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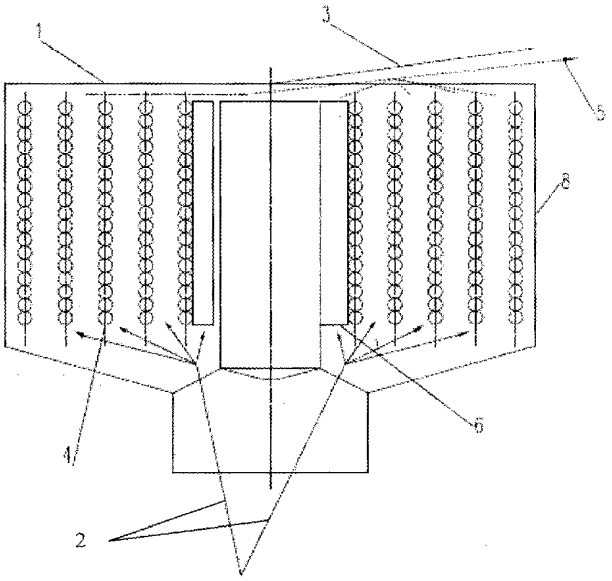

Fig. 1

(57) Abstract: The device and method for returning aromatics to the fermentation broth solves the technical problem of the loss of aromatics during fermentation process if fermentation is carried out at temperatures that are ideal for yeast operation in such a way that the temperature of the fermentation broth is maintained at 15°C to 30°C or a temperature that is ideal for the development of yeasts. At the same time, $C0_2$ is formed, and aromatics in form of vapors. This gas mixture is fed to the condenser, where the aromatics are condensed while $C0_2$ continues on. The condensed aromatics are returned to the fermentation broth by use of device according to the invention.

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DEVICE AND METHOD FOR RETURN OF AROMATICS TO FERMENTATION BROTH

Field of technology

wine production; fermentation; fermentation technology

Technical problem

Technical problem solved by present invention is loss of aromatics during fermentation of fermentation broth during wine production, said fermentation taking place at approximate temperatures ideal for yeast growing.

State of the Art

FR2307037 describes a gas purifier comprising a cooled condenser, preferably in the form of a vertical tube with a tube and a jacket, with an ethylene glycol coolant at -50 ° C circulating in a coating. The condenser has a funnel under the tube that collects a condensate and returns it to the container.

FR2459280 describes a device for returning steam that is captured in carbon dioxide formed in fermentation vessels, in particular those used in the production of wine. The plant is of the kind in which vapors are separated from the carbon dioxide in the condenser, and the condensate is then returned to the fermentation vessel. The plant shown shows the plurality of fermentation vessels where vapors and gases are fed into a common gas tank, and then into a condenser where carbon dioxide is separated from the condensed pair. Then, the condensate is returned to each of the fermentation vessels, this being done successively, with complicated opening and closing of the valves.

In the chemical sense, in the area of distillation (burning, whiskey, cognac), condensers are condensing distillation vapors that are released at high temperatures, and in wine production until now the condensation of aromatics has been primarily linked to the binding of aromatic substances in absorbent solutions, which are then returned back to

the process. In this way, it is possible to absorb aromatic components, but at the same time it is also a further dilution of the fermentation broth, because the absorption fluid needs to be replaced frequently and, in the course of continuous saturation, it is necessary to return it back into the process. The mentioned process represents an artificial interference in the production of wine and is therefore, as such, undesirable in the technology of producing premium wines.

The top wines are produced in the state of the art in such a way that the fermentation temperatures are in the range of 10 to 15 ° C, as the aromatics evaporation is lower than at higher temperatures.

The technology of producing premium wines provides for various esters - aromatic components of yeast metabolism that enrich the wine bouquet and thus enrich the aroma and quality of the wine (Eustace R., Thornton RJ 1987. Selective hybridiation of wine yeasts for higher yields of aromatics and glycerol. J. Microbiol 33: 112-117). The increased production of aromatics in wine also has a beneficial effect on the sensory perception of wine (Pretorius IS, Van der Westhuizen TJ 1991. The impact of yeast genetics and recombinant DNA technology on the wine industry, S. Afr., J. Enol., Vitic, 12 : 3-31). Among the parameters that accelerate the growth of the quality of metabolism and the components that give the fullness of the wine also include the character of the selected yeast strain and mixing with the flow of exit gases (Radler F., Schütz H. 1982. Production of various strains of Saccharomyces. Vitic., Vol. 33, No. 1: 36-40). The results of the research have shown that with the gradual increase in temperature, the content of metabolites in the emerging wine slowly grows (Ough CS, Fong D., Amerine MA 1972. Determination and some factors affecting, J. J. Enol., Vitic, 23: 1-5, Gardner N., Rodrigue N :, Champagne CP 1993. Combined effect of sulfites, temperature and agitation time on the production of aromatics in grape juice by Saccharomyces cerevisiae. Applied and Environmental Microbiology, 59: 2022-2028).

Description of new invention

Device and method for returning aromatics to fermentation broth solves the technical problem described above in such a way that the temperature of the fermentation broth is 15 ° C to 22 ° C, or the temperature that is ideal for the development of yeast. At the same time CO_2 as well as aromatics (vapors) are formed, as a gas mixture. Said gas mixture is fed to a condenser for condensing of said aromatics, and CO_2 essentially continues through. Said condensed aromatics return to said fermentation broth.

Production of wine by the fermentation of grape juice in wine takes place in the technology of wine making in fermenters (i.e, containers in which fermentation is carried out), preferably in the range from 1,000 to 100,000 liters. The fermentation process is initially an endothermal process requiring heat during its start, and in its continuation, during its exponential or agitated growth phase in need of heat removal, which also accelerates evaporation. At this stage, the reaction of fermentation or glucose conversion produces ethanol and carbon dioxide released from fermentation. Carbon dioxide exiting from fermentation tanks during said agitated fermentation phase is essentially saturated with water vapor, said water vapor dissolving aromatics, said aromatics giving said wine the fullness of smell and taste. The resulting mixture of gases brings along aromatic substances which, for the purpose of this application, are also called aromatics, from said fermentation broth, usually into the environment of the basement, and thus causes evaporation of the aromatic substances from the emerging wine. Consequently, the potential of the emerging wine is weakened, this is especially true of the fullness of the smell and taste and is undesirable effect to be remedied by this invention.

The problem of evaporation of aromatic substances is currently addressed in the winery by lowering of the fermentation temperature and, consequently, in the less energetic fermentation process, typically said fermentation process taking place in a temperature range between 12 ° C and 16 ° C. Novel technological process of fermentation as presented herein involves a rise in the fermentation temperature from temperature range 12 ° C -16 ° C to temperature range 16 ° C -30 ° C (preferably in to temperature range 16 ° C -22 ° C), this process carried out by device and method according to this invention, thus enabling optimum yeast metabolism. Yeast in technological process

according to this invention produce maximum aromatic products, and consequently the reaction is more agitated prompting return of aromatics through the discharge of saturated CO2 from the fermentation vessel using said he device and method according to this invention, to the fermenter.

The process of fermentation of grape juice into wine depends on the individual wishes of the winemaker according to the desired markers (smell, taste, ...) and its production technology, and the process depends on the grape variety and the type of yeast. Traditionally, the temperature of the fermentation is kept at a certain range to limit the agitation of the reaction.

The process according to the invention is comprised of the following steps:
- obtaining a fermentation broth, said broth comprising yeast, said yeast suitable for transformation of grape juice into fermented drink, preferably wine;
- regulating temperature of said fermentation broth to a temperature range between 16 ° C and 30 ° C;
- collecting of exhaust gases, said gases comprising CO2 and aromatics;
- guiding said mixture into a condenser;
- cooling said mixture in a condenser to condense aromatics;
- returning aromatics to said fermentation broth.

The process according to the invention is further characterized in that it comprises the following steps:
- preparing of suspension of wine yeast;
- preparing of wine must;
- adding suspension of wine yeast to said wine must;
- further fermentation of the resulting mixture.

The step of preparing the wine must according to the invention comprises:
- preparing a wine must in a fermenter at a temperature between 15 ° C and 30 ° C, preferably at about 18 ° C

- in a special embodiment, for small fermenters, said wine must blended with a stirrer, preferably at 20 to 80 rpm, even more preferably about 50 rpm while simultaneously blowing at a surface of said wine must with gaseous nitrogen, preferably at a flow of 0.3 - 1.2 l / min, even more preferably 0.5 l / min from 10 to 30 min, preferably 20 min.

The fermentation step of the resulting mixture according to the invention may further comprise:
- fermenting said mixture of said wine must and said suspension of wine yeasts for a time up to 360 hours, preferably up to 240 hours, with mixing said mixture with a stirrer, preferably at 20-80 rpm, even more preferably about 50 rpm while simultaneously blowing at a surface of said wine must with gaseous nitrogen,, preferably with a flow rate of said gaseous nitrogen of 0.3-1.2 l / min

The step of adding the suspension of the yeast to the prepared wine must may further comprise:
- adding of the amount of 0.1-0.5 g / l, preferably 0.3 g / l of yeast to said wine must;
- maintaining the temperature of the mixture so obtained at a temperature between 15 ° C and 30 ° C, preferably at about 18 ° C for a period of 45 minutes to 75 minutes, preferably about 60 minutes.

The process described above differs substantially from that described in FR2307037 and FR2459280, in particular by restricting the temperature to a temperature that is optimal for the development of yeasts, as well as by constructing a condenser separating from the condenser with a tube and a coating and with a built-in non-return valve, and, finally, to precisely determine the process parameters.

The device according to this invention is a condenser in the form of a container preferably of an oval shape acting as a condenser, said container preferably mounted on the top of the fermenter. In preferred embodiment, the apparatus has a condensation surface, preferably in the form of a helical coil, still more preferably finned. Aromatic vapors condense from mixture of gases on said condensation surface, said aromatic vapors then returned to the fermentation broth. The condenser surface is cooled with a

medium having temperature lower than the temperature of the mixture of CO_2 and vapors, preferably between -5 ° C and 10 ° C.

The device according to the invention can furthermore be equipped with an opening, said opening further equipped with a non-return valve, said non-return valve preventing entry of gases from the environment or condenser into the fermenter while allowing flow of gases through said opening into said condenser during intense exhausting of said gases. In preferred embodiment, said non-return valve is a flap, preferably comprising spring, said flap automatically opening when pressure difference between said fermenter and said condenser increases above preset value thus allowing transition of said gas mixture into said condenser or said environment through said opening between said fermenter and said condenser, said flap closing when pressure difference between said fermenter and said condenser or said environment falls below preset value, making said fermenter again substantially gas-proof.

Below, the essence of the invention is presented in better detail with drawings, said drawings forming integral part of this application, and comprising:

Figure 1 shows a device according to the invention, i.e., a condenser (1) comprising housing (8), inlet flow of mixture of CO2 and aromatics (2), non-return valve, preferably in the form of a pivoting flap (3), helical coil for coolant (4), exit gas stream comprising, in particular, remaining CO_2 (5), cooling fins (6).

Figure 2 shows a device according to the invention, i.e. a cross-section of the condenser (1), housing (8), helical coil for coolant (4), cooling fins (6).

Figure 3 shows the device according to the invention, i.e. the cross-section of the condenser (1), housing (8), helical coil for coolant (4), cooling fins (6).

Figure 4 shows condenser (1), fermenter (7).

The device according to the invention is a condenser comprising a housing (1) said housing (1) further comprising helical coil (4) for coolant flow. The device according to the invention may further comprise the cooling fins (6). Optionally, device may only comprise cooling fins (6) without helical coil (4) with coolant flowing within said cooling fins (6).

The gas mixture, namely CO_2 saturated with water vapor and aromatics, said gas mixture fermentation products of fermentation broth, rises from a fermenter (7) in the direction of the inlet flow of the CO_2 and the aromatics (2) into said condenser (1). Said gas mixture rises over said helical coil (4) in substantially transverse flow over tubes of said helical coil (4) and / or over cooling fins (6) causing said aromatics to condense from gas mixture. Resulting condensate in form of liquid aromatics flow back into the fermenter, while the remaining gas, comprising in particular CO_2, passes through said non-return valve, preferably in the form of a pivoting flap (3), preferably comprising a spring resisting the opening of said flap in the direction of the flow of the discharge gas, said gas comprising in particular the remaining CO_2 (5) for either further treatment or release into the environment.

Embodiments and experiments

Below, the process is described in more detail with embodiments and experimental results, wherein the first and the third experiments describe the process without using the device according to the invention, and the second and fourth experiments using the device according to the invention. Essential difference between the two procedures is immediately apparent to an expert.

According to the embodiment, the process is carried out as follows:

A) wine must of the Laski Riesling sort from Ljutomer-Ormoška Gorica, which was previously neither filtered nor exposed to sulfur is used. Before starting fermentation, the concentration of reducