

# Garlic essential oil extraction method

## Abstract

The invention discloses a garlic essential oil extraction method which comprises the following steps: carefully choosing and cleaning garlic; crushing the cleaned garlic to powder with diameter of 0.2-0.5mm; sending the crushed garlic powder into a distillation column, adjusting pressure in the distillation column to 0.10-0.20MPa, and keeping distillation for at least 4 hours when temperature in the distillation column rises to 120-150 DEG C; sending a distillate into a cooling tower for cooling; and sending a condensate in the cooling tower into an oil-water separating column to separate garlic essential oil, where a disk-shaped separating disc with several through holes arranged in the surface is also disposed inside the distillation column. Purity of garlic essential oil extracted by the above garlic essential oil extraction method is high; garlic distillation efficiency is raised; and extraction rate of garlic essential oil can reach 0.2-0.5%. In addition, byproducts of garlic essential oil are fully utilized, and economic value is raised. The method provided by the invention is convenient to operate, is cost-saving, and also can be applied in extraction of essential oil of ginger, rapeseed, soybean and the like.

CN104046514A

China

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Other languages: [Chinese](#)

Inventor: [杨善炳](#)

Current Assignee : Shifang City Heng Yuan Grease LLC

### Worldwide applications

2013 [GN](#)

Application CN201310083025.8A events 

2013-03-15	Application filed by Shifang City Heng Yuan Grease LLC
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2016-08-03	Publication of CN104046514B
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Info: [Patent citations \(7\)](#), [Non-patent citations \(3\)](#), [Cited by \(6\)](#), [Legal events](#), [Similar documents](#), [Priority and Related Applications](#)

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## Claims (8)

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1. a Bulbus Allii quintessence oil extracting method, is characterized in that, comprises the following steps:

Step 1, selected, cleaning, the selected garlic going mouldy without insect pest, nothing puts it in water to be soaked, and takes out garlic and rinses with water blast gun, removes impurity and the earth on garlic surface;

Step 2, pulverizing, be broken into even broken end by the garlic powder cleaning up, and broken last particle diameter is 0.2 ~ 0.5mm;

Step 3, charging, distillation, send the broken end of described garlic after pulverizing into distillation tower (1), and charging evenly; Described distillation tower (1) is provided with vapour pipe (601), described vapour pipe (601) is provided with open steam valve (7), open open steam valve (7), pass into steam, regulating described open steam valve (7) to control distillation tower (1) internal pressure is 0.10 ~ 0.20MPa, treat that the interior temperature of described distillation tower (1) is raised to 120 ~ 150 DEG C, keep distillation to close described open steam valve (7) after at least 4 hours;

Step 4, cooling, sends described distillate into cooling tower (9), controls the temperature out of water coolant within 30 DEG C, controls the temperature out of phlegma within 25 DEG C;

Step 5, essential oil separate, described phlegma flows into oily water separation tower (10), described oily water separation tower (10) separates described phlegma, and isolated Bulbus Allii quintessence oil and waste water, until it is clearly gradually transparent and containing described Bulbus Allii quintessence oil to separate the described waste water of discharging.

2. a kind of Bulbus Allii quintessence oil extracting method according to claim 1, it is characterized in that, in described distillation tower (1), be provided with separator disk (4) corresponding with described vapour pipe (601), described separator disk (4) is disc-shape, and surface has some through holes (8).
3. a kind of Bulbus Allii quintessence oil extracting method according to claim 1, is characterized in that, in described step 1, garlic soak time is 1 ~ 2 hour.
4. a kind of Bulbus Allii quintessence oil extracting method according to claim 1, is characterized in that, in described step 2, garlic is used pulverizer or hollander to pulverize, and broken last particle diameter is 0.2 ~ 0.3mm.
5. a kind of Bulbus Allii quintessence oil extracting method according to claim 1, is characterized in that, the interior temperature of distillation tower described in described step 3 (1) remains 150 DEG C, distills and after 4 hours, closes described open steam valve (7).

6. a kind of Bulbus Allii quintessence oil extracting method according to claim 1, is characterized in that, the charging garlic volume in distillation tower in described step 3 (1) is 80% of described distillation tower (1) volume.
7. a kind of Bulbus Allii quintessence oil extracting method according to claim 1, is characterized in that, the waste water in water coolant, described step 5 in described step 4 enters in collecting tank to be processed.
8. according to the arbitrary described a kind of Bulbus Allii quintessence oil extracting method of claim 1-7, it is characterized in that, distillation tower in described step 3 (1) is provided with Dump gate (3), when after described distillation tower (1) pressure release, cool the temperature to 50 DEG C, open described Dump gate (1), take out garlic slag, dry moisture, and control biodiversity in described garlic slag below 12%, then described garlic slag is pressed into and carries out pie and be packaged into bag.

