Acetaldehyde*	75-07-0
alpha-Gurjunene	489-40-7
Ethyl acetate*	141-78-6
3,4,4-Trimethyl-2-cyclopenten-1-one	30434-65-2
2-(1,1-Dimethyl-2-propenyl)-1,1-dimethylcyclopropane	81051-15-2
Methanol*	67-56-1
Diethyl phthalate	84-66-2
Ethanol*	64-17-5
Citronellyl acetate	150-84-5
Toluene*	108-88-3
Methyl 4-methylvalerate	2412-80-8
alpha-Thujene	2867-05-2
Dimethyl phthalate*	131-11-3
Methyl (S)-2-methylbutanoate	53955-81-0
trans-2-Hexen-1-al	6728-26-3
2,6-Dimethylhepta-1,5-diene	6709-39-3
3-Carene*	13466-78-9
Methyl formate*	107-31-3
cis-1,2-Dimethylcyclopropane	930-18-7
Methyl 3-methylvalerate	2177-78-8
m-Cymene	535-77-3
beta-trans-Ocimene	3779-61-1
2-Methyl-2-(4-methylpent-3-en-1-	98678-70-7

yl)cyclopropylmethanol	
2-Hexyne	764-35-2
Camphene	79-92-5
3,5-Heptadienal, 2-ethylidene-6-methyl-	99172-18-6
2-(2-Methyl-1-propenyl)bicyclo[2.2.1]heptane	61142-27-6
(Z)-rose oxide	16409-43-1
trans-2-Methyl-1,3-pentadiene	926-54-5
Furan*	110-00-9
Isovaleraldehyde	590-86-3
3-Ethyl-2,2-dimethyloxirane	1192-22-9
2,3,5-Trimethyl-1,3-hexadiene	61142-34-5
Terpinolene	586-62-9
Isobutyraldehyde	78-84-2
cis-4-Methyl-2-Pentene	691-38-3
sec-Butyl acetate*	105-46-4
(E)-linalool oxide (furanoid)	34995-77-2
Pentane*	109-66-0
2-Methylbutyraldehyde	96-17-3
2-Ethylfuran	3208-16-0
1,1,2-Trimethylcyclopentane	4259-00-1
3-Octyne	15232-76-5
Isopulegol	7786-67-6
Ethyl formate*	109-94-4
2-Methoxy-1-methylethyl acetate*	108-65-6
3-Methylcrotonaldehyde	107-86-8
1-hydroxy-2-nitrocyclohexane-1-carboxylic acid	149695-77-2
Perillen	539-52-6
2-Methyl-1-propene*	115-11-7
Isopropyl propionate*	637-78-5
Ethyl butyrate	105-54-4
Hexanal	66-25-1
Methyl valerate	624-24-8
3-Methylcyclopentanol	18729-48-1
4-Hexen-1-ol, acetate	72237-36-6
Lavandulyl acetate	25905-14-0
Isopropyl butyrate	638-11-9
Methyl 3-methyl-2-butenoate	924-50-5

*Classified as potentially hazardous

5. Eucalyptus essential oil

Compounds	**CAS#**
Eucalyptol	470-82-6
alpha-Pinene	80-56-8
Limonene*	138-86-3
m-Cymene	535-77-3
beta-Pinene	127-91-3
gamma-Terpinene	99-85-4
3-Carene*	13466-78-9
alpha-Thujene	2867-05-2
alpha-Terpineol	98-55-5
Ethanol*	64-17-5
beta-Myrcene*	123-35-3
4-Carene	29050-33-7
alpha-Phellandrene	99-83-2
Camphene	79-92-5
4-Terpineol	562-74-3
Acetone*	67-64-1
beta-Phellandrene	555-10-2
Isovaleraldehyde	590-86-3
Linalyl isobutyrate	78-35-3
(+)-Camphene	5794-03-6
Isoamyl alcohol	123-51-3
2,4-Thujadiene	36262-09-6
Terpinolene	586-62-9
Methanol*	67-56-1
Isoamyl acetate*	123-92-2
2-Methylbutyl acetate*	624-41-9
2-Methyl-1-propene*	115-11-7
1,4-Pentadiene	591-93-5
Isopropyl alcohol*	67-63-0
Iso-propylcyclopropane	3638-35-5
Isobutyraldehyde	78-84-2
2,3-Dimethyl-1-butene	563-78-0
1,1-Dimethylallyl alcohol	115-18-4
2-Methylpropan-1-ol*	78-83-1
2-Pentanone	107-87-9
Toluene*	108-88-3
6-Bromocycloocta-1,4-diene	23359-89-9
2,4-Dimethyl-2,4-heptadiene	74421-05-9
2-Isopropenyltoluene	7399-49-7
4-Isopropyl-2-cyclohexenone	500-02-7
Acetaldehyde*	75-07-0
2-Methyl-1-butene	563-46-2
Methacrolein	78-85-3
2-Methylfuran	534-22-5
trans-2-trans-4-Hexadiene	6108-61-8

Methyl isobutyl ketone*	108-10-1
2-Methylpropyl ester*	110-19-0
Cyclopentene,4-ethenyl-1,5,5-trimethyl	1727-69-1
(-)-trans-Pinocarveol	547-61-5

*Classified as potentially hazardous

6. Eucalyptus essential oil

Compounds	**CAS#**
Eucalyptol	470-82-6
Limonene*	138-86-3
alpha-Pinene	80-56-8
gamma-Terpinene	99-85-4
m-Cymene	535-77-3
3-Carene*	13466-78-9
beta-Pinene	127-91-3
alpha-Thujene	2867-05-2
beta-Myrcene*	123-35-3
4-Carene	29050-33-7
alpha-Terpineol	98-55-5
Terpinolene	586-62-9
Isovaleraldehyde	590-86-3
Ethanol*	64-17-5
4-Terpineol	562-74-3
beta-trans-Ocimene	3779-61-1
Acetone*	67-64-1
Pentylidenecyclopentane	53366-55-5
alpha-Pinene oxide	1686-14-2
Linalool	78-70-6
Isoamyl alcohol	123-51-3
alpha-Phellandrene	99-83-2
Methanol*	67-56-1
Camphene	79-92-5
2-Isopropenyltoluene	7399-49-7
(-)-trans-Pinocarveol	547-61-5
Linalool oxide	1365-19-1
(4E,6Z)-2,6-dimethylocta-2,4,6-triene	7216-56-0
2-Methyl-1-propene*	115-11-7
Acetaldehyde*	75-07-0
Isobutyraldehyde	78-84-2
2,3-Dimethyl-1-butene	563-78-0
2-Methylpropan-1-ol*	78-83-1
Methyl isopropyl ketone*	563-80-4
Methyl isobutyl ketone*	108-10-1
Toluene*	108-88-3
Isoamyl acetate*	123-92-2
Isobutyl butyrate	539-90-2
Butylbenzene	104-51-8
(E)-linalool oxide (furanoid)	34995-77-2
Fenchyl alcohol*	1632-73-1
Ocimene	13877-91-3
Methyl acetate*	79-20-9

