

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
29 November 2007 (29.11.2007)

PCT

(10) International Publication Number
WO 2007/136259 A1

(51) International Patent Classification:
C11C 5/00 (2006.01)

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(21) International Application Number:
PCT/NL2007/050222

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH,
CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES,
FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN,
IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR,
LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY,
MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS,
RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(22) International Filing Date: 16 May 2007 (16.05.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
06114267.5 19 May 2006 (19.05.2006) EP

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL,
PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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Published:

— with international search report

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For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: VEGETABLE FAT CONTAINING CANDLE

(57) Abstract: The present invention relates to a method of manufacturing a candle comprising a vegetable oil, said method com-
prising incorporating into said candle at least 10 wt.% of a palm oil fraction with a melting point of 32-54°C. The use of the palm
oil fraction in accordance with the present invention enables the manufacture of candles that are soft and ductile (as contrasted to
hard and brittle) and that exhibit excellent burning properties. The present invention also provides a candle comprising a candlewick
and a combustible candle body, said combustible candle body comprising at least 10 wt.% of the aforementioned palm oil fraction
and at least one of: - at least 20 wt.% of a further combustible material selected from the group consisting of petroleum-based wax,
fatty acid, bees wax and combinations thereof; and - at least 10 wt.% of hydrogenated oil with a melting point of at least 55 °C and
a iodine value of not more than 5.



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VEGETABLE FAT CONTAINING CANDLE

TECHNICAL FIELD OF THE INVENTION

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The present invention provides a vegetable fat containing candle with improved burning properties. The invention also provides a method for the manufacture of such a candle.

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BACKGROUND OF THE INVENTION

Candles have been used by mankind for more than 2000 years. Besides their liturgical relevance, candles were predominantly used as a source of light. Despite the availability of alternative means of illumination, such as electric lighting, candles have remained very popular.

A candle typically comprises a solid body of combustible wax and combustible fibrous wick embedded within the wax. When the wick of the candle is lit, the generated heat melts the wax, which is subsequently sucked up into the wick by capillary action and combusted. The term 'wax' covers a variety of different combustible materials of mineral, animal or vegetable origin, notably petroleum-derived waxes such as paraffin, bees wax, stearin and hardened fats.

Paraffin wax represents about 85% of the raw material that is currently used in the production of candles. A disadvantage of the use of petroleum-based waxes in candles is associated with the fact that the source of these waxes, i.e. petroleum, is non-renewable. Furthermore, availability of petroleum-based waxes is declining as a result of new petroleum refining techniques that reduce or eliminate the paraffin wax by-product.

In addition, there are problems associated with the burning properties of petroleum-based waxes. Burning of petroleum-based waxes can lead to the formation of soot deposits on walls and ceilings. Also, burning of these waxes may produce airborne particles that may have adverse health effects when inhaled. Finally, the smell caused by the burning of petroleum-based waxes is often regarded as objectionable.

The aforementioned problems have been recognised in the art and it has been proposed to reduce these problems by replacing at least a part of the petroleum-based waxes by a vegetable oil.

US 5,171,329 describes a candle which can be burned without producing smoke and toxic particles, and which can be burned with an odour released. Such a candle may be produced by mixing butter oil with solidified oil at a ratio of 5:3 to 3:5 to form a mixture and solidifying the mixture in the shape of a candle, wherein the butter oil contains 50-58% palm oil, 30-35% coconut oil, 5-8% soybean oil, 5-8% cottonseed oil, 2% flavour and less than 0.1% palmitic acid, melting point 35°-37°C and wherein the solidified oil contains 80-90% palm oil and 10-20% soybean oil with a melting point of approximately 60°C.

US 2003/004860 describes a candle which does not contain paraffin wax or any other petroleum based product as a primary ingredient. Instead the candles described in this US-application contain a vegetable fat having an iodine value of about 0 to about 80 as a primary component. In the examples candles are described that are formed from 80-100 wt.% of palm stearin and 0-20 wt.% hydrogenated palm oil (iodine value 5).

