

Use of a perfume composition as a fuel for internal combustion engines

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(54) **Title:** USE OF A PERFUME COMPOSITION AS A FUEL FOR INTERNAL COMBUSTION ENGINES

(57) **Abstract:** The present invention relates to fuel compositions containing perfume fractions, that is to say compositions of fragrance materials, and to the use of such perfume fractions containing fuel compositions to provide a fuel for internal combustion engines and burners. According to the present fuel composition for internal combustion engines and burners on basis of ethanol, wherein said fuel composition contains 1–40 vol. % of a perfume fraction, based on the total fuel composition, said perfume fraction is constituted of one or more additives selected from a group consisting of essential oils, aroma compounds and aromatic oxygenates, the Volumetric Higher Heating Value (HHV), measured according to ASTM D240, of said perfume fraction is higher than or equal to 33,0 MJ/litre.



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Title: Use of a perfume composition as a fuel for internal combustion engines.

The present invention relates to fuel compositions containing perfume fractions, that is to say compositions of fragrance materials, and to the use of such perfume
5 fractions containing fuel compositions to provide a fuel for internal combustion engines and burners.

EP-B-3172, US-A-4304679, US-A-4322308, US-A-4278658, US-A-4134838, US-A-4288341, US-A-4289641 and US-A-4663068 all describe perfume compositions. A difficulty with the perfume compositions disclosed in these documents is that they possibly
10 include components which limit their use in combustion processes. One aspect is that these perfume compositions possess a very low caloric value due to the presence of water and ethanol as solvents. In addition to that, the water component in the perfume composition may show a corrosion inducing behaviour, which makes the perfume composition less suitable for use in engines. Furthermore, the perfume compositions are somewhat of polar nature which is
15 also not favourable for use as a fuel in internal combustion engines and burners.

It has already been proposed to eliminate malodorous gases by absorption with active carbon or like substances, or also by catalysts with the object of setting up a secondary combustion in the flow of the exhaust system.

Japanese patent applications 2240196, 06220469, 57115490 and 02092992,
20 US 2008/0032913, EP 2 147 966, BE 9000634, WO 01/36354 and GB 404046 relate to ameliorating the smell of petrol. For example, GB 404046 discloses that an agreeable smell can be imparted to the exhaust gases of petrol engines by adding aromatic substances to the fuel.

A disadvantage of fuel compositions is that they contain harmful substances.
25 Vapor recovery is the process of recovering the vapors of gasoline or other fuels, so that they do not escape into the atmosphere. This is often done (or required by law) at filling stations, in order to reduce noxious and potentially explosive fumes and pollution. The negative pressure created in the (underground) tank by the withdrawal is usually used to pull in the vapors. They are drawn-in through holes in the side of the nozzle and travel through special hoses which
30 have a return path. This solution of special hoses is a secondary solution. A more basic approach to the negative effects of the vapors of gasoline is to adapt the fuel composition in such a way that the fuel composition itself is more environmental friendly and safe.

An aspect of the present invention is to provide a perfume composition which can be used as a fuel for internal combustion engines and burners.

35 An aspect of the present invention is to provide a perfume composition in which the portion of water as a co solvent is reduced to such a level that the perfume composition is suitable for use as a fuel in internal combustion engines and burners.

An aspect of the present invention is to provide a perfume composition that still has its own characteristic odour but can be used as a fuel for internal combustion engines and burners.

Another aspect of the present invention is to provide a perfume composition that can be used as a fuel for internal combustion engines and burners, wherein the safety, stability and durability of the internal combustion engines and burners, in which these perfume compositions are to be used, are guaranteed.

And, an aspect of the present invention is to provide a fuel composition which can be combined with a perfume fraction, wherein the consumer of the fuel composition can decide, on the basis of his own preference, which perfume fraction is to be chosen as the additional component in the fuel composition.

Another aspect of the present invention is to provide a fuel composition that can be used as a fuel for internal combustion engines and burners, wherein the presence of carcinogenic substances is prevented resulting in an environmentally safe, both for human and animals, fuel composition.