*Classified as potentially hazardous

7. Peppermint essential oil

Compounds	**CAS#**
Menthone	89-80-5
Menthol	1490-04-6
Eucalyptol	470-82-6
Limonene*	138-86-3
beta-Pinene	127-91-3
alpha-Pinene	80-56-8
4,5,6,7-Tetrahydro-3,6-dimethylbenzofuran	494-90-6
beta-Phellandrene	555-10-2
Dl-Menthyl acetate	16409-45-3
D,l-Menthol	15356-70-4
m-Cymene	535-77-3
Acetone*	67-64-1
4-Carene	29050-33-7
gamma-Terpinene	99-85-4
Methanol*	67-56-1
2-Isopropylidene-5-methylcyclohexanone	15932-80-6
Caryophyllene	87-44-5
Isovaleraldehyde	590-86-3
2-Methylbutyraldehyde	96-17-3
alpha-Phellandrene	99-83-2
Camphene	79-92-5
2,5-Diethyl tetrahydrofuran	41239-48-9
alpha-Thujene	2867-05-2
Butane*	106-97-8
(R)-(+)-pulegone*	89-82-7
Isobutyraldehyde	78-84-2
2-Ethylfuran	3208-16-0
Ethanol*	64-17-5
alpha-Terpineol	98-55-5
1-Methyl-4-isopropyl-1-cyclohexen-3-one	89-81-6
3-Methylcyclohexanone	591-24-2
Terpinolene	586-62-9
3-Carene*	13466-78-9
(Z)-sabinene hydrate	15537-55-0
Acetaldehyde*	75-07-0
Neryl acetate	141-12-8
Isoamyl alcohol	123-51-3
beta-Bourbonene	5208-59-3
(±)-2-Methyl-1-butanol	137-32-6
Toluene*	108-88-3
Ethyl 2-methylbutyrate	7452-79-1
2,4-Thujadiene	36262-09-6
2-Methylfuran	534-22-5
2-Methylpropan-1-ol*	78-83-1
8-Isopropyl-1-methyl-5-methylene-1,6-	23986-74-5

cyclodecadiene	
Linalool	78-70-6
2-Methylbutyl 2-methylbutyrate	2445-78-5
3-Methylfuran	930-27-8
Pentane*	109-66-0
Butanone*	78-93-3
1,1-Dimethylallyl alcohol	115-18-4
Isopropyl alcohol*	67-63-0
Methyl acetate*	79-20-9
4,4-Dimethyl octane	15869-95-1
Methyl formate*	107-31-3
2,4-Dimethylhexane*	589-43-5
Amyl isovalerate	25415-62-7
Pentanal	110-62-3
Isopentane*	78-78-4
1-Octen-3-ol	3391-86-4
alpha-Humulene	6753-98-6
2-Butene*	107-01-7
(R)-(+)-3-methylcyclopentanone	6672-30-6
Methyl (S)-2-methylbutanoate	53955-81-0
Benzene*	71-43-2

*Classified as potentially hazardous

8. Lavender essential oil

Compounds	**CAS#**
Linalool	78-70-6
Linalyl butyrate	78-36-4
Eucalyptol	470-82-6
Limonene*	138-86-3
3-Octanone	106-68-3
(−)-Terpinen-4-ol	20126-76-5
Hexyl methyl ether	4747-07-3
alpha-Pinene	80-56-8
Acetone*	67-64-1
beta-Myrcene*	123-35-3
Hexyl acetate	142-92-7
Camphor	76-22-2
3-Carene*	13466-78-9
alpha-Phellandrene	99-83-2
Camphene	79-92-5
cis-1,2-Dimethylcyclopropane	930-18-7
Neryl acetate	141-12-8
Bicyclo[5.2.0]nonane, 2-methylene-4,8,8-trimethyl-4-vinyl-	242794-76-9
Methanol*	67-56-1
beta-Pinene	127-91-3
gamma-Terpinene	99-85-4
m-Cymene	535-77-3
1-Octen-3-yl-acetate	2442-10-6
Ocimenol	5986-38-9
Isovaleraldehyde	590-86-3
3-Octanol	589-98-0
beta-trans-Ocimene	3779-61-1
(−)-Borneol	464-45-9
beta-Phellandrene	555-10-2
Hexyl butyrate	2639-63-6
Isobutyraldehyde	78-84-2
Benzo(b)thiophene-1,1-dioxide	825-44-5
3-Methylfuran	930-27-8
2-Methylpropyl ester*	110-19-0
Butyl butyrate*	109-21-7
2-Methylbutyraldehyde	96-17-3
Terpinolene	586-62-9
Butyl methyl ether	628-28-4
2-Methyl-1-propene*	115-11-7
trans-β-Farnesene	18794-84-8
Acetaldehyde*	75-07-0
Ethanol*	64-17-5
2-Ethylfuran	3208-16-0
2-Methylfuran	534-22-5

1-Hexanol*	111-27-3
4-Methyl-1,3-pentadiene	926-56-7
1,1-Dimethylallyl alcohol	115-18-4
Linalool oxide	1365-19-1
Toluene*	108-88-3
trans-1,2-Dimethylcyclopropane	2402-06-4
1-Octen-3-ol	3391-86-4
Pentane*	109-66-0
Methacrolein	78-85-3
4,4,6,6-Tetramethylbicyclo[3.1.0]hex-2-ene	19487-09-3
Hexyl isobutyrate	2349-07-7
Isopropyl alcohol*	67-63-0
Butyl isobutyrate	97-87-0
(Z)-sabinene hydrate	15537-55-0
Geranyl acetate	105-87-3
alpha-Santalene	512-61-8
1-Methyl-3-(2-methylcyclopropyl)cyclopropene	61142-26-5
4-Isopropyl-2-cyclohexenone	500-02-7
Methyl acetate*	79-20-9
Iso-propylcyclopropane	3638-35-5
Methyl isobutyl ketone*	108-10-1
2,3,4-Trimethylhexane	921-47-1
cis-3-Hexene-1-ol	928-96-1
2,7-Dimethyloxepine	1487-99-6
Lavandulyl acetate	25905-14-0
8-Isopropyl-1-methyl-5-methylene-1,6-cyclodecadiene	23986-74-5
Methyl butyrate	623-42-7
3-Hexanone	589-38-8
Butyl propionate	590-01-2
Hexyl propionate	2445-76-3
1-Pentene	109-67-1
Propanal*	123-38-6
Butanone*	78-93-3
Ethyl acetate*	141-78-6
2-Methylpropan-1-ol*	78-83-1
cis-Hexatriene	2612-46-6
2,5-Dimethylfuran	625-86-5

