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(54) **Essential oil and aromatic water extraction process from vegetable matrices**

(57) Aromatic water and essential oil extraction process from vegetable matrices, in the absence of solvent, in which the vegetable matrix is placed under vacuum and heated to a temperature higher than the water boiling point, in which the water that is obtained from the evaporation comes exclusively from the vegetable matrix as

a result of the breaking of the cell structures, in which vapors condense by lowering the temperature, in which after condensation in a collector water and essential oil are recovered, characterized by the fact that the vegetable matrix is homogenized with the addition of a salt, that the heating is performed under vacuum with a hot bath.

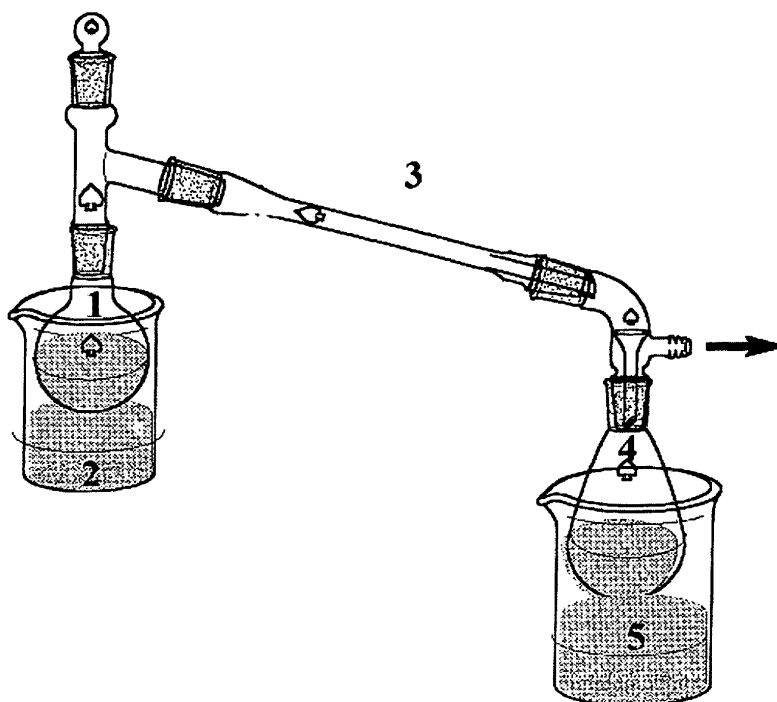


Fig. 1

Description

Technical field

[0001] The invention regards an extraction process of natural products from plant material, in the absence of solvent. In particular at the end of this process the obtained products are essential oils and aromatic water, the oils are volatile aromatic compounds that are obtained by distillation of the vapor that is created as a result of the heating of the vegetable matrix, after that the cell structures are demolished and the water in them contained is released.

State of the art

[0002] For the extraction of oils and aromatic waters from vegetable matrices in the absence of solvent were used different processes. FR-A-2787347 describes a process that provides for the extraction of oils and aromatic water from plant matrices in the absence of solvent, only taking advantage of the water contained in the vegetable structures and proceeding to the heating under vacuum and the separation of the aqueous phase from the oil. So it is a hydrodistillation process without homogenization of the vegetable matrix, in which by microwave irradiation of plant material the vegetable structures are broken. Moreover in this process heating uniformity is not guaranteed as heating treatment and vacuum conditions are contextual.

[0003] WO-A-9426853 defines a demolition technique of cell structures of a plant material by irradiation with microwave, aimed at extracting essential oils by hydrodistillation. Also in this case the extraction is performed in the absence of solvent and the obtained water originates from the matrix. Again in this process heating uniformity is not guaranteed as heating treatment and vacuum conditions are contextual.

[0004] The limits of these processes are as follows:

- Lack of homogenization of the vegetable matrix;
- Lack of uniformity of heating temperature because the heating treatment occurs concurrently with the pressure reduction.