The present invention thus relates to a fuel composition for internal combustion engines and burners on basis of ethanol, wherein said fuel composition contains 1 – 40 vol. % of a perfume fraction, based on the total fuel composition, said perfume fraction is constituted of one or more additives selected from a group consisting of essential oils, aroma compounds and aromatic oxygenates, wherein the Volumetric Higher Heating Value (HHV), measured according to ASTM D240, of said perfume fraction is higher than or equal to 33,0 MJ/litre.

One or more of the aforementioned objects are achieved by such a perfume fraction containing fuel composition. Especially, the presence of ethanol is essential for obtaining the required caloric value and combustion properties, compared to ethanol/water solutions. And the presence of the perfume fraction, that is one or more additives selected from a group consisting of essential oils, aroma compounds and aromatic oxygenates, will have an effect of the odour of the fuel composition by maintaining the characteristic odour of the perfume fraction itself.

The perfume fraction according to the present invention has superior properties to and replaces the gasoline fraction in conventional ethanol/gasoline blends (e.g. E85, now commercially available). The present perfume fraction offers improvements on four aspects:

- 1) Improved volumetric higher heating value (HHV in MJ/liter): improved mileage
- 2) Improved research octane number (RON): improved anti-knock properties

3) Gasoline, which contains many known toxins, some of which are confirmed human carcinogens, most notably benzene. The present perfume fraction is free from carcinogens and all substances are recognized by the FDA as GRAS (Generally Recognized as Safe).

5 4) Tailorable scent

The minimum Research Octane Number (RON), measured according to ASTM D2699, of said perfume fraction present in the fuel composition according to the invention is preferably higher than or equal to 95,0.

10 According to a preferred embodiment of the present invention the amount of aromatic oxygenates present in said perfume fraction is in the range of 50 - 100 vol.%, calculated on the total perfume fraction present in said fuel composition.

According to another preferred embodiment of the present invention the minimum Research Octane Number (RON), measured according to ASTM D2699, of said aromatic oxygenates present in said perfume fraction is higher than or equal to 95,0.

15 It is preferred that the Volumetric Higher Heating Value (HHV), measured according to ASTM D240, of said aromatic oxygenates present in said perfume fraction is higher than or equal to 33,0 MJ/litre.

20 The present inventor found that in the present fuel composition the aromatic oxygenates preferably comprise a benzene ring and only one functional oxygen group attached to said benzene ring.

Preferred aromatic oxygenates are selected from the group consisting of 1-phenyl ethanol, anisole, benzaldehyde, benzyl alcohol, 2-phenyl ethanol, acetophenone and cinnamaldehyde, or combinations thereof.

An even more preferred aromatic oxygenate is benzyl alcohol.

25 In the present fuel composition it is preferred to apply a perfume fraction comprising benzyl alcohol and one or more additives selected from essential oils and aroma compounds.

30 In perfumery, the smallest perfume fractions of 1-3 vol.-% can be found in so-called after shaves. Perfume concentrations lower than 1 vol.-% are typically not used because the scent of the solvent (e.g. ethanol) can than no longer be overcome. The largest utilized perfume fractions of 15-40 vol.-% can be found in so-called perfume extracts. Perfume concentrations higher than 40 vol.-% are not used because the scent becomes too saturated and no added value pertaining to smell is perceived.

35 According to a first embodiment the present fuel composition contains 30 – 40 vol.% of said perfume fraction.

According to a second embodiment the present fuel composition contains 20 - 30 vol.% of said perfume fraction.

According to a third embodiment the present fuel composition contains 10 - 20 vol.% of said perfume fraction.

According to a fourth embodiment the present fuel composition contains 5 - 10 vol.% of said perfume fraction.

5 According to a fifth embodiment the present fuel composition contains 3 - 5 vol.% of said perfume fraction.

According to a sixth embodiment the present fuel composition contains 1 - 3 vol.% of said perfume fraction.