*Classified as potentially hazardous

9. Mix essential oil

Compounds	**CAS#**
Eucalyptol	470-82-6
Propylene glycol	57-55-6
alpha-Pinene	80-56-8
Limonene*	138-86-3
beta-Pinene	127-91-3
gamma-Terpinene	99-85-4
m-Cymene	535-77-3
Camphene	79-92-5
Menthol	1490-04-6
3-Carene*	13466-78-9
alpha-Thujene	2867-05-2
beta-Myrcene*	123-35-3
alpha-Terpineol	98-55-5
Camphor	76-22-2
4-Carene	29050-33-7
alpha-Phellandrene	99-83-2
Methyl salicylate	119-36-8
gamma-Terpineol	586-81-2
Terpinolene	586-62-9
beta-trans-Ocimene	3779-61-1
beta-Terpineol	138-87-4
Pentylidenecyclopentane	53366-55-5
Caryophyllene	87-44-5
Borneol	10385-78-1
Dihydrocarveol	619-01-2
1-Terpinenol	586-82-3
Bornyl acetate	76-49-3
(+)-Longifolene	475-20-7
Cyclofenchene	488-97-1
2,4-Thujadiene	36262-09-6
beta-Phellandrene	555-10-2
3-Undecyne	60212-30-8
Acetaldehyde*	75-07-0
2-Methylpentane*	107-83-5
Bornylene	464-17-5
Linalool	78-70-6
Methanol*	67-56-1
2,2-Dimethylbutane*	75-83-2
3-Methylpentane*	96-14-0
Hexane*	110-54-3
Isovaleraldehyde	590-86-3
1-Methoxy-2-propanol*	107-98-2
(Z)-7-Methyl-5-undecene	74630-62-9
3,8-p-Menthadiene	586-67-4
(1R,3R,4S)-2,2,3-trimethylbicyclo[2.2.1]heptane	20536-41-8

2-Isopropenyltoluene	7399-49-7
(+)-Camphor	464-49-3
alpha-Ylangene	14912-44-8
1-Pentene	109-67-1
2-Methyl-2-pentene	625-27-4
3-Methylfuran	930-27-8
Fenchyl alcohol	1632-73-1

*Classified as potentially hazardous

10. Mix essential oil

Compounds	**CAS#**
Ethanol*	64-17-5
Eucalyptol	470-82-6
Linalyl butyrate	78-36-4
Limonene*	138-86-3
Linalool	78-70-6
beta-Myrcene*	123-35-3
alpha-Pinene	80-56-8
3-Octanone	106-68-3
Camphene	79-92-5
Caryophyllene	87-44-5
Hexyl methyl ether	4747-07-3
beta-Pinene	127-91-3
Hexyl acetate	142-92-7
m-Cymene	535-77-3
alpha-Phellandrene	99-83-2
beta-trans-Ocimene	3779-61-1
gamma-Terpinene	99-85-4
3-Carene*	13466-78-9
Camphor	76-22-2
Terpinolene	586-62-9
Hexyl butyrate	2639-63-6
Butyl butyrate*	109-21-7
beta-Phellandrene	555-10-2
Neryl acetate	141-12-8
4-Terpineol	562-74-3
1-Octen-3-yl-acetate	2442-10-6
Hexyl isobutyrate	2349-07-7
Acetone*	67-64-1
Butyl acetate*	123-86-4
Fenchyl alcohol*	1632-73-1
cis-1,2-Dimethylcyclopropane	930-18-7
Ethyl formate*	109-94-4
3-Methylfuran	930-27-8
Ethyl acetate*	141-78-6
Acetaldehyde*	75-07-0
Acetaldehyde diethyl acetal*	105-57-7
4,4,6,6-Tetramethylbicyclo[3.1.0]hex-2-ene	19487-09-3
(−)-Borneol	464-45-9
alpha-Terpineol	98-55-5
Lavandulyl acetate	25905-14-0
Geranyl acetate	105-87-3
2-Methylfuran	534-22-5
Isovaleraldehyde	590-86-3
2[2(2-Methoxyethoxy)ethoxy]ethanol acetate	3610-27-3
Toluene*	108-88-3

Butyl isobutyrate	97-87-0
Hexyl propionate	2445-76-3
(2E)-1-ethoxy-3,7-dimethylocta-2,6-diene	22882-91-3
Methanol*	67-56-1
Pentane*	109-66-0
trans-1,2-Dimethylcyclopropane	2402-06-4
Isobutyraldehyde	78-84-2
Butyl methyl ether	628-28-4
trans-2-trans-4-Hexadiene	6108-61-8
1,1-Dimethylallyl alcohol	115-18-4
2-Methylbutyraldehyde	96-17-3
2-Ethylfuran	3208-16-0
2,4-Dimethylhexane*	589-43-5
cis-3-Nonen-1-ol	10340-23-5
1-Hexanol*	111-27-3
D,L-isobornyl acetate	92618-89-8
alpha-Santalene	512-61-8
(Z)-but-2-ene*	590-18-1
Hexane*	110-54-3
Methacrolein	78-85-3
3-Octyl acetate	4864-61-3

*Classified as potentially hazardous

11. Mix essential oil

Compounds	**CAS#**
Limonene*	138-86-3
Linalool	78-70-6
Linalyl butyrate	78-36-4
(Z)-beta-ocimene	3338-55-4
beta-Myrcene*	123-35-3
alpha-Pinene	80-56-8
(−)-Terpinen-4-ol	20126-76-5
Ethyl 2-methylcyclopropanecarboxylate	20913-25-1
3-Octanone	106-68-3
Acetone*	67-64-1
Neryl acetate	141-12-8
Hexyl acetate	142-92-7
Caryophyllene	87-44-5
3-Carene*	13466-78-9
beta-Phellandrene	555-10-2
1-Octen-3-yl-acetate	2442-10-6
Methanol*	67-56-1
Iso-amyl-senecioate	56922-73-7
alpha-Phellandrene	99-83-2
alpha-Terpineol	98-55-5
Camphene	79-92-5
Hexyl methyl ether	4747-07-3
Isobutyl butyrate	539-90-2
beta-Pinene	127-91-3
beta-trans-Ocimene	3779-61-1
Isovaleraldehyde	590-86-3
(−)-Borneol	464-45-9
Ethanol*	64-17-5
3,3-Diethoxy-1-propyne	10160-87-9
trans-β-Farnesene	18794-84-8
Octanal	124-13-0
Isobutyraldehyde	78-84-2
3-Methylfuran	930-27-8
1,1-Dimethylallyl alcohol	115-18-4
Butyl butyrate*	109-21-7
Acetaldehyde*	75-07-0
Menthone	89-80-5
Hexyl butyrate	2639-63-6
2-Methylbutyraldehyde	96-17-3
(+)-Camphor	464-49-3
1,4-Pentadiene	591-93-5
Terpinolene	586-62-9
Linalool oxide	1365-19-1
3-Octyl acetate	4864-61-3
Geranyl acetate	105-87-3