Vegetable fat based candles such as those described in the aforementioned prior art publications suffer from a couple of drawbacks. First of all, the soft, ductile properties of paraffin-based candles are usually lost when a substantial fraction of the paraffin is replaced by high melting fat. Secondly, candles containing a substantial amount of vegetable fat often do not burn completely, especially not if the candle has a relatively large diameter. Also, the flame properties of candles containing substantial amounts of vegetable fat usually deteriorate as the candle burns lower. Finally, if a candle is contained in a fuel receptacle (i.e. if it is not freestanding), some of the vegetable fat tends to stick to the receptacle and will not be burned.

SUMMARY OF THE INVENTION

The inventors have unexpectedly found that the aforementioned drawbacks may be overcome by incorporating into the candle at least 10 wt.% of a palm oil fraction with a melting point of 32-54 °C.

The use of this palm oil fraction enables the manufacture of candles that are soft and ductile (as contrasted to hard and brittle) and that exhibit excellent burning properties. Furthermore, the use of the aforementioned palm oil fraction unexpectedly improves the fragrance release from perfumed candles.

5 As regards the burning properties, although the inventors do not wish to be bound by theory, it is believed that the present palm oil fraction advantageously affects the rheological properties of the candle body after it has melted, thus enhancing the capillary action of the wick and enabling complete combustion of the candle body.

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DETAILED DESCRIPTION OF THE INVENTION

Accordingly, one aspect of the invention relates a method of manufacturing a candle comprising a vegetable oil, said method comprising incorporating into said
15 candle at least 10 wt.% of a palm oil fraction with a melting point of 32-54 °C.

The term "palm oil fraction" as used herein refers to a portion of palm oil that has been isolated therefrom using a process (fractionation) in which a liquid triglyceride component of the palm oil is separated from a solid component of the same palm oil. Fractionation may be carried out at temperatures at which the oil contains
20 both solid and liquid fat. The present invention encompasses palm oil fractions that are obtained by different fractionation techniques such as wet and dry fractionation.

Unless indicated otherwise, throughout this document, the terms "oil" and "fat" are deemed to be synonyms.

Whenever reference is made in this document to the concentration of a
25 particular fatty acid, unless indicated otherwise, this concentration refers to the amount of that particular fatty acid residue relative to the total amount of fatty acid residues.

The palm oil fraction of the present invention typically contains at least 50 wt.% palmitic acid, preferably at least 53 wt.% of palmitic acid. The concentration of unsaturated fatty acids in the palm oil fraction preferably is in the range of 33-45 wt.%,
30 more preferably in the range of 35-43 wt.%. The amount of stearic acid contained in the palm oil fraction typically is less than 10 wt.%, preferably less than 8 wt.%.

The composition of an oil may also be characterised by specifying the concentration of the different triglycerides contained therein. The individual

triglycerides may be characterised on the basis of the fatty acids contained within the triglyceride (e.g. two palmitic acid residues and one oleic acid residue). The triglyceride compositions referred to in this document are determined by means of the analysis method described in A.O.C.S. Official Method Ce 5-86 and A.O.C.S. Official
5 Method Ce 5c-93.

In case a triglyceride contains two different fatty acids, this triglyceride can occur in two isomeric forms. For instance, if a triglyceride contains two palmitic acid residues (represented by P) and one oleic acid residue (represented by O), this triglyceride can occur in the form of PPO and POP. The notation "XXY" and "XYX"
10 are used in this document interchangeably to refer to all triglycerides that contain two fatty acid residues X and one fatty acid residue Y.

The palm oil fraction of the present invention is characterised by a high content of POP and POO triglycerides. According to a preferred embodiment POP and POO triglycerides represent 42-53 wt.% of the triglycerides contained in the palm oil
15 fraction. The amount of PPP triglycerides contained in the palm oil fraction preferably is in the range of 15-30 wt.%.