10 Additives are admixtures, active ingredients or active ingredient mixtures which, in motor or combustion fuels and lubricants, enhance desired properties, suppress unwanted properties or exert novel effects. For example, in the case of motor fuels, the engine intake system may be kept clean and deposits prevented in the engine or the ageing resistance of lubricant oils may be extended. Reducing exhaust gas pollutant emissions and preventing the corrosion of metal parts in the fuel system are further desired actions of
15 additives.

In a preferred embodiment the fuel composition according to the present invention further comprise a proportion of 0,1 - 10 wt. %, relative to the said fuel composition, of one or more substances which are selected from group consisting of pigments, dyes, colorants, cetane improvers, soot particle emission reducing agents, flow promoters, filterability improvers, antioxidants, corrosion inhibitors, antifoam agents, ignition accelerators, stabilizers, antiknock agents, carburettor antiicing additives, antideposition agents, antismoke agents, biocides, lubricity improvers, antiwear agents, fixatives and viscosity improvers.
20

Specific examples of the aforementioned additives are: flow promoters (flow improvers, antisetling agents, for example in diesel fuel, Wax AntiSettling Additives (WASA),
25 for example polyolefins, chlorinated polyethylenes, ethylene/propylene copolymers, low molecular weight copolymers such as ethylene/vinyl acetate copolymers), filterability improvers (for example relatively high molecular weight chlorinated hydrocarbons such as for example condensation products of naphthalene and chlorinated paraffins, copolymers based on ethylene with in each case acrylic and methacrylic acid esters, maleic acid diesters, alcohols or vinyl acetate), metal deactivators (usually chelating agents, for example
30 1,3-bis-(2-hydroxybenzylideneamino)propane=N,N'-disalicylidene-1,2-diaminopropane), antioxidants (oxidation inhibitors, for example phenol derivatives such as p-aminophenol, 2,6-di-tert.-butyl-4-methylphenol (BHT), phenylenediamine, naphthalene derivatives such as naphthylamine, 1,3-bis-(2-hydroxy-benzylideneamino)propane), corrosion inhibitors (for
35 example naphthenoic acid sodium salt, mixtures of (2-ethylhexyl)-(3-methylbutyl) phosphate and C14-C16 amines, 2-(2-(2-ethylhexyl)-phenoxy)-1,1,2,2-tetraethoxyethanol, ethylenediamine dinonylnaphthalenesulfonate, mixtures of polymerized linoleic acid,

polymerized methylinoleic acid and organic phosphorus compounds, hydrazine, oleamides), ignition accelerators (cetane number improvers, for example amyl nitrate, cyclohexyl nitrate, 2-ethylhexyl nitrate, nitrobenzene), detergents (for example benzenesulfonic acid sodium salt, alkyl substituted succinimides such as for example polyisobutenyl succinic acid derivatives, 5 alkyl substituted carbamides, polyisobuteneamines/ polyisobutenepolyamines, amines), particulate-reducing substances, stabilizers (in particular for diesel) (for example long-chain or cyclic amines such as N,N-dimethylcyclohexylamine), antiknock agents (for example tert.-butyl alcohol, isobutyl alcohol, MTBE, ETBE, TAME, N-methylaniline, methanol), carburetor antiicing additives (icing inhibitors, for example ethanol, isopropanol, 10 dimethylformamide, dimethylacetamide, dipropylene glycol, diethylene glycol monomethyl ether, organic phosphorus compounds, glycerol esters of fatty acids, formamides, imidazolines), antideposition agents (antipreignition agents, for example 1,2-dibromoethane, cresyl diphenyl phosphate, tricresyl phosphate, tricresyl phosphate, trimethyl phosphite, trichloroethyl phosphate, boric acid esters), antismoke agents (combustion aids, 15 smoke-reducing agents, for example barium naphthalenesulfonate, barium carbonate, lead naphthenate, tetraethyl lead, calcium sulfonate, manganese naphthenate, nickel carbonyl, methylcyclopentadienyl manganese tricarbonyl, ferrocene, butyl hydroperoxide, nitropropane, ethyl nitrate), biocides, lubricity improvers, antiwear agents, dyes, color stabilizers, and viscosity improvers.