[0005] The limitations and disadvantages existing in the state of the art are overcome by the present extraction process of aromatic water and essential oils from plant material, in the absence of solvent, in which the vegetable matrix is placed under vacuum and heated to a temperature higher than the water boiling point, in which the evaporated water comes exclusively from vegetable matrix as a result of the breaking of the cell structures, in which vapors condense by lowering of the temperature, in which after condensation in a collector water and essential oil are recovered, characterized by the fact that the vegetable matrix is homogenized with the addition of a salt, that the heating is performed under vacuum with

a hot bath.

[0006] Another characteristic is given by the fact that the salt is an organic salt.

5 [0007] Another characteristic is given by the fact that the salt is an inorganic salt.

[0008] Another characteristic is given by the fact that the vegetable matrix is heated with a hot bath to a temperature 30 degrees higher than the boiling point.

10 [0009] Other characteristics and advantages of the invention will appear clear from the following description of some methods of creating the invention, given as non-limiting examples in figure 1.

Brief description of the figure.

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[0010]

Fig. 1: The figure schematically represents a way to realize a system in order to carry out the process object of the invention.

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Description of an embodiment of the invention

25 [0011] For the realization of the process object of the present invention, the vegetable matrix is homogenized with an inorganic salt, added to 20%, in order to create on the cell membrane a proper osmotic pressure to the leakage of the water and the consequent demolition of the cell structures and placed in a container 1.

30 [0012] The container 1 with the homogenized plant material is placed under vacuum, created by vacuum pump 6 (wide range, centred at 20 mmHg) and the container 1 is dipped in a fluid heating bath 2 previously heated. The temperature of the bath 2 must be at least 30 degrees higher than the water boiling point under the used pressure conditions. The fast heating and vacuum conditions involve the generation of a water vapor current in which the volatile organic components resulting from the demolition of cell structures codistill.

35 [0013] The vapors pass through the tube 3 and condense in the collector 4 maintained at low temperature by the cold bath 5.

40 [0014] From the collector 4 are recovered:

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1. aromatic water, that is the water contained exclusively in the vegetable matrix, that is made aromatic by the volatile components that codistill with water and that in it are soluble;

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2. essential oil constituted by the volatile components present in the vegetable matrix. This is immiscible in the water.

[0015] The essential oil is recovered by separation from the aromatic water. The obtained aromatic water is ideal for the preparation of cosmetic products and constitutes (according to the type and the state of the matrix) the 20-80 % in weight of the matrix subjected to the treatment. The aromatic water and the essential oil so ob-

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tained can find application in the field of aromatherapy and food productions and aromas.

[0016] The duration of the separation process is short, only 15-30 minutes per 500 g of material.

[0017] The process can be applied to flowers, leaves, peels and every kind of vegetable material.

[0018] The process is performed implementing the following steps:

1. the organic matrix is homogenized with an organic or inorganic salt, placed under vacuum and heated. The developed vapors are condensed by lowering the temperature.

1.1 Any organic or inorganic salt, water-soluble, can be used in the process of homogenization. It contributes to demolish the cell structures of the vegetable material and indirectly promotes the heat conduction in the heating step.

1.2 In experiments carried out without the addition of salt the yields in recovered product are reduced until 50% for aromatic waters and 65% for essential oils.

1.3 The heating is performed by a fluid bath. The vegetable matrix can be heated also by coils in which a hot fluid flows in and placed in the same matrix.

1.4 The temperature of the heating fluid can be changed in a single process and/or depending on the material to treat.

1.5 The products of the process are: 1) essential oil and aromatic water; 2) aromatic water only; 3) essential oil only. The variability of the products depends on the type of matrix, the state of the matrix (fresh or dried) and the period of its collection.

1.6 The vegetable matrix can be constituted by flowers, leaves, parts of stalk, parts of roots, peels etc.

is homogenized with the addition of a salt and that the heating is performed under vacuum with a hot bath.

2. Aromatic water and essential oil extraction process from vegetable matrices according to claim 1, **characterized by** the fact that the salt is an organic salt.
3. Aromatic water and essential oil extraction process from vegetable matrices according to claim 1, **characterized by** the fact that the salt is an inorganic salt.
4. Aromatic water and essential oil extraction process from vegetable matrices according to claim 1 or 2, **characterized by** the fact that the vegetable matrix is heated with a hot bath to a temperature 30 degrees higher than the boiling point.