Butyl acetate*	123-86-4
3-Octanol	589-98-0
Decanal	112-31-2
2-Methylfuran	534-22-5
Isobutyl methacrylate*	97-86-9
2-Methyl-1-propene*	115-11-7
Borane-methyl sulfide complex	13292-87-0
Ethyl 1-methylcyclopropanecarboxylate	71441-76-4
alpha-Santalene	512-61-8
1-Octen-3-ol	3391-86-4
1,3,5,5-Tetramethyl-1,3-cyclohexadiene	4724-89-4
(-)-trans-Pinocarveol	547-61-5
D,L-isobornyl acetate	92618-89-8
Lavandulyl acetate	25905-14-0
2-Methylpropan-1-ol*	78-83-1
1-Hexanol*	111-27-3
(S)-(-)-limonene oxide	42477-94-1
cis-2-Pentene	627-20-3
4-Methyl-1,3-pentadiene	926-56-7
1-(1-Methylcyclopropyl)urea	58102-14-0
2-Ethylfuran	3208-16-0
Toluene*	108-88-3
cis-3-Hexene-1-ol	928-96-1
(E)-sabinene hydrate	17699-16-0
cis-p-Menth-2,8-dienol	22771-44-4
Butyl methyl ether	628-28-4
Butanone*	78-93-3
(Z)-sabinene hydrate	15537-55-0
(±)-Citronellal	106-23-0
4-Isopropyl-2-cyclohexenone	500-02-7
2-Methyl-2-butene	513-35-9
Isopropyl alcohol*	67-63-0
Methacrolein	78-85-3
(±)-2-Methyl-1-butanol	137-32-6
Hexyl propionate	2445-76-3
Hexyl isobutyrate	2349-07-7
alpha-Bergamotene	17699-05-7
8-Isopropyl-1-methyl-5-methylene-1,6-cyclodecadiene	23986-74-5
Pentane*	109-66-0
Propanal*	123-38-6
Iso-propylcyclopropane	3638-35-5
trans-4-Tert-butylcyclohexan-1-ol	21862-63-5
2,7-Dimethyloxepine	1487-99-6
(−)-Caryophyllene oxide	1139-30-6
alpha-Santalol	115-71-9
Methyl acetate*	79-20-9
2,3-Dimethylene-1,4-butanediol	50521-50-1

Methyl isobutyl ketone*	108-10-1
Isoamyl alcohol	123-51-3
Methyl 2-ethylacrylate	2177-67-5
Undecane	1120-21-4
Butyl propionate	590-01-2
3-Bromopentane	1809-10-5
Butyl isobutyrate	97-87-0
DL-α-hydroxy-β,β-dimethyl-γ-butyrolactone	79-50-5
Hexyl 2-methylbutanoate	10032-15-2
trans-Carveol	1197-07-5
2-Methylpropyl ester*	110-19-0
2-Butenoic acid, 2-methyl-, 2-methylpropyl ester	66917-61-1

*Classified as potentially hazardous

12. Mix essential oil

Compounds	**CAS#**
Limonene*	138-86-3
alpha-Pinene	80-56-8
Linalool	78-70-6
Linalyl butyrate	78-36-4
Eucalyptol	470-82-6
beta-Pinene	127-91-3
Camphene	79-92-5
beta-Myrcene*	123-35-3
Benzyl acetate	140-11-4
Acetone*	67-64-1
beta-Phellandrene	555-10-2
Caryophyllene	87-44-5
Methyl benzoate	93-58-3
Borneol	10385-78-1
3-Carene*	13466-78-9
alpha-Phellandrene	99-83-2
Isomenthone	491-07-6
Citronellyl formate	105-85-1
3-Octanone	106-68-3
Hexyl acetate	142-92-7
beta-Citronellol	106-22-9
beta-trans-Ocimene	3779-61-1
Isopropyl alcohol*	67-63-0
Acetaldehyde*	75-07-0
Octanal	124-13-0
Geraniol	106-24-1
Neryl acetate	141-12-8
Isoborneol	124-76-5
Methanol*	67-56-1
6-Methyl-5-hepten-2-one	110-93-0
Ethanol*	64-17-5
Geranyl acetate	105-87-3
Nonanal	124-19-6
Decanal	112-31-2
Methyl formate*	107-31-3
1,4-Pentadiene	591-93-5
2-Methylfuran	534-22-5
3-Methylfuran	930-27-8
trans-Rose oxide	876-18-6
8-Isopropyl-1-methyl-5-methylene-1,6-cyclodecadiene	23986-74-5
1,1-Dimethylallyl alcohol	115-18-4
Terpinolene	586-62-9
3-Ethyl-2-methyl-1,3-heptadiene	61142-35-6
Hexyl butyrate	2639-63-6

Linalool oxide	1365-19-1
(Z)-linalool oxide (furanoid)	5989-33-3
alpha-Terpineol	98-55-5
3-Ethyl-2-methyl-1,3-heptadiene	61142-35-6
5-Isopropenyl-2-methylcyclohexanol	18675-33-7
beta-Bourbonene	5208-59-3
Isobutyraldehyde	78-84-2
Methacrolein	78-85-3
2,3-Dimethylpentane	565-59-3
3-Methylhexane*	589-34-4
1-(1-Methylcyclopropyl)urea	58102-14-0
2-Ethylfuran	3208-16-0
Toluene*	108-88-3
Ethyl butyrate	105-54-4
Isopropylidenecyclohexane	5749-72-4
2,6-Dimethylhepta-1,5-diene	6709-39-3
2,2,6-Trimethyl-6-vinyltetrahydropyran	7392-19-0
(E)-2,7-Dimethyl-3-octen-5-yne	55956-33-7
(±)-Citronellal	106-23-0
Linalyl anthranilate	7149-26-0
beta-Terpinyl acetate	10198-23-9
alpha-Humulene	6753-98-6
delta-Cadinene	483-76-1
(Z)-but-2-ene*	590-18-1
Pentane*	109-66-0
trans-1,2-Dimethylcyclopropane	2402-06-4
2-Methyl-2-pentene	625-27-4
Butanone*	78-93-3
Ethyl acetate*	141-78-6
2,3,4-Trimethylpentane*	565-75-3
3-Ethyl-3-methylpentane*	1067-08-9
Isovaleraldehyde	590-86-3
Allyl ethyl carbonate	1469-70-1
Isoamyl alcohol	123-51-3
4-Methyloctane	2216-34-4
3-Methylcrotonaldehyde	107-86-8
2,6-Dimethyl-1,3-heptadiene	74779-65-0
3-Methyl-1-pentanol	42072-39-9
Butyl propionate	590-01-2
Butylbenzene	104-51-8
gamma-Terpinene	99-85-4
Propanal*	123-38-6
Methyl acetate*	79-20-9
3-Methyl-1-cyclopentene	1120-62-3
2,4-Hexadiene	592-46-1
1,1-Dimethylcyclopentane	1638-26-2
4,5-Dimethyloctane	15869-96-2