## Description

A kind of Bulbus Allii quintessence oil extracting method

Technical field

The present invention relates to a kind of food processing technology field, particularly a kind of Bulbus Allii quintessence oil extracting method.

Background technology

Oleum Bulbus Allii is a kind of broad-spectrum antimicrobial material, has active cells, promotes power generation, increases antibacterial and anti-virus ability, the multiple pharmacological function such as quickening metabolism, alleviating fatigue, therefore, is all widely used in a lot of fields. China is in the world important garlic producing country and export State, but it is fewer that garlic is carried out to deep processing, is mainly outlet primary products and raw material type product. In order to enhance our international competitiveness, garlic is carried out to deep processing, especially extract high-quality Oleum Bulbus Allii, product is very important to high added value future development. This carries out constantly perfect with regard to requiring to the extraction process of Oleum Bulbus Allii.

The working method of ginger oil and Oleum Bulbus Allii mainly adopts steam distillation, extraction process, supercritical CO<sub>2</sub> extraction, ultrasonic assisted Extraction are followed the example of etc., traditional wet distillation extraction method, and extraction time is long, and the extraction yield of Oleum Bulbus Allii is relatively low, effectively do not utilize the elite of garlic, cause the waste of raw material, production cost is high, by-product utilized is poor simultaneously, and waste water is not effectively addressed; Use in addition the methods such as extraction process will add as organic solvents such as ethanol, ether, benzene, between solvent and essential oil, have certain intermiscibility, be difficult to separate completely, cause the purity of essential oil poor, affect the color index of essential oil, and then affect the quality of product.

Summary of the invention

The extraction yield that the object of the invention is to overcome existing traditional steam distillation Oleum Bulbus Allii in prior art is lower, the above-mentioned deficiency of garlic by-product utilized rate variance, and a kind of Bulbus Allii quintessence oil extracting method is provided.

In order to realize foregoing invention object, the invention provides following technical scheme:

A kind of Bulbus Allii quintessence oil extracting method, comprises the following steps:

Step 1, selected, cleaning, the selected garlic going mouldy without insect pest, nothing puts it in water to be soaked, and takes out garlic and rinses with water blast gun, removes impurity and the earth on garlic surface;

Step 2, pulverizing, be ground into even broken end by the garlic cleaning up, and broken last particle diameter is 0.2 ~ 0.5mm;

Step 3, charging, distillation, send the broken end of described garlic after pulverizing into distillation tower, and charging evenly; Described distillation tower is provided with vapour pipe, described vapour pipe is provided with open steam valve, open open steam valve, pass into steam, regulating open steam valve control distillation tower internal pressure is 0.10 ~ 0.20MPa, in tower to be distilled, temperature is raised to 120 ~ 150 DEG C, keeps distillation to close described open steam valve after at least 4 hours;

Step 4, cooling, sends described distillate into cooling tower, controls the temperature out of water coolant within 30 DEG C, controls the temperature out of phlegma within 25 DEG C;

Step 5, essential oil separate, and described phlegma flows into oily water separation tower, and described oily water separation tower separates described phlegma, and isolated Bulbus Allii quintessence oil and waste water, until it is clearly gradually transparent and containing described Bulbus Allii quintessence oil to separate the described waste water of discharging.

Preferably, be provided with separator disk corresponding with described vapour pipe in described distillation tower, described separator disk is disc-shape, and surface has some through holes.

After the steam comparing in prior art vapour pipe passes in distillation tower, because the distillation that skewness causes is insufficient not thorough, adopt disc-shape and have the separator disk of through hole, can be by the steam in vapour pipe after passing into distillation tower, flow through after separator disk and evenly enter in garlic raw material, can distill garlic raw material fully.

Preferably, in described step 1, garlic soak time is 1 ~ 2 hour.

Preferably, in described step 2, garlic is used pulverizer or hollander to pulverize, and broken last particle diameter is 0.2-0.3mm.

Preferably, in described step 3, temperature remains 150 DEG C in distillation tower, distills and after 4 hours, closes described open steam valve.