[0019] This invention is not limited to the representation given by the figures but can be perfected and modified by men expert in the art without altering the aim of the patent.

[0020] This invention has numerous advantages and will permit to overcome problems which could not be achieved by heating systems on the market today.

Claims

1. Aromatic water and essential oil extraction process from vegetable matrices, in the absence of solvent, in which the vegetable matrix is placed under vacuum and heated to a temperature higher than the water boiling point, in which the water that is obtained from the evaporation comes exclusively from the vegetable matrix as a result of the breaking of the cell structures, in which vapors condense by lowering the temperature, in which after condensation in a collector water and essential oil are recovered, **characterized by** the fact that the vegetable matrix

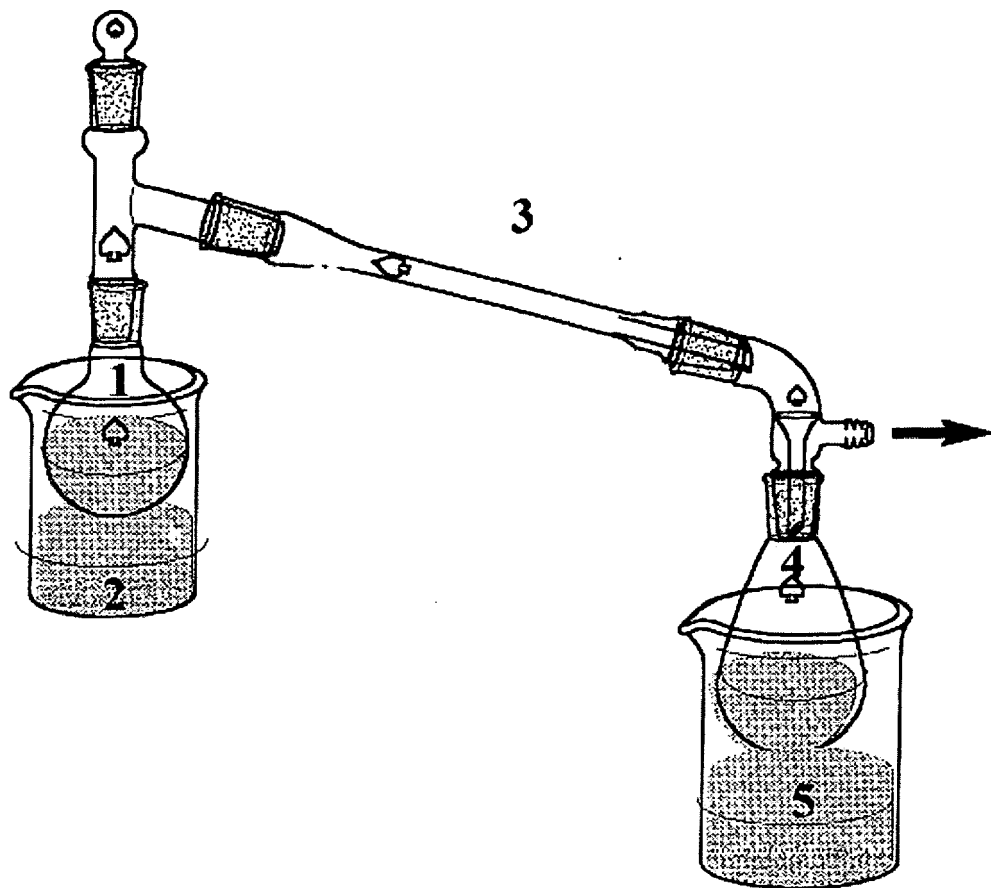


Fig. 1



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 02 0630

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 03/080777 A (COUNCIL SCIENT IND RES) 2 October 2003 (2003-10-02) * examples *	1-4	INV. C11B9/02
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D,A	FR 2 787 347 A (GATTEFOSSE ETS SA) 23 June 2000 (2000-06-23) * claims *	1-4	
			TECHNICAL FIELDS SEARCHED (IPC)
			C11B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 15 January 2008	Examiner Hillebrecht, Dieter
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 07 02 0630

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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15-01-2008

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- WO 9426853 A [0003]