*Classified as potentially hazardous

13. Tea tree essential oil

Compounds	**CAS#**
(−)-Terpinen-4-ol	20126-76-5
gamma-Terpinene	99-85-4
4-Carene	29050-33-7
m-Cymene	535-77-3
alpha-Pinene	80-56-8
Eucalyptol	470-82-6
Terpinolene	586-62-9
alpha-Phellandrene	99-83-2
Ethanol*	64-17-5
Limonene*	138-86-3
alpha-Terpineol	98-55-5
beta-Pinene	127-91-3
beta-Myrcene*	123-35-3
3-Carene*	13466-78-9
Alloaromadendrene	25246-27-9
Isobutyraldehyde	78-84-2
alpha-Thujene	2867-05-2
(+)-Ledene	21747-46-6
delta-Cadinene	483-76-1
beta-Phellandrene	555-10-2
gamma-Muurolene	30021-74-0
Butane*	106-97-8
Acetone*	67-64-1
2-Methylbutyraldehyde	96-17-3
alpha-Gurjunene	489-40-7
Caryophyllene	87-44-5
Methanol*	67-56-1
alpha-Copaene	3856-25-5
2-Isopropenyltoluene	7399-49-7
Ethyl acetate*	141-78-6
Calamenene	483-77-2
Cycloheptane,4-methylene-1-methyl-2-(2-methyl-1-propen-1-yl)-1-vinyl	826337-63-7
2-Methylpropan-1-ol*	78-83-1
(R)-(−)-2-butanol*	14898-79-4
(+)-Sativene	3650-28-0
1,2,3,4,6,8a-Hexahydro-1-isopropyl-4,7-dimethyl-naphthalene	16728-99-7
2,5-Dimethyl-3-hexyne-2,5-diol	142-30-3
(−)-Isoledene	95910-36-4
beta-Cadinene	523-47-7
Camphene	79-92-5
(E)-sabinene hydrate	17699-16-0
2,2-Dimethyl-4,5-di(1-propenyl)-1,3-dioxolane	36334-88-0
1-Methyl-4-(1-methylethylidene)-2-(1-	3242-08-8

methylvinyl)-1-vinylcyclohexane	
Isovaleraldehyde	590-86-3
1,4-Pentadiene	591-93-5
(±)-Citronellal	106-23-0
(−)-Borneol	464-45-9
cis-Carveol	1197-06-4
Acetaldehyde*	75-07-0
(−)-α-Cubebene	17699-14-8
alpha-Gurjunene	489-40-7
γ-Gurjunene	22567-17-5
Butanone*	78-93-3
cis-3-Hexene-1-ol	928-96-1
Linalool	78-70-6
3-Ethoxy-3,7-dimethylocta-1,6-diene	72845-33-1
alpha-Humulene	6753-98-6
Rosifolio	63891-61-2
Pentane*	109-66-0
1,1-Dimethylallyl alcohol	115-18-4
(Z)-sabinene hydrate	15537-55-0
1-Terpinenol	586-82-3
cis-p-Menth-1-en-3-ol	16721-38-3
Valencene	4630-07-3
2-Butene*	107-01-7
2-Methylfuran	534-22-5
3-Methylfuran	930-27-8
(±)-2-Methyl-1-butanol	137-32-6
3-Methyl-2-pentanone	565-61-7
alpha-Fenchene	471-84-1
(E)-linalool oxide (furanoid)	34995-77-2
Fenchyl alcohol	1632-73-1
2-Ethylcyclohexanone	4423-94-3
(−)-β-Elemene	515-13-9
Spathulenol	6750-60-3
Tetracarbonylnickel*	13463-39-3
Glycolaldehyde dimer	23147-58-2
Methyl acetate*	79-20-9
2,3-Dimethyl-1-butene	563-78-0
2-Butanol*	78-92-2
2-Ethylfuran	3208-16-0
2-Pentanone	107-87-9
3-Pentanone*	96-22-0
Dimethyl disulfide	624-92-0
Isoamyl alcohol	123-51-3
2,3,4-Trimethylhexane	921-47-1
Nonanol	143-08-8
1-Hexanol*	111-27-3
(−)-Noe’s reagent	108031-79-4
3-Ethyl-1,2-dimethylcyclohexa-1,4-diene	125909-70-8

3-Cyclohexene-1-carboxaldehyde	100-50-5
(S)-cis-Verbenol	18881-04-4
Camphene hydrate	465-31-6
1-Methyl-4-isopropyl-1-cyclohexen-3-one	89-81-6
Isopentane*	78-78-4
trans-1,2-Dimethylcyclopropane	2402-06-4
1-Methylcyclopentene	693-89-0
1-Isopropoxy-2-propanol	3944-36-3
1-Acetyl-2-methyl-1-cyclopentene	3168-90-9
1,4-Dimethyl-δ-3-tetrahydroacetophenone	43219-68-7

*Classified as potentially hazardous

14. Sweet orange essential oil

Compounds	**CAS#**
Limonene*	138-86-3
beta-Pinene	127-91-3
alpha-Pinene	80-56-8
beta-Phellandrene	555-10-2
3-Carene*	13466-78-9
beta-trans-Ocimene	3779-61-1
Methanol*	67-56-1
Acetone*	67-64-1
Octanal	124-13-0
Linalool	78-70-6
Ocimene	13877-91-3
Ethanol*	64-17-5
alpha-Thujene	2867-05-2
1,1-Dimethylallyl alcohol	115-18-4
1-Octanol*	111-87-5
(+)-Limonene oxide	1195-92-2
Methyl formate*	107-31-3
Decanal	112-31-2
alpha-Terpineol	98-55-5
gamma-Terpinene	99-85-4
(+)-(E)-limonene oxide	6909-30-4
Nonanal	124-19-6
1-Hexanol*	111-27-3
alpha-Phellandrene	99-83-2
Camphene	79-92-5
Terpinolene	586-62-9
(±)-Citronellal	106-23-0
Acetaldehyde*	75-07-0
Butanone*	78-93-3
Ethyl acetate*	141-78-6
3-Methylhexane*	589-34-4
4-Carene	29050-33-7
Propanal*	123-38-6
Ethyl formate*	109-94-4
2-Butanol*	78-92-2
Ethyl butyrate	105-54-4
Hexanal	66-25-1
1-Heptanol*	111-70-6
2-Ethenyl-1,1-dimethyl-3-methylenecyclohexane	95452-08-7
1-Octyl trifluoroacetate	2561-21-9
cis-p-Menth-2,8-dienol	22771-44-4
Isoprene (stabilised)*	78-79-5

*Classified as potentially hazardous

Supplementary Table 2: All emitted VOCs from all essential oils (n=14)