When temperature in distillation tower remains 150 DEG C, distill and can obtain most Bulbus Allii quintessence oils after 4 hours, if continue again to keep 150 DEG C to continue again distillation than 4 hours longer times, compared with the minute quantity Bulbus Allii quintessence oil obtaining, need to consume the more energy, improve on the contrary cost.

Preferably, the charging garlic volume in described step 3 in distillation tower is 80% of described distillation tower volume, avoids forming steam short circuit.

Preferably, the waste water in water coolant, the described step 5 in described step 4 enters in collecting tank and processes.

For environmental protection more, water coolant and wastewater collection to be processed in collecting tank, replenishment cycles water, neutralizes and dilutes the residual garlic end in water coolant, waste water.

Preferably, in described step 3, distillation tower is provided with Dump gate, when after described distillation tower pressure release, cool the temperature to 50 DEG C, open described Dump gate, take out garlic slag, dry moisture, and control biodiversity in described garlic slag below 12%, then described garlic slag is pressed into and carries out pie and be packaged into bag, can be applied in cultivation industry, increase the economic worth of garlic slag.

#### compared with prior art, beneficial effect of the present invention:

A kind of Bulbus Allii quintessence oil extracting method of the present invention, by using pulverizer, distillation tower, cooling tower, oily water separation tower, and controls the Bulbus Allii quintessence oil of various parameter extractions well, does not need to extract with extraction agent; Separator disk simultaneously that arrange in distillation tower, can make steam more evenly, fast the broken end of garlic is distilled, the Bulbus Allii quintessence oil extracting not only color all keeps good feature, and improve garlic distillation efficiency, Bulbus Allii quintessence oil purity is higher, and garlic extraction yield can reach 0.2 ~ 0.5%; The waste water of separating at Bulbus Allii quintessence oil has carried out wastewater treatment by collecting tank simultaneously, has protected environment; In addition the garlic slag after extracting is dried into cake and is packaged into bag, take full advantage of Bulbus Allii quintessence oil by product, improved economic worth; The method is simple, easy to operate, it is less, cost-saving to invest; Especially, this Bulbus Allii quintessence oil extracting method, can also be applied to extract in ginger oil, rapeseed oil, soybean oil and go.

Brief description of the drawings:

Fig. 1 is Bulbus Allii quintessence oil extraction process schema of the present invention.

The various device connection diagrams that Fig. 2 adopts for Bulbus Allii quintessence oil extracting method of the present invention.

Fig. 3 is the structural representation that the present invention adopts distillation tower.

Fig. 4 is the structural representation of separator disk in distillation tower of the present invention.

Mark in figure:

1, distillation tower, 2, upper bin gate, 3, Dump gate, 4, separator disk, 5, charging cage, 601, vapour pipe, 602, steam discharge pipe, 603, cooling tube, 604, water shoot one, 605, water shoot two, 606, blast main, 7, steam valve, 8, through hole, 9, cooling tower, 10, oily water separation tower, 11, water distributing can, 12, sub-cylinder, 13, pulverizer.

Embodiment

Below in conjunction with test example and embodiment, the present invention is described in further detail. But this should be interpreted as to the scope of the above-mentioned theme of the present invention only limits to following embodiment, all technology realizing based on content of the present invention all belong to scope of the present invention.

As Figure 1-4, a kind of Bulbus Allii quintessence oil extracting method, comprises the following steps:

Step 1 S01: selected, cleaning, the selected garlic going mouldy without insect pest, nothing puts it in water to be soaked, and takes out garlic and rinses with water blast gun, removes impurity and the earth on garlic surface;

Step 2 S02: pulverize, the garlic cleaning up is ground into even broken end, broken last particle diameter is 0.2-0.5mm;

Step 3 S03: charging, distillation, open the upper bin gate 2 on distillation tower 1, distillation tower 1 is sent into by charging cage 5 in the broken end of described garlic after pulverizing, charging is evenly; Described distillation tower 1 is provided with vapour pipe 601, open steam valve 7 is housed on vapour pipe 601, open open steam valve 7, pass into steam, regulating open steam valve 7 to control distillation tower 1 internal pressure is 0.10 ~ 0.20MPa, the interior temperature of tower 1 to be distilled is raised to 120 ~ 150 DEG C, keeps distillation to close described open steam valve 7 after at least 4 hours;

Step 4 S04: cooling, described distillate is sent into cooling tower 9 by vapor pipe 602, control the temperature out of water coolant within 30 DEG C, control the temperature out of phlegma within 25 DEG C;

Step 5 S05: essential oil separates, distillate in described cooling tower 9 is flowed into oily water separation tower 10, described oily water separation tower 10 separates described distillate, and isolated Bulbus Allii quintessence oil and waste water, until it is clearly gradually transparent and containing described Bulbus Allii quintessence oil to separate the described waste water of discharging.