20 Examples of essential oils to be used in the present invention are Alfalfa, Allspice, Almond bitter (free from prussic acid), Ambrette (seed), Angelica root, Angelica seed, Angelica stem, Angostura (cusparia bark), Anise, Asafetida, Balm (lemon balm), Balsam of Peru, Basil, Bay leaves, Bay (myrcia oil), Bergamot (bergamot orange), Bitter almond (free from prussic acid), Bois de rose, Cacao, Camomile (chamomile) flowers, 25 Hungarian, Camomile (chamomile) flowers, Roman or English, Cananga Capsicum, Caraway, Cardamom seed (cardamon), Carob bean, Carrot, Cascarrilla bark, Cassia bark, Chinese, Cassia bark, Padang or Batavia, Cassia bark, Saigon, Celery seed, Cherry, wild, bark, Chervil, Chicory, Cinnamon bark, Ceylon, Cinnamon bark, Chinese, Cinnamon bark, Saigon, Cinnamon leaf, Ceylon Cinnamon leaf, Chinese, Cinnamon leaf, Saigon, Citronella, 30 Citrus peels, Clary (clary sage), Clover, Coca (decocainized), Coffee, Cola nut, Coriander, Cumin (cummin), Curacao orange peel (orange, bitter peel), Cusparia bark, Dandelion, Dandelion root, Dog grass (quackgrass, triticum), Elder flowers, Estragole (esdragol, esdragon, tarragon), Estragon (tarragon), Fennel, sweet, Fenugreek, Galanga (galangal), Geranium Geranium, East Indian, Geranium, rose, Ginger, Grapefruit, Guava, Hickory bark, 35 Horehound (hoarhound) Hops, Horsemint, HyssopImmortelle, Jasmine, Juniper (berries)Kola nut, Laurel berries, Laurel leaves, Lavender, Lavender, spike, Lavandin, Lemon, Lemon balm (see balm), Lemon grass, Lemon peel, Lime, Linden flowers, Locust bean, Lupulin, Mace,

Mandarin, Marjoram, sweet, Mate, Melissa (see balm), Menthol, Menthyl acetate, Molasses (extract) Mustard, Naringin, Neroli, bigarade, Nutmeg, Onion, Orange, bitter, flowers, Orange, bitter, peel, Orange leaf, Orange, sweet, Orange, sweet, flowers Orange, sweet, peel, Origanum, Palmarosa, Paprika, Parsley, Pepper, black, Pepper, white, Peppermint, 5 Peruvian balsam, Petitgrain, Petitgrain lemon, Petitgrain mandarin or tangerine, Pimenta, Pimenta leaf, Pipsissewa leaves, Pomegranate, Prickly ash bark, Rose absolute, Rose (otto of roses, attar of roses), Rose buds, Rose flowers, Rose fruit (hips), Rose geranium, Rose leaves Rosemary, Saffron, Sage, Sage, Greek, Sage, Spanish, St. John's bread, Savory, summer, Savory, winter, Schinus molle, Sloe berries (blackthorn berries,) Spearmint, Spike 10 lavender, Tamarind, Tangerine, Tarragon, Tea, Thyme, Thyme, white, Thyme, wild or creeping, Triticum (see dog grass), Tuberose, Turmeric, Vanilla, Violet flowers, Violet leaves, Violet leaves absolute, Wild cherry bark, Ylang-ylang, Zedoary bark, Apricot kernel (persic oil), Peach kernel (persic oil) Peanut stearine, Persic oil (see apricot kernel and peach kernel), Quince seed, or combinations thereof.

15 Preferred examples of essential oils are Basil, Bay, Balsam Peru, Bergamot, Black Pepper, Cassia, Cajuput, Cardamom, Cedarwood, Cinnamon, Chamomile, Cinnamon, Clary Sage, Cypress, Clove, Coriander, Fennel, Frankincense, Eucalyptus, Geranium, Ginger, Grapefruit, Ho Leaf, Jasmine, Hyssop, Ho Wood, Myrrh, Lemon, Hyssop, Neroli, Lemongrass, Juniper, Oakmoss, Lime, Lavender, Patchouli, Mandarin /Tangerine, Marjoram, Rose, Neroli, 20 Melissa, Rosewood, Verbena, Myrtle, Sandalwood, Niaouli, Nutmeg, Valerian, Orange,, Palma, Rosa, Vanilla, Peppermint, Pine, Vetiver, Petitgrain, Rosemary, Ylang Ylang, Ravensara, Spikenard, Sage, Yarrow, Spearmint, Tagetes, Tangerine, Tea Tree, Thyme, or combinations thereof.