Compound	CAS #	Prevalence (# of Products)
Acetaldehyde*	75-07-0	14
alpha-Phellandrene	99-83-2	14
alpha-Pinene	80-56-8	14
Camphene	79-92-5	14
Limonene*	138-86-3	14
Methanol*	67-56-1	14
Terpinolene	586-62-9	14
3-Carene*	13466-78-9	13
Acetone*	67-64-1	13
beta-Phellandrene	555-10-2	13
Ethanol*	64-17-5	13
gamma-Terpinene	99-85-4	13
alpha-Terpineol	98-55-5	12
beta-Pinene	127-91-3	12
Isovaleraldehyde	590-86-3	12
Linalool	78-70-6	12
beta-Myrcene*	123-35-3	11
Isobutyraldehyde	78-84-2	11
1,1-Dimethylallyl alcohol	115-18-4	10
2-Methylfuran	534-22-5	10
3-Methylfuran	930-27-8	10
beta-trans-Ocimene	3779-61-1	10
Toluene*	108-88-3	10
Caryophyllene	87-44-5	9
Eucalyptol	470-82-6	9
Pentane*	109-66-0	9
2-Ethylfuran	3208-16-0	8
2-Methylpropan-1-ol*	78-83-1	8
alpha-Thujene	2867-05-2	8
Butanone*	78-93-3	8
Ethyl acetate*	141-78-6	8
Isoamyl alcohol	123-51-3	8
m-Cymene	535-77-3	8
Neryl acetate	141-12-8	8
2-Methyl-1-propene*	115-11-7	7
2-Methylbutyraldehyde	96-17-3	7

4-Carene	29050-33-7	7
Isopropyl alcohol*	67-63-0	7
Methyl acetate*	79-20-9	7
(Z)-sabinene hydrate	15537-55-0	6
1-Hexanol*	111-27-3	6
8-Isopropyl-1-methyl-5-methylene-1,6-cyclodecadiene	23986-74-5	6
Geranyl acetate	105-87-3	6
Hexyl butyrate	2639-63-6	6
Lavandulyl acetate	25905-14-0	6
Methacrolein	78-85-3	6
Methyl isobutyl ketone*	108-10-1	6
Propanal*	123-38-6	6
(±)-Citronellal	106-23-0	5
(E)-linalool oxide (furanoid)	34995-77-2	5
3-Octanone	106-68-3	5
4-Terpineol	562-74-3	5
alpha-Humulene	6753-98-6	5
Butyl butyrate*	109-21-7	5
Butyl propionate	590-01-2	5
cis-3-Hexene-1-ol	928-96-1	5
Hexyl acetate	142-92-7	5
Methyl formate*	107-31-3	5
(−)-Borneol	464-45-9	4
(−)-Terpinen-4-ol	20126-76-5	4
(±)-2-Methyl-1-butanol	137-32-6	4
(E)-sabinene hydrate	17699-16-0	4
1,4-Pentadiene	591-93-5	4
1-Octen-3-ol	3391-86-4	4
1-Octen-3-yl-acetate	2442-10-6	4
2,7-Dimethyloxepine	1487-99-6	4
2-Isopropenyltoluene	7399-49-7	4
4-Isopropyl-2-cyclohexenone	500-02-7	4
alpha-Bergamotene	17699-05-7	4
alpha-Gurjunene	489-40-7	4
alpha-Santalene	512-61-8	4
Butyl isobutyrate	97-87-0	4
Butyl methyl ether	628-28-4	4
cis-1,2-Dimethylcyclopropane	930-18-7	4
Decanal	112-31-2	4
Ethyl formate*	109-94-4	4
Fenchyl alcohol*	1632-73-1	4

Hexyl isobutyrate	2349-07-7	4
Hexyl methyl ether	4747-07-3	4
Hexyl propionate	2445-76-3	4
Iso-propylcyclopropane	3638-35-5	4
Linalool oxide	1365-19-1	4
Linalyl butyrate	78-36-4	4
Octanal	124-13-0	4
trans-1,2-Dimethylcyclopropane	2402-06-4	4
(-)-trans-Pinocarveol	547-61-5	3
(+)-Camphor	464-49-3	3
(Z)-beta-ocimene	3338-55-4	3
1-Pentene	109-67-1	3
2,3-Dimethyl-1-butene	563-78-0	3
2,4-Dimethylhexane*	589-43-5	3
2,4-Thujadiene	36262-09-6	3
2,5-Dimethylfuran	625-86-5	3
2-Methylpropyl ester*	110-19-0	3
2-Pentanone	107-87-9	3
3-Methylcrotonaldehyde	107-86-8	3
3-Methylhexane*	589-34-4	3
3-Octanol	589-98-0	3
6-Methyl-5-hepten-2-one	110-93-0	3
beta-Bourbonene	5208-59-3	3
Borneol	10385-78-1	3
Butane*	106-97-8	3
Butyl acetate*	123-86-4	3
Butylbenzene	104-51-8	3
Camphor	76-22-2	3
cis-4-Methyl-2-Pentene	691-38-3	3
delta-Cadinene	483-76-1	3
Ethyl butyrate	105-54-4	3
Hexanal	66-25-1	3
Hexane*	110-54-3	3
Isopentane*	78-78-4	3
Nonanal	124-19-6	3
trans-2-Methyl-1,3-pentadiene	926-54-5	3
trans-β-Farnesene	18794-84-8	3
(−)-α-Cubebene	17699-14-8	2
(+)-Ledene	21747-46-6	2
(+)-Sativene	3650-28-0	2
(4E,6Z)-2,6-dimethylocta-2,4,6-triene	7216-56-0	2
(S)-cis-Verbenol	18881-04-4	2

(Z)-but-2-ene*	590-18-1	2
(Z)-linalool oxide (furanoid)	5989-33-3	2
(Z)-rose oxide	16409-43-1	2
1-(1-Methylcyclopropyl)urea	58102-14-0	2
1-Acetyl-2-methyl-1-cyclopentene	3168-90-9	2
1-Methyl-4-isopropyl-1-cyclohexen-3-one	89-81-6	2
1-Terpinenol	586-82-3	2
2-(1,1-Dimethyl-2-propenyl)-1,1-dimethylcyclopropane	81051-15-2	2
2,2,6-Trimethyl-6-vinyltetrahydropyran	7392-19-0	2
2,3,4-Trimethylhexane	921-47-1	2
2,6-Dimethylhepta-1,5-diene	6709-39-3	2
2-Butanol*	78-92-2	2
2-Butene*	107-01-7	2
2-Methyl-1-butene	563-46-2	2
2-Methyl-2-butene	513-35-9	2
2-Methyl-2-pentene	625-27-4	2
2-Methylpentane*	107-83-5	2
3,4,4-Trimethyl-2-cyclopenten-1-one	30434-65-2	2
3-Ethyl-2-methyl-1,3-heptadiene	61142-35-6	2
3-Hexanone	589-38-8	2
3-Methyl-1-cyclopentene	1120-62-3	2
3-Octyl acetate	4864-61-3	2
3-Undecyne	60212-30-8	2
4,4,6,6-Tetramethylbicyclo[3.1.0]hex-2-ene	19487-09-3	2
4-Methyl-1,3-pentadiene	926-56-7	2
Alloaromadendrene	25246-27-9	2
alpha-Copaene	3856-25-5	2
alpha-Pinene oxide	1686-14-2	2
alpha-Terpinene	99-86-5	2
beta-Cadinene	523-47-7	2
Bornyl acetate	76-49-3	2
cis-Hexatriene	2612-46-6	2
cis-p-Menth-2,8-dienol	22771-44-4	2
Citronellyl acetate	150-84-5	2
Citronellyl formate	105-85-1	2
Cyclofenchene	488-97-1	2
D,L-isobornyl acetate	92618-89-8	2
D,L-Menthol	15356-70-4	2
Dimethyl sulfide	75-18-3	2
gamma-Muurolene	30021-74-0	2
Geraniol	106-24-1	2