For the extraction effect of Bulbus Allii quintessence oil, in distillation tower 1, be also provided with separator disk 4 corresponding with vapour pipe 601, its separator disk 4 is disc-shape, and surface has some through holes 8, as shown in Figure 3,4. With respect to prior art, be directly to enter distillation tower 1 after vapour pipe 601 passes into steam, because vapour pipe 601 bores are little a lot of compared with distillation tower 1 size, the steam flowing into is smaller to the broken last coverage rate of garlic, skewness, and the steam entering all covers the broken end of garlic needs the time spent more, ally neither synchronously carry out the distillation of garlic; And at 601 mouthfuls of correspondence positions of vapour pipe at distillation tower 1 place, separator disk 4 is set, steam in vapour pipe 601 is after passing into distillation tower 1, the separator disk 4 of flowing through is rear evenly, enter in garlic raw material fast, covering the broken end of the interior all garlicks of distillation tower 1 can be synchronously, distill fully, increase garlic distillation efficiency, also improved Bulbus Allii quintessence oil extraction yield simultaneously.

Wherein in above-mentioned steps one S01, garlic soak time is 1 ~ 2 hour; In step 2 S02, garlic is used pulverizer or hollander to pulverize, and broken last particle diameter is 0.2 ~ 0.3mm; Charging garlic volume in step 3 S03 in distillation tower 1 is 80% of distillation tower 1 volume, avoid forming steam short circuit, simultaneously for save energy, reduce costs, ensure Bulbus Allii quintessence oil extraction yield simultaneously, the interior temperature of described distillation tower 1 keeps electing 150 DEG C as, described open steam valve 7 is closed in redistillation after 4 hours, just can obtain most Bulbus Allii quintessence oils, and the garlic extraction yield that the method obtains can reach 0.2 ~ 0.5%; Waste water in water coolant, described step 5 S05 in step 4 S04 enters in collecting tank to be processed.

As shown in Figure 2, for the device connection diagram that adopts a kind of Bulbus Allii quintessence oil extracting method of the present invention to carry out Bulbus Allii quintessence oil extraction, comprise distillation tower 1, distillation tower 1 is fixedly connected with respectively sub-cylinder 12, cooling tower 9 by vapour pipe 601, steam discharge pipe 602, cooling tower 9 is fixedly connected with oily water separation tower 10 by cooling tube 603, vapour pipe 601, steam discharge pipe 602, cooling tube 603 are provided with steam valve 7, and separator disk 4 is arranged in distillation tower 1.

This Bulbus Allii quintessence oil extraction element also comprises pulverizer 13, and distillation tower 1 comprises bin gate 2 and Dump gate 3, and pulverizer 13 is fixedly connected on upper bin gate 2 by charging cage 5; Pulverizer 13 can be broken into garlic powder the broken end of garlic of reduced size, improves the utilization ratio of garlic, and can be circulated and be transported to the upper bin gate 2 on distillation tower 1 by charging cage 5, realizes automatic production. Meanwhile,

Bulbus Allii quintessence oil extraction element is also provided with water distributing can 11, and its water distributing can 11 is connected on cooling tower 9, oily water separation tower 10 by water shoot 1, water shoot 2 605, and water shoot 1, water shoot 2 605 are provided with steam valve 7; Water distributing can 11 is mainly to collect the water coolant of cooling tower 9 circulation outflows and the waste water that oily water separation tower 10 is separated, and processes, and whole this Bulbus Allii quintessence oil extraction element is by more environmental protection.Sub-cylinder 12 is fixedly connected on described cooling tower 9 by blast main 606, and blast main 606 is provided with steam valve 7; Sub-cylinder 12 is provided with blast main 606 and passes into air and can provide recirculating air for cooling tower 9, takes away the heat of cooling tower 9 interior distillates, accelerates the cooling efficiency of cooling tower 9.

In addition, in order to make full use of the by product of Bulbus Allii quintessence oil—garlic slag, in above-mentioned steps Three S's 03, distillation tower 1 is provided with Dump gate 3, when after described distillation tower 1 pressure release, cool the temperature to 50 DEG C, open described Dump gate 3, take out garlic slag, dry moisture, and control biodiversity in described garlic slag below 12%, and then garlic slag is pressed into and carries out pie and be packaged into bag, be applied in the feed of cultivation industry as livestock, effectively utilize Bulbus Allii quintessence oil by product, improved the economic worth of garlic slag.