According to a particularly preferred embodiment, the palm oil fraction is characterised by a weight ratio (POP+POO)/PPP of at least 1.4, preferably of 1.6-2.5.

The palm oil fraction of the present invention may also be characterised on the
20 basis of the solid fat content of the palm oil fraction at different temperatures. The solid fat content at a temperature of T °C (N_T) may suitably be determined by means of the analytical method described in; ISO 8292 (1995). Typically, the present palm oil fraction is characterised by the following solid fat profile:

$$\begin{aligned} 72 &\leq N_{10} \leq 80; \\ 25 \quad 52 &\leq N_{20} \leq 60; \\ 28 &\leq N_{30} \leq 36; \text{ and} \\ 14 &\leq N_{40} \leq 22. \end{aligned}$$

The present palm oil fraction preferably is rather steep melting in the temperature range of 10-30 °C. Accordingly, in a preferred embodiment, N_{10} - N_{30} is within the range
30 of 32-57, more preferably of 36-52.

The palm oil fraction of the present invention is advantageously obtainable by a multi-step fractionation process comprising isolating a stearin fraction from palm oil and subsequently isolating an olein fraction from said stearin fraction. According to an

even more preferred embodiment, the palm oil fraction is obtainable by isolating a stearin fraction with an iodine value of less than 37 and by isolating from said stearin fraction an olein fraction having an iodine value of at the most 42, preferably of 35-42, and wherein the iodine value of the latter olein fraction is at least 2 points higher than the iodine value of the stearin fraction from which it is isolated.

According to a particular embodiment of the present invention, the palm oil fraction is incorporated into the candle together with at least 20 wt.%, more preferably at least 30 wt.% and most preferably at least 40 wt.% of a further combustible material selected from the group consisting of petroleum-based wax, fatty acid, bees wax and combinations thereof. Advantageously, the palm oil fraction, the further combustible material and optional further triglyceride fats together represent at least 80 wt.%, preferably at least 90 wt.% of the combustible matter contained in the candle.

According to another embodiment of the invention the method comprises incorporating into the candle at least 10 wt.% of fully hydrogenated oil with a melting point of at least 55 °C and a iodine value of not more than 5, preferably of not more than 2. The incorporation of a substantial amount of hydrogenated oil is particularly advantageous in case the candle contains a relatively large amount of the palm oil fraction. Thus, even more preferably, the present method comprises incorporation into the candle of at least 40 wt.%, more preferably at least 50 wt.% of the palm oil fraction. The amount of hydrogenated oil applied in the manufacture of the candle preferably is within the range of 20-80 wt.%, more preferably within the range of 25-70 wt.%. A particularly preferred embodiment of the present method comprises the incorporation of at least 80 wt.% of the combination of palm oil fraction and hydrogenated oil.

The hydrogenated oil is suitably selected from the group consisting of hydrogenated palm oil, hydrogenated soybean oil, hydrogenated sunflower oil, hydrogenated rape seed oil and combinations thereof. Most preferably, the hydrogenated oil employed in accordance with the present invention is fully hydrogenated palm oil.

The present process typically comprises the steps of:

- providing a molten candle body composition containing the palm oil fraction;
- contacting the molten candle body composition with a candlewick such that a portion of the candlewick is coated with the candle body composition; and

- cooling the candlewick and the candle body composition coated thereon to form a solid candle.

In comparison to the vegetable fat containing candles of the prior art, the candles obtained by incorporating therein the present palm oil fraction exhibit

- 5 improved burning properties and/or improved fragrance release. Hence, another aspect of the invention relates to the use of the palm oil fraction as defined herein before to improve the burning properties and/or to improve the fragrance release of a candle.

Yet another aspect of the invention relates to a candle comprising a candlewick and a combustible candle body, said combustible candle body comprising at least 10
10 wt.% of the present palm oil fraction and at least one of:

- at least 20 wt.% of a further combustible material selected from the group consisting of petroleum-based wax, fatty acid, bees wax and combinations thereof; and
- at least 10 wt.% of hydrogenated oil with a melting point of at least 55 °C and a
15 iodine value of not more than 5, preferably of not more than 2.