Preferred examples of aroma compounds are Methyl formate, Methyl acetate, 25 Methyl butyrate, Methyl butanoate, Ethyl acetate, Ethyl butyrate, Ethyl butanoate, Isoamyl acetate, Pentyl butyrate, Pentyl butanoate, Pentyl pentanoate, Octyl acetate, Myrcene, Geraniol Rose, Nerol Sweet rose, Citral, Citronellal, Citronellol, Linalool, Nerolidol, Limonene, Camphor, Terpeneol, alphasolone, Thujone, Eugenol, Ethyl maltol, Vanillin, Anethole, Estragole, Thymol, gamma-Decalactone, gamma-Nonalactone, delta-Octalactone, Jasmine 30 lactone, Massoia lactone, Wine lactone, Sotolon, Dihydrojasmane, or combinations thereof.

Preferred examples of fixatives are selected from the group consisting of Ambergris, sandalwood, musk, vetiver, orris root, and bergamot orange, or combinations thereof. These fixatives will reduce the evaporation rate and improve the stability. So the final fuel composition will last longer while keeping its original fragrance.

35 The present invention can be used to tailor made a fuel composition according to one's needs. A petrol station or a service station will provide such a fuel composition by the use of a filling station comprising several petrol pump hoses. For example, one hose delivers

the basic component ethanol, the second one delivers the aromatic oxygenates, for example benzyl alcohol, and the third, fourth etc deliver the specific perfume fraction components. By mixing these flows together one can create his own fuel composition having a specific pleasant scent. Another embodiment is that the filling station itself has several buttons for choosing the specific odour component or components, with the resulting perfume coming out of one single hose. In addition, the mixing of these components is done in such a way that the perfume fraction obtained has the correct Volumetric Higher Heating Value (HHV), i.e. said perfume fraction is higher than or equal to 33,0 MJ/litre.

The present invention will now be explained by Examples according to the invention and comparative examples. The invention is by no means restricted to the values and components used in the Examples.

Comparative Example 1

The caloric value of a woody vanilla perfume was measured before testing the perfume composition in an internal combustion engine. The caloric value measured was far below the lower limit of a fuel to be qualified as a fuel suitable for internal combustion engine. Composition tested: 85 vol.-% ethanol with 15 vol.-% perfume fraction, whereby perfume fraction is 90 vol.-% guaiacol (aromatic oxygenate) and 10 vol.-% vanilla oil (essential oil) with a HHV of only 32 MJ/l, but a RON of 95.

Comparative Example 2

The RON value of a woody citrus perfume was measured before testing the perfume composition in an internal combustion engine. The RON value measured was far below the lower limit of a fuel to be qualified as a fuel suitable for internal combustion engine. Composition tested: 85 vol.-% ethanol with 15 vol.-% perfume fraction, whereby perfume fraction is 70 vol.-% guaiacol (aromatic oxygenate) and 30 vol.-% limonene (aroma compound) with a HHV 33,6 MJ/l, but a RON of 93.

Example 1

A fuel mixture having a citrus odor, i.e. limonene, was measured before testing the perfume composition in an internal combustion engine. The caloric value and RON value measured were both above the lower limit of a fuel to be qualified as a fuel suitable for internal combustion engine. Composition tested: 85 vol.-% ethanol with 15 vol.-% perfume fraction: RON ~105 and HHV ~36 MJ/l. The perfume fraction was:

- 90 vol.-% aromatic oxygenate: benzyl alcohol
- 10 vol.-% aroma compound: limonene

The fuel composition, that is the ethanol and the above perfume fraction, was tested as a fuel in an internal combustion engine. The performance of the engine was comparable with the performance of the same engine running without the fragrance.