Especially, this Bulbus Allii quintessence oil extracting method, can be used for extracting ginger oil, rapeseed oil, soybean oil, and its method is identical; And can make the flavor oil that various different materials mix, to adapt to the demand in market.

Patent Citations (7)

Publication number	Priority date	Publication date	Assignee	Title
<a href="#">CN1605288A</a> *	2003-10-08	2005-04-13	杨向光	Normal temperature extraction method of plant formulated concentrate
<a href="#">WO2006047404A2</a> *	2004-10-25	2006-05-04	Sensient Flavors Inc.	Methods for the production of food grade extracts
<a href="#">CN200946143Y</a> *	2006-09-15	2007-09-12	王庆才	Gas-electric dual-using aromatic oil distiller
<a href="#">CN101401636A</a> *	2008-11-20	2009-04-08	许昌元化生物科技有限公司	Method for producing organic garlic oil with reduced pressure distillation and B-grade condensation abstraction
<a href="#">CN101444272A</a> *	2008-12-26	2009-06-03	许昌元化生物科技有限公司	Novel process for deodorizing garlic oil
<a href="#">CN102000449A</a> *	2009-09-02	2011-04-06	美国Gtc技术有限责任公司	Methods and apparatuses for steam addition to a reboile for improved extractive distillation
<a href="#">CN102477355A</a> *	2010-11-21	2012-05-30	于腾升	Garlic oil processing method
Family To Family Citations				

\* Cited by examiner, † Cited by third party

Non-Patent Citations (3)

Title
张丽: "水蒸汽蒸馏法提取产生姜精油的生产工艺研究", 《现代商贸工业》, vol. 19, no. 12, 31 December 2007 (2007-12-31), pages 284 - 285 *
李辉 等: "大蒜精油提取工艺的研究", 《农业机械》, no. 7, 31 December 2011 (2011-12-31), pages 48 - 51 *
詹益兴: "《现代化化工小商品制法大全》", 30 April 2001, article "滇白珠精油" *

\* Cited by examiner, † Cited by third party

Cited By (6)

Publication number	Priority date	Publication date	Assignee	Title
<a href="#">CN106544150A</a> *	2016-10-11	2017-03-29	江西南大硒谷农业科技有限公司	Preparation method of the selenium-enriched garlic quintessence oil as the selenium enriched rapeseed oil of antioxidant
<a href="#">CN107099371A</a> *	2017-05-26	2017-08-29	四川巴蜀乐油脂有限责任公司	A kind of manufacture craft of Jiang Suan flavored oils
<a href="#">CN107177408A</a> *	2017-05-26	2017-09-19	四川巴蜀乐油脂有限责任公司	A kind of manufacture craft of garlic flavor oil
<a href="#">CN107603741A</a> *	2017-09-28	2018-01-19	江永百润福天然植物科技发展有限公司	A kind of preparation method and galic essential oil that galic essential oil is extracted from garlic
<a href="#">CN108410581A</a> *	2018-04-18	2018-08-17	佛山市飞程信息技术有限公司	A method of extracting galic essential oil from garlic
<a href="#">CN108546596A</a> *	2018-04-18	2018-09-18	佛山市飞程信息技术有限	A kind of new process extracting galic essential oil from garlic