Hexyl 2-methylbutanoate	10032-15-2	2
Isoamyl acetate*	123-92-2	2
Isobutyl butyrate	539-90-2	2
Isoprene (stabilised)*	78-79-5	2
Isopropylidenecyclohexane	5749-72-4	2
Linalyl acetate	115-95-7	2
Menthol	1490-04-6	2
Menthone	89-80-5	2
Methyl (S)-2-methylbutanoate	53955-81-0	2
Ocimene	13877-91-3	2
Ocimenol	5986-38-9	2
o-Cymene	527-84-4	2
Pentylidenecyclopentane	53366-55-5	2
Perillen	539-52-6	2
Tetracarbonylnickel*	13463-39-3	2
trans-2-trans-4-Hexadiene	6108-61-8	2
(−)-Caryophyllene oxide	1139-30-6	1
(−)-Isoledene	95910-36-4	1
(−)-Noe’s reagent	108031-79-4	1
(−)-β-Elemene	515-13-9	1
(+)-(E)-limonene oxide	6909-30-4	1
(+)-Camphene	5794-03-6	1
(+)-Isomenthone	1196-31-2	1
(+)-Limonene oxide	1195-92-2	1
(+)-Longifolene	475-20-7	1
(1R,3R,4S)-2,2,3-trimethylbicyclo[2.2.1]heptane	20536-41-8	1
(2E)-1-ethoxy-3,7-dimethylocta-2,6-diene	22882-91-3	1
(4E)-4-Hexenyl acetate	72237-36-6	1
(E)-2,7-Dimethyl-3-octen-5-yne	55956-33-7	1
(E)-citral*	141-27-5	1
(E,E)-1,3,5-Undecatriene	19883-29-5	1
(R)-(−)-2-butanol*	14898-79-4	1
(R)-(+)-3-methylcyclopentanone	6672-30-6	1
(R)-(+)-pulegone*	89-82-7	1
(S)-(-)-limonene oxide	42477-94-1	1
(Z)-1-methoxyhex-3-ene	70220-06-3	1
(Z)-7-Methyl-5-undecene	74630-62-9	1
1,1,2-Trimethylcyclopentane	4259-00-1	1
1,1-Dimethylcyclopentane	1638-26-2	1
1,2,3,4,6,8a-Hexahydro-1-isopropyl-4,7-dimethyl-naphthalene	16728-99-7	1

1,2,3-Trimethylcyclopentene	473-91-6	1
1,3,5,5-Tetramethyl-1,3-cyclohexadiene	4724-89-4	1
1,3-Cyclohexadiene	592-57-4	1
1,3-Dimethyl cyclohexene	2808-76-6	1
1,4-Dimethyl-δ-3-tetrahydroacetophenone	43219-68-7	1
1-Acetyl-1-cyclohexene	932-66-1	1
1-Butyne	107-00-6	1
1-Cyclopropyl-1-pentanol	4379-16-2	1
1-Heptanol*	111-70-6	1
1-hydroxy-2-nitrocyclohexane-1-carboxylic acid	149695-77-2	1
1-Isopropoxy-2-propanol	3944-36-3	1
1-Methoxy-2-propanol*	107-98-2	1
1-Methyl-3-(2-methylcyclopropyl)cyclopropene	61142-26-5	1
1-Methyl-3-isopropylcyclopentane	53771-88-3	1
1-Methyl-3-propylcyclooctane	255885-37-1	1
1-Methyl-4-(1-methylethylidene)-2-(1-methylvinyl)-1-vinylcyclohexane	3242-08-8	1
1-Methylcyclopentene	693-89-0	1
1-Octanol*	111-87-5	1
1-Octyl trifluoroacetate	2561-21-9	1
2-(2-Methyl-1-propenyl)bicyclo[2.2.1]heptane	61142-27-6	1
2,2,3-Trimethylhexane	16747-25-4	1
2,2-Dimethyl-4,5-di(1-propenyl)-1,3-dioxolane	36334-88-0	1
2,2-Dimethylbutane*	75-83-2	1
2,3,4-Trimethylpentane*	565-75-3	1
2,3,5-Trimethyl-1,3-hexadiene	61142-34-5	1
2,3-Dimethylcyclohexan-1-ol	1502-24-5	1
2,3-Dimethylene-1,4-butanediol	50521-50-1	1
2,3-Dimethylpentane	565-59-3	1
2,3-Pentadiene	591-96-8	1
2,4,6-Trimethyl-2,4,6-triphenyl-1,3,5,2,4,6-trioxatrisilinane	546-45-2	1
2,4-Dimethyl-2,4-heptadiene	74421-05-9	1
2,4-Hexadiene	592-46-1	1
2,5-Diethyl tetrahydrofuran	41239-48-9	1
2,5-Dimethyl-3-hexyne-2,5-diol	142-30-3	1
2,5-Dimethylhex-5-en-3-yn-2-ol	2696-26-6	1
2,6-Dimethyl-1,3-heptadiene	74779-65-0	1
2,6-Dimethyl-3-heptene	2738-18-3	1
2[2(2-Methoxyethoxy)ethoxy]ethanol acetate	3610-27-3	1