5 Example 2:

A fuel mixture having a rose odor, i.e. Rose absolute, was measured before testing the perfume composition in an internal combustion engine. The caloric value and RON value measured were both above the lower limit of a fuel to be qualified as a fuel suitable for internal combustion engine. Composition tested: 85 vol-% ethanol and 15 vol.-% perfume fraction: RON ~108 and HHV ~37 MJ/l. The perfume fraction was:

- 80 vol-% aromatic oxygenate: 2-phenyl ethanol
- 20 vol-% essential oil: rose oil

The fuel composition, that is the ethanol and the above perfume fraction, was tested as a fuel in an internal combustion engine. The performance of the engine was comparable with the performance of the same engine running without the fragrance.

Example 3:

A fuel mixture having a almond odor, i.e. Almond bitter, was measured before testing the perfume composition in an internal combustion engine. The caloric value and RON value measured were both above the lower limit of a fuel to be qualified as a fuel suitable for internal combustion engine. Composition tested: 85 vol-% ethanol and 15 vol.-% perfume fraction: RON ~120 and HHV ~34 MJ/l. The perfume fraction was:

- 70 vol-% aromatic oxygenate: benzaldehyde
- 30 vol-% essential oil: almond oil

The fuel composition, that is the ethanol and the above perfume fraction, was tested as a fuel in an internal combustion engine. The performance of the engine was comparable with the performance of the same engine running without the fragrance.

Although the Examples disclosed herein only comprise one essential oil or aromatic compound, it is clear that combinations of several essential oils and aromatic compounds can be used in the present fuel composition.

CLAIMS

1. Fuel composition for internal combustion engines and burners on basis of ethanol, wherein said fuel composition contains 1 – 40 vol. % of a perfume fraction, based
5 on the total fuel composition, said perfume fraction is constituted of one or more additives selected from a group consisting of essential oils, aroma compounds and aromatic oxygenates, wherein the Volumetric Higher Heating Value (HHV), measured according to ASTM D240, of said perfume fraction is higher than or equal to 33,0 MJ/litre.
2. Fuel composition according to claim 1, wherein the minimum Research
10 Octane Number (RON), measured according to ASTM D2699, of said perfume fraction is higher than or equal to 95,0.
3. Fuel composition according to any one or more of the preceding claims, wherein the amount of aromatic oxygenates present in said perfume fraction is in the range of 50 - 100 vol.%, calculated on the total perfume fraction present in said fuel
15 composition.
4. Fuel composition according to any one or more of the preceding claims, wherein the minimum Research Octane Number (RON), measured according to ASTM D2699, of said aromatic oxygenates present in said perfume fraction is higher than or equal to
20 95,0.
5. Fuel composition according to any one or more of the preceding claims, wherein the Volumetric Higher Heating Value (HHV), measured according to ASTM D240, of said aromatic oxygenates present in said perfume fraction is higher than or equal to
33,0 MJ/litre.
6. Fuel composition according to any one or more of the preceding
25 claims, wherein the aromatic oxygenates comprise a benzene ring and only one functional oxygen group attached to said benzene ring.
7. Fuel composition according to claim 6, wherein said aromatic oxygenates are selected from group consisting of 1-phenyl ethanol, anisole, benzaldehyde, benzyl alcohol, 2-phenyl ethanol, acetophenone and cinnamaldehyde, or combinations
30 thereof.
8. Fuel composition according to claim 7, wherein said aromatic oxygenate is benzyl alcohol.
9. Fuel composition according to any one or more of the claims 6-8, wherein said perfume fraction comprises benzyl alcohol and one or more additives selected
35 from essential oils and aroma compounds.
10. Fuel composition according to any one or more of the preceding claims, wherein said fuel composition contains 30 – 40 vol.% of said perfume fraction.

11. Fuel composition according to any one or more of the claims 1-9, wherein said fuel composition contains 20 - 30 vol.% of said perfume fraction.