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Similar Documents

▲

Publication	Publication Date	Title
<a href="#">CN104046514A</a>	2014-09-17	Garlic essential oil extraction method
<a href="#">WO2012071972A1</a>	2012-06-07	Process for extracting oil and fat from microalgae
<a href="#">CN105385504A</a>	2016-03-09	Method for preparing fingered citron essential oil
<a href="#">CN105112155A</a>	2015-12-02	Preparation method of high-quality cape jasmine seed oil rich in linoleic acid
<a href="#">CN103751317A</a>	2014-04-30	Method for extracting hovenia dulcis thunb total flavones by cooperation of surfactant and microwave-ultrasonic extraction process
<a href="#">CN203159578U</a>	2013-08-28	Extracting device for garlic essential oil
<a href="#">CN104629902A</a>	2015-05-20	Method for extracting maize germ oil assisted by ethyl alcohol and steam explosion
<a href="#">CN104693008B</a>	2017-02-22	Method for coarsely extracting natural borneol from cinnamomum camphora
<a href="#">CN103357193B</a>	2015-06-10	Superheated steam involved plant extract production equipment and process
<a href="#">CN104650264A</a>	2015-05-27	Method for extracting inulin
<a href="#">CN105777929A</a>	2016-07-20	Extracting method for pleurotus eryngii polysaccharide
<a href="#">CN103304378B</a>	2015-06-24	Method for processing natural borneol and sublimation tank for producing natural borneol
<a href="#">CN105017433A</a>	2015-11-04	Process for comprehensively utilizing wild acorns to process and extract tannin and starch
<a href="#">CN104069172B</a>	2019-01-18	Perilla leaf extract and its extracting method
<a href="#">CN203999556U</a>	2014-12-10	Microwave-assisted essential oil extracting device
<a href="#">CN103642594A</a>	2014-03-19	Method for extraction of garlic oil
<a href="#">CN101108998A</a>	2008-01-23	Processing method for solvent extracting ricinus oil with methanol
<a href="#">CN102516226A</a>	2012-06-27	Method for distilling and refining nicotine circularly and nicotine distilling and absorbing device
<a href="#">CN104312732A</a>	2015-01-28	Extraction method for fructus forsythia volatile oil
<a href="#">CN102172364A</a>	2011-09-07	Method for extracting general flavone from peas in ultrasound-assisted way
<a href="#">CN204198717U</a>	2015-03-11	A kind of grease deodorization device
<a href="#">CN109913318A</a>	2019-06-21	A kind of supercritical extraction method of borneol essential oil
<a href="#">CN104650252A</a>	2015-05-27	Efficient extraction method of ulva polysaccharide
<a href="#">CN108048210A</a>	2018-05-18	A kind of supercritical extraction method of oil of ginger
<a href="#">CN108215277A</a>	2018-06-29	A kind of walnut oil oil press

Priority And Related Applications

Priority Applications (1)

▲

Application	Priority date	Filing date	Title
<a href="#">CN201310083025.8A</a>	2013-03-15	2013-03-15	A kind of Bulbus Allii quintessence oil extracting method

Applications Claiming Priority (1)

▲

Application	Filing date	Title
<a href="#">CN201310083025.8A</a>	2013-03-15	A kind of Bulbus Allii quintessence oil extracting method

Legal Events

Date	Code	Title	Description
2014-09-17	PB01	Publication	
2014-09-17	C06	Publication	
2014-10-22	SE01	Entry into force of request for substantive examination	
2014-10-22	C10	Entry into substantive examination	
2016-08-03	GR01	Patent grant	
2016-08-03	C14	Grant of patent or utility model	
2019-03-08	CF01	Termination of patent right due to non-payment of annual fee	<b>Granted publication date:</b> 20160803 <b>Termination date:</b> 20180315
2019-03-08	CF01	Termination of patent right due to non-payment of annual fee	

Concepts

machine-extracted

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Name	Image	Sections	Count	Query match
■ Allium sativum		title,claims,abstract,description	65	0.000
■ garlic		title,claims,abstract,description	65	0.000
■ volatile oil		title,claims,abstract,description	14	0.000
■ extraction		title,abstract,description	25	0.000
■ distillation		claims,abstract,description	65	0.000
■ water		claims,abstract,description	38	0.000
■ cooling		claims,abstract,description	24	0.000
■ cleaning		claims,abstract,description	8	0.000
■ GARLIC POWDER		claims,abstract,description	3	0.000
■ oil		claims,description	42	0.000
■ wastewater		claims,description	14	0.000
■ slag		claims,description	13	0.000
■ separation method		claims,description	11	0.000
■ coolant		claims,description	9	0.000
■ particle		claims,description	6	0.000
■ pulverizing process		claims,description	5	0.000
■ Hexapoda		claims,description	3	0.000
■ Yersinia pestis		claims,description	3	0.000
■ corresponding		claims,description	3	0.000
■ discharging		claims,description	3	0.000
■ impurity		claims,description	3	0.000
■ pies		claims,description	3	0.000
■ regulatory		claims,description	3	0.000
■ byproduct		abstract,description	6	0.000

■ Brassica napus	abstract	1	0.000
■ Brassica sinapistrum	abstract	1	0.000
■ Glycine max	abstract	1	0.000
■ Glycine max	abstract	1	0.000
■ Zingiber officinale	abstract	1	0.000
■ Zingiber officinale	abstract	1	0.000
■ ginger	abstract	1	0.000
■ powder	abstract	1	0.000

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