The candle of the present invention advantageously comprises at least 10 wt.% of the palm oil fraction and at least 10 wt.% of the hydrogenated oil, the combination of palm oil fraction and hydrogenated oil representing at least 40 wt.%, preferably at least 80 wt.% of the candle body.

20 According to another preferred embodiment, the candle comprises at least 30 wt.% of the palm oil fraction and at least 20 wt.% of a further combustible material selected from the group consisting of petroleum-based wax, fatty acid, bees wax and combinations thereof. Most preferably, the further combustible material is petroleum-based wax.

25 POP and POO together advantageously represent 21-53 wt.%, preferably 30-53 wt.% of the triglycerides contained in the candle body. PPP preferably represents 10-30 wt.%, more preferably 12-30 wt.% of the triglycerides contained in the candle body.

The fat contained in the candle base advantageously has a solid fat profile that is similar to that of paraffin wax. Such a solid fat profile may be realised by blending
30 the present palm oil fraction with an adequate amount of hydrogenated fat. Preferably, the fat contained in the candle base is characterised by the following solid fat profile:

$$70 \leq N_{10} \leq 98;$$

$$60 \leq N_{20} \leq 95;$$

$$45 \leq N_{30} \leq 90; \text{ and}$$

$$30 \leq N_{40} \leq 85.$$

- 5 Even more preferably, the fat contained in the candle base is characterised by the following solid fat profile:

$$75 \leq N_{10} \leq 98;$$

$$70 \leq N_{20} \leq 95;$$

$$50 \leq N_{30} \leq 90; \text{ and}$$

10 $32 \leq N_{40} \leq 85.$

The invention is further illustrated by means of the following examples:

EXAMPLES

15

Example 1

- A grave light was manufactured by vertically inserting a wick into a plastic cup, pouring in the molten candle base and allowing candle base to solidify whilst the wick is fixated in the centre of the cup. The candle base contained 50 wt.% of a palm oil fraction with an iodine value of 40 and a melting point of 48 °C and 50 wt.% of paraffin wax. The fatty acid, triglyceride composition and solid fat profile of the palm oil fraction are depicted in Tables 1-3.
- 20

Table 1

<i>Fatty acid</i>	<i>Wt.%</i>
Lauric acid	0.2
Myristic acid	1.2
Palmitic acid	55.3
Stearic acid	5.1
Oleic acid	30.3
Linoleic acid	6.8

25

Table 2

<i>Triglyceride</i> [#]	<i>Wt.%</i>
MPP	2.34
MOM	0.08
PPP	24.71
MOP	1.59
MLP	0.12
PPS	5.29
POP	35.15
MOO	0.20
PLP	6.14
MLO	-
PSS	0.57
POS	4.89
POO	12.12
PLS	1.73
PLO	4.59
PLL	0.74
SOS	0.36
SOO	1.12
OOO	1.53
SLO	0.32
OLO	0.50

L = lauric acid; M = myristic acid; P = palmitic acid; S = stearic acid; O = oleic acid;
L = linoleic acid

5 Table 3

N ₁₀	76%
N ₂₀	58%
N ₃₀	34%
N ₄₀	18%
N ₅₀	0%

The palm oil fraction used in this experiment was obtained by a two-step dry fractionation of palm oil. In the first step, palm oil was separated in an stearin fraction with an iodine value of 35 and an olein fraction with a iodine value of 56. Next, the stearin fraction was fractionated to yield the palm oil fraction described above and a stearin fraction having an iodine value of 12.

The candle was found to have excellent burning properties. The quality of the flame remained constant until the candle had burned completely. Virtually no wax/fat remained on the cup after the candle had burned completely. Also there was no ash left from the candle wick. The candle wick had been burned completely.

Example 2

Example 1 was repeated except that the candle base contained 42 wt.% of the palm oil fraction, 18 wt.% of fully hydrogenated palm oil (melting point of 58 °C) and 40 wt.% of paraffin wax. The fatty acid composition of the fully hydrogenated palm oil is depicted in Tables 4. Table 5 depicts the solid fat profile of the vegetable fat blend contained in the candle base.

Table 4

<i>Fatty acid</i>	<i>Wt. %</i>
Lauric acid	0.1
Myristic acid	1.1
Palmitic acid	43.9
Stearic acid	53.6
Oleic acid	0.5
Linoleic acid	0.1

10 Table 5

N ₁₀	86%
N ₂₀	76%
N ₃₀	59%
N ₄₀	40%
N ₅₀	5%

The candle was found to have excellent burning properties. The quality of the flame remained constant until the candle and candle wick had burned completely. Virtually no wax/fat remained on the cup after the candle had burned completely.

15

Example 3

Example 1 was repeated except that the candle base contained 50 wt.% of the palm oil fraction and 50 wt.% of the fully hydrogenated palm oil (melting point of 58 °C). The solid fat profile of the candle base is depicted in Table 6.

20

Table 6

N ₁₀	88%
N ₂₀	85%
N ₃₀	74%
N ₄₀	59%
N ₅₀	10%

The candle was found to have excellent burning properties. The quality of the flame remained constant until the candle had burned completely. Virtually no fat remained on the cup after the candle had burned completely.

5 Comparative Example

Example 3 was repeated except that the candle base was made of the fully hydrogenated palm oil (melting point of 58 °C). The candle so obtained was more brittle than the candles described in the previous examples. Furthermore, also the burning properties were found to be inferior.

10

Example 4

Candles having a diameter of 45 mm and a height of 23 cm were prepared from blends of paraffin wax and vegetable fat. The paraffin used was a commercial product sold under the name Dunawax DWC 0,5 – 6062 K 0812-005 (ex Mol chem). The paraffin wax had a melting point of 60.2 °C. The wick used was a 3x9 cotton wick supplied by Vlamco NV, Belgium.

The following vegetable fat components were applied in combination with paraffin wax in the indicated amounts (in wt.%):

20 Table 1

	4A	4B	4C	4D	4E	4F	4G	4H
Vegetable fat	Fat 1		Fat 2		Fat 3		Fat 4	
% vegetable fat	20	60	20	60	20	60	20	60
% paraffin wax	80	40	80	40	80	40	80	40

Fat 1 = palm oil fraction obtained as olein fraction (IV=40) from palm stearin (IV=35)

Fat 2 = 70/30 blend of Fat 1 and fully hydrogenated palm oil (melting point = 58 °C; IV = 1.3)

Fat 3 = 50/50 blend of Fat 1 and fully hydrogenated palm oil (melting point = 58 °C; IV = 1.3)

25 Fat 4 = 50/50 blend of Fat 1 and partially hydrogenated palm oil (melting point = 44 °C; IV = 44)

The candles were prepared by pouring a molten mixture of the vegetable fat and the paraffin wax into a mould containing a wick. After the mixture had solidified within the mould, the candle was removed.

30 It was found that the candles could be removed from the moulds without any problem. All the candles were found to have burning properties that were ranked from satisfactory to excellent.

Example 5

Candles were prepared as described in Example 4, using the following recipes:

5 Table 2

	5A	5B
Paraffin wax	78.4 wt. %	98 wt. %
Vegetable fat [#]	19.6 wt. %	
Lavender aroma	2 wt. %	2 wt. %

Same fat blend as in products 4E and 4F of Example 4

A so called QDA panel (n=12) was used to evaluate the odour generated by the above candles during burning. The following protocol was used. The candle was lit approximately 1 minute before the evaluation. The panellists were asked to evaluate the odour above a burning candle at approximately 20 cm distance from the candle. For about 10 seconds the panellists waved the air above the candle towards the nose and evaluated the odour. After approximately 10 seconds the panellists retreated for about 15 seconds to regenerate their ofactory system before starting the next evaluation.