12. Fuel composition according to any one or more of the claims 1-9, wherein fuel composition contains 10 - 20 vol.% of said perfume fraction.

5 13. Fuel composition according to any one or more of the claims 1-9, wherein said fuel composition contains 5 - 10 vol.% of said perfume fraction.

14. Fuel composition according to any one or more of the claims 1-9, wherein said fuel composition contains 3 - 5 vol.% of said perfume fraction.

10 15. Fuel composition according to any one or more of the claims 1-9, wherein said fuel composition contains 1 - 3 vol.% of said perfume fraction.

16. Fuel composition according to any one or more of the preceding claims, wherein said fuel composition further comprises a proportion of 0,1 - 10 vol. %, relative to the said fuel composition, of one or more substances which are selected from group consisting of pigments, dyes, colorants, cetane improvers, soot particle emission reducing agents, flow promoters, filterability improvers, antioxidants, corrosion inhibitors, antifoam agents, ignition accelerators, stabilizers, antiknock agents, carburettor antiicing additives, antideposition agents, antismoke agents, biocides, lubricity improvers, antiwear agents, fixatives and viscosity improvers.

17. Fuel composition according to any one or more of the preceding claims, wherein the essential oils are selected from group (i) consisting Alfalfa, Allspice, Almond bitter (free from prussic acid), Ambrette (seed), Angelica root, Angelica seed, Angelica stem, Angostura (cusparia bark), Anise, Asafetida, Balm (lemon balm), Balsam of Peru, Basil, Bay leaves, Bay (myrcia oil), Bergamot (bergamot orange), Bitter almond (free from prussic acid), Bois de rose, Cacao, Camomile (chamomile) flowers, Hungarian, 25 Camomile (chamomile) flowers, Roman or English, Cananga Capsicum, Caraway, Cardamom seed (cardamon), Carob bean, Carrot, Cascarilla bark, Cassia bark, Chinese, Cassia bark, Padang or Batavia, Cassia bark, Saigon, Celery seed, Cherry, wild, bark, Chervil, Chicory, Cinnamon bark, Ceylon, Cinnamon bark, Chinese, Cinnamon bark, Saigon, Cinnamon leaf, Ceylon Cinnamon leaf, Chinese, Cinnamon leaf, Saigon, Citronella, Citrus peels, Clary (clary 30 sage), Clover, Coca (decocainized), Coffee, Cola nut, Coriander, Cumin (cummin), Curacao orange peel (orange, bitter peel), Cusparia bark, Dandelion, Dandelion root, Dog grass (quackgrass, triticum), Elder flowers, Estragole (esdragol, esdragon, tarragon), Estragon (tarragon), Fennel, sweet, Fenugreek, Galanga (galangal), Geranium Geranium, East Indian, Geranium, rose, Ginger, Grapefruit, Guava, Hickory bark, Horehound (hoarhound) Hops, 35 Horsemint, HyssopImmortelle, Jasmine, Juniper (berries)Kola nut, Laurel berries, Laurel leaves, Lavender, Lavender, spike, Lavandin, Lemon, Lemon balm (see balm), Lemon grass, Lemon peel, Lime, Linden flowers, Locust bean, Lupulin, Mace, Mandarin, Marjoram, sweet,

Mate, Melissa (see balm), Menthol, Menthyl acetate, Molasses (extract) Mustard, Naringin, Neroli, bigarade, Nutmeg, Onion, Orange, bitter, flowers, Orange, bitter, peel, Orange leaf, Orange, sweet, Orange, sweet, flowers Orange, sweet, peel, Origanum, Palmarosa, Paprika, Parsley, Pepper, black, Pepper, white, Peppermint, Peruvian balsam, Petitgrain, Petitgrain
5 lemon, Petitgrain mandarin or tangerine, Pimenta, Pimenta leaf, Pipsisewa leaves, Pomegranate, Prickly ash bark, Rose absolute, Rose (otto of roses, attar of roses), Rose buds, Rose flowers, Rose fruit (hips), Rose geranium, Rose leaves Rosemary, Saffron, Sage, Sage, Greek, Sage, Spanish, St. John's bread, Savory, summer, Savory, winter, Schinus molle, Sloe berries (blackthorn berries,) Spearmint, Spike lavender, Tamarind, Tangerine,
10 Tarragon, Tea, Thyme, Thyme, white, Thyme, wild or creeping, Triticum (see dog grass), Tuberosa, Turmeric, Vanilla, Violet flowers, Violet leaves, Violet leaves absolute, Wild cherry bark, Ylang-ylang, Zedoary bark, Apricot kernel (persic oil), Peach kernel (persic oil) Peanut stearine, Persic oil (see apricot kernel and peach kernel), Quince seed, or combinations thereof.

15 18. Fuel composition according to any one or more of the preceding claims, wherein the aroma compounds are selected from group (ii) consisting of Methyl formiate, Methyl acetate, Methyl butyrate, Methyl butanoate, Ethyl acetate, Ethyl butyrate, Ethyl butanoate, Isoamyl acetate, Pentyl butyrate, Pentyl butanoate, Pentyl pentanoate, Octyl acetate, Myrcene, Geraniol Rose, Nerol Sweet rose, Citral, Citronellal, Citronellool, Linalool,
20 Nerolidol, Limonene, Camphor, Terpeneol, alpha Ionone, Thujone, Eugenol, Ethyl maltol, Vanillin, Anethole, Estragole, Thymol, gamma-Decalactone, gamma Nonalactone, delta Octalactone, Jasmine lactone, Massoia lactone, Wine lactone, Sotolon, Dihydrojasmane, or combinations thereof.

25 19. Fuel composition according to any one or more of the claims 16 - 18, wherein the fixatives are selected from the group consisting of Ambergris, sandalwood, musk, vetiver, orris root, and bergamot orange, or combinations thereof.

INTERNATIONAL SEARCH REPORT

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<p>A. CLASSIFICATION OF SUBJECT MATTER INV. C10L1/02 ADD.</p> <p>According to International Patent Classification (IPC) or to both national classification and IPC</p>														
<p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols) C10L</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched</p> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI Data, CHEM ABS Data</p>														
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>WO 2006/088462 A1 (STANDARD ALCOHOL COMPANY OF AM [US]; JIMESON ROBERT M [US]; RADOSEVICH) 24 August 2006 (2006-08-24) page 19: composition I; page 2, paragraph first -----</td> <td>1,2,4-8, 10-19</td> </tr> <tr> <td>X</td> <td>US 5 501 713 A (WILKINS JR JOE S [US]) 26 March 1996 (1996-03-26) column 1, line 6; example 4 -----</td> <td>1,2,4-8, 10-19</td> </tr> <tr> <td>X</td> <td>WO 01/53437 A1 (GOLUBKOV ANGELICA [SE]; GOLUBKOV IGOR [SE]) 26 July 2001 (2001-07-26) page 20, line 4 - page 21, line 30 ----- -/--</td> <td>1-19</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	WO 2006/088462 A1 (STANDARD ALCOHOL COMPANY OF AM [US]; JIMESON ROBERT M [US]; RADOSEVICH) 24 August 2006 (2006-08-24) page 19: composition I; page 2, paragraph first -----	1,2,4-8, 10-19	X	US 5 501 713 A (WILKINS JR JOE S [US]) 26 March 1996 (1996-03-26) column 1, line 6; example 4 -----	1,2,4-8, 10-19	X	WO 01/53437 A1 (GOLUBKOV ANGELICA [SE]; GOLUBKOV IGOR [SE]) 26 July 2001 (2001-07-26) page 20, line 4 - page 21, line 30 ----- -/--	1-19
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<p><input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.</p>														
<p>* Special categories of cited documents :</p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="vertical-align: top;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p> </td> </tr> </table>			<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>										
<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>													
<p>Date of the actual completion of the international search</p> <p style="text-align: center;">8 November 2012</p>		<p>Date of mailing of the international search report</p> <p style="text-align: center;">22/11/2012</p>												
<p>Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016</p>		<p>Authorized officer</p> <p style="text-align: center;">Klaes, Daphne</p>												

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