2-Bromocyclooctanone	39261-18-2	1
2-Butenoic acid, 2-methyl-, 2-methylpropyl ester	66917-61-1	1
2-Ethenyl-1,1-dimethyl-3-methylenecyclohexane	95452-08-7	1
2-Ethylcyclohexanone	4423-94-3	1
2-Hexyne	764-35-2	1
2-Isopropylidene-5-methylcyclohexanone	15932-80-6	1
2-Methoxy-1-methylethyl acetate*	108-65-6	1
2-Methyl-1-butanol	34713-94-5	1
2-Methyl-2-(4-methylpent-3-en-1-yl)cyclopropylmethanol	98678-70-7	1
2-Methylbutyl 2-methylbutyrate	2445-78-5	1
2-Methylbutyl acetate*	624-41-9	1
2-Octynoic acid	5663-96-7	1
3,3-Diethoxy-1-propyne	10160-87-9	1
3,4-Dimethyl-2,4,6-octatriene	57396-75-5	1
3,5-Heptadienal, 2-ethylidene-6-methyl-	99172-18-6	1
3,7-dimethyl-2,6-octadienyl isobutyrate	2345-26-8	1
3,8-p-Menthadiene	586-67-4	1
3-Allylcyclohexene	15232-95-8	1
3-Bromopentane	1809-10-5	1
3-Cyclohexene-1-carboxaldehyde	100-50-5	1
3-Ethoxy-3,7-dimethylocta-1,6-diene	72845-33-1	1
3-Ethyl-1,2-dimethylcyclohexa-1,4-diene	125909-70-8	1
3-Ethyl-2,2-dimethyloxirane	1192-22-9	1
3-Ethyl-3-methylpentane*	1067-08-9	1
3-Methyl-1-pentanol	589-35-5	1
3-Methyl-1-pentanol	42072-39-9	1
3-Methyl-2-cyclopenten-1-one	2758-18-1	1
3-Methyl-2-pentanone	565-61-7	1
3-Methylcyclohexanone	591-24-2	1
3-Methylcyclopentanol	18729-48-1	1
3-Methylpentane*	96-14-0	1
3-Octyne	15232-76-5	1
3-Pentanone*	96-22-0	1
4,4-Dimethyl octane	15869-95-1	1
4,5,6,7-Tetrahydro-3,6-dimethylbenzofuran	494-90-6	1
4,5-Dimethyloctane	15869-96-2	1
4-Hexen-1-ol, acetate	72237-36-6	1
4-Methyloctane	2216-34-4	1
5-Isopropenyl-2-methylcyclohexanol	18675-33-7	1
5-Methyl-1,4-hexadiene	763-88-2	1

6-Bromocycloocta-1,4-diene	23359-89-9	1
7-Methyl-1,6-octadiene	42152-47-6	1
Acetaldehyde diethyl acetal*	105-57-7	1
Acetaldol	107-89-1	1
Acetylcyclohexane	823-76-7	1
Allyl ethyl carbonate	1469-70-1	1
Allyl nonanoate	7493-72-3	1
alpha-Fenchene	471-84-1	1
alpha-Santalol	115-71-9	1
alpha-Ylangene	14912-44-8	1
Amyl isovalerate	25415-62-7	1
Aristolene	6831-16-9	1
Benzene*	71-43-2	1
Benzo(b)thiophene-1,1-dioxide	825-44-5	1
Benzyl acetate	140-11-4	1
beta-Bisabolene	495-61-4	1
beta-Citronellol	106-22-9	1
beta-Terpineol	138-87-4	1
beta-Terpinyl acetate	10198-23-9	1
beta-Thujene	28634-89-1	1
Bicyclo[4.1.0]hept-2-ene	2566-57-6	1
Bicyclo[5.2.0]nonane, 2-methylene-4,8,8-trimethyl-4-vinyl-	242794-76-9	1
Borane-methyl sulfide complex	13292-87-0	1
Bornylene	464-17-5	1
Butyl formate*	592-84-7	1
Butyraldehyde*	123-72-8	1
Calamenene	483-77-2	1
Camphene hydrate	465-31-6	1
Carane, 4,5-epoxy-, trans	6909-20-2	1
cis-2-Pentene	627-20-3	1
cis-3,7-Dimethyl-2,6-octadien-1-ol	106-25-2	1
cis-3-Hexenyl butyrate	16491-36-4	1
cis-3-Nonen-1-ol	10340-23-5	1
cis-Carveol	1197-06-4	1
cis-p-Menth-1-en-3-ol	16721-38-3	1
Citronellyl butyrate	141-16-2	1
Citronellyl propionate	141-14-0	1
Cyclobutane	287-23-0	1
Cycloheptane,4-methylene-1-methyl-2-(2-methyl-1-propen-1-yl)-1-vinyl	826337-63-7	1
Cyclopentene,4-ethenyl-1,5,5-trimethyl	1727-69-1	1

Diethyl phthalate	84-66-2	1
Dihydrocarveol	619-01-2	1
Dimethyl disulfide	624-92-0	1
Dimethyl phthalate*	131-11-3	1
Dl-Menthyl acetate	16409-45-3	1
DL-α-hydroxy-β,β-dimethyl-γ-butyrolactone	79-50-5	1
Ethyl 1-methylcyclopropanecarboxylate	71441-76-4	1
Ethyl 2-methylbutyrate	7452-79-1	1
Ethyl 2-methylcyclopropanecarboxylate	20913-25-1	1
Furan*	110-00-9	1
gamma-Terpineol	586-81-2	1
Geranyl butyrate	106-29-6	1
Geranyl propionate	105-90-8	1
Glycolaldehyde dimer	23147-58-2	1
Hexyl formate	629-33-4	1
Iso-amyl-senecioate	56922-73-7	1
Isoborneol	124-76-5	1
Isobutyl methacrylate*	97-86-9	1
Isomenthone	491-07-6	1
Isopentyl formate*	110-45-2	1
Isopropyl butyrate	638-11-9	1
Isopropyl propionate*	637-78-5	1
Isopulegol	7786-67-6	1
Linalyl anthranilate	7149-26-0	1
Linalyl isobutyrate	78-35-3	1
Menthone	10458-14-7	1
Methyl 2-ethylacrylate	2177-67-5	1
Methyl 3-methyl-2-butenoate	924-50-5	1
Methyl 3-methylvalerate	2177-78-8	1
Methyl 4-methylvalerate	2412-80-8	1
Methyl benzoate	93-58-3	1
Methyl butyrate	623-42-7	1
Methyl isopropyl ketone*	563-80-4	1
Methyl salicylate	119-36-8	1
Methyl valerate	624-24-8	1
Myrtanyl acetate	29021-36-1	1
Nerol oxide	1786-08-9	1
Nonanol	143-08-8	1
Octyl acetate	112-14-1	1
p,α-Dimethylstyrene	1195-32-0	1
Pentanal	110-62-3	1
Phenethyl butyrate	103-52-6	1

Phenyl butyrate	4346-18-3	1
Propylene glycol	57-55-6	1
Rosifolio	63891-61-2	1
Sabinene	3387-41-5	1
sec-Butyl acetate*	105-46-4	1
Spathulenol	6750-60-3	1
trans-2-Hexen-1-al	6728-26-3	1
trans-3,4-Dimethyl-2-pentene	4914-92-5	1
trans-4-Tert-butylcyclohexan-1-ol	21862-63-5	1
trans-Carveol	1197-07-5	1
trans-Rose oxide	876-18-6	1
Undecane	1120-21-4	1
Valencene	4630-07-3	1
Vinyl methacrylate	4245-37-8	1
Vinylcyclohexane	695-12-5	1
β-Citronellol	106-22-9	1
β-Selinene	17066-67-0	1
γ-Gurjunene	22567-17-5	1

*Compound classified as potentially hazardous