The attributes that were used by the panel to describe the odour generated by the candles are listed below:

- Smell intensity
- Lavender
- Toilet freshener
- Chemical
- Pungent
- Burnt
- Wax/candle
- Oily/soapy
- Fresh
- Musty
- Round
- Caramel/cooked

The panel evaluation showed that the candle containing added vegetable fat yielded a higher score on the following attributes: "smell intensity", "lavender", "toilet freshener", "pungent". The vegetable fat containing candle scored lower on the attribute "caramel/cooked". These results show that the incorporation of only small

amount of a vegetable fat in accordance with the present invention significantly improved fragrance release from a burning candle.

In order to quantitatively assess the effect of the vegetable fat on the release of fragrance molecules, the following analysis was performed on the candles 5A and 5B.

5 The candle was lit 1 minute before starting the analysis. Next, the candle was placed under a bell-glass to collect the released fragrance molecules. A vacuum pump was connected to the bell-glass via an adsorption tube (Carbotrap®/Carbosieve®). Headspace was sucked off at a flow rate of 100 mL/min. After 30 minutes of sampling, the adsorption tube was dried for 10 minutes with a nitrogen stream (150 mL/min.).

10 After drying, the adsorbed fragrance volatiles were thermally desorbed for 15 minutes at 275 °C with a direct flow of 60 mL/min. The volatile compounds were refocussed at the start of a GC column using an active PDMS phase at -10 °C. Subsequently, the volatiles were separated on a chromatographic column and detected by means of a mass spectrometer. The GC-MS chromatograms so obtained were used
15 to determine the amount of fragrance molecules released from candles 5A and 5B. The following results were obtained:

Table 3

Substance	Odour description	Peak area	Peak area
Camphene	Oily, sweet, camphoraceous	0.13	0.36
D-limonene	Hydrocarbon, citrus-turpentine	0.06	0.23
1,8-cineole	Strong, camphoraceous, cool, fresh	0.72	1.16
Benzyl acetate	Sweet, floral, fruity (jasmine, gardenia)	0.97	1.92
Camphor	Harsh, minty-cooling	0.73	0.96
L- α -Terpineol	Sweet, floral (lilac), lime	0.16	0.19
Bornyl acetate	Sweet, herbaceous, piney	0.36	3.48

20 The analytical results are in line with the outcome of the sensory evaluation in that they show that several fragrance molecules are released in considerably larger quantities from candles containing a vegetable fat in accordance with the present invention as compared to candles containing 100% paraffin wax.

25 Example 6

Example 4 was repeated except that this time another type of candle was made. The molten blends of paraffin wax and vegetable fat were poured into a clear plastic

container containing a wick (type 2812.B ex Vlamco NV, Belgium). The holder was cylindrically shaped, had an internal diameter of 63 mm and a height of 61 mm.

Again it was found that all the candles exhibited burning characteristics that were ranked from satisfactory to excellent. It was also observed that in comparison to
5 candles made from only paraffin wax, the candles in accordance with the present invention showed less shrinkage during congealing.

CLAIMS

1. A method of manufacturing a candle comprising a vegetable oil, said method comprising incorporating into said candle at least 10 wt.%, preferably at least 30 wt.% of a palm oil fraction with a melting point of 32-54 °C.
2. Method according to claim 1, wherein the palm oil fraction contains at least 50 wt.%, preferably at least 53 wt.% of palmitic acid.
3. Method according to claim 1 or 2, wherein the palm oil fraction contains 33-45 wt.%, preferably 35-43 wt.% of unsaturated fatty acids.
4. Method according to any one of the preceding claims, wherein the palm oil fraction contains less than 10 wt.%, preferably less than 8 wt.% of stearic acid.
5. Method according to any one of the preceding claims, wherein POP and POO triglycerides represent 42-53 wt.% of the triglycerides contained in the palm oil fraction, POP representing triglycerides containing two palmitic acid residues and one oleic acid residue and POO representing triglycerides containing one palmitic acid residue and two oleic acid residues.
6. Method according to any one of the preceding claims, wherein the palm oil fraction contains 15-30 wt.% of PPP triglycerides.
7. Method according to any one of the preceding claims wherein the palm oil fraction is characterised by a weight ratio (POP+POO)/PPP of at least 1.4, preferably of 1.6-2.5.
8. Method according to any one of the preceding claims, wherein the palm oil fraction is characterised by the following solid fat profile:

$$72 \leq N_{10} \leq 80;$$

$$52 \leq N_{20} \leq 60;$$

$$28 \leq N_{30} \leq 36; \text{ and}$$

5 $14 \leq N_{40} \leq 22.$

9. Method according to any one of the preceding claims, wherein the method comprises incorporating into the candle at least 20 wt.%, preferably at least 40 wt.% of a further combustible material selected from the group consisting of
- 10 petroleum-based wax, fatty acid, bees wax and combinations thereof.
10. Method according to any one of the preceding claims wherein the method comprises incorporating into the candle at least 10 wt.% of hydrogenated oil with a melting point of at least 55 °C and a iodine value of not more than 5.
- 15
11. Use of a palm oil fraction as defined in any one of claims 1-8 to improve the burning properties and/or to improve the fragrance release of a candle.
12. A candle comprising a candlewick and a combustible candle body, said
- 20 combustible candle body comprising at least 10 wt.% of a palm oil fraction as defined in any one of claims 1-8 and at least one of:
- at least 20 wt.% of a further combustible material selected from the group consisting of petroleum-based wax, fatty acid, bees wax and combinations thereof; and
- 25 - at least 10 wt.% of hydrogenated oil with a melting point of at least 55 °C and a iodine value of not more than 5.
13. A candle according to claim 12, comprising at least 10 wt.% of the palm oil fraction and at least 10 wt.% of the hydrogenated oil, the combination of palm oil fraction
- 30 and hydrogenated oil representing at least 40 wt.%, preferably at least 80 wt.% of the candle body.

14. Candle according to claim 12 or 13, comprising at least 30 wt.% of the palm oil fraction and at least 20 wt.% of a further combustible material selected from the group consisting of petroleum-based wax, fatty acid, bees wax and combinations thereof.

5

15. Candle according to any one of claims 12-14, wherein POP and POO together represent 21-53 wt.%, preferably 30-53 wt.% of the triglycerides contained in the candle body.

10 16. Candle according to any one of claims 12-15, wherein PPP represents 10-30 wt.%, preferably 12-30 wt.% of the triglycerides contained in the candle body.

17. Candle according to any one of claims 12-16, wherein the fat contained in the candle base is characterised by the following solid fat profile:

15 $70 \leq N_{10} \leq 98;$
 $60 \leq N_{20} \leq 95;$
 $45 \leq N_{30} \leq 90;$ and
 $30 \leq N_{40} \leq 85.$

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2007/050222

A. CLASSIFICATION OF SUBJECT MATTER

INV. C11C5/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

C11C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, FSTA, COMPENDEX, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	REZAEI K ET AL: "HYDROGENATED VEGETABLE OILS AS CANDLE WAX" JOURNAL OF THE AMERICAN OIL CHEMISTS' SOCIETY, AOCS PRESS, CHAMPAIGN, IL, US, vol. 12, no. 79, December 2002 (2002-12), pages 1241-1247, XP001140912 ISSN: 0003-021X page 1241, column 2, paragraph 4 - page 1242, column 1, paragraph 4 figures 2-4; table 1	1-17
X	WO 03/012016 A (ARCHER DANIELS MIDLAND CO [US]; TIFFANY TOM [US]; SLEETER RON [US]; WI) 13 February 2003 (2003-02-13) page 5, paragraph 3; tables 5,6 ----- -/--	1-17

☒ Further documents are listed in the continuation of Box C.

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10 July 2007

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31/07/2007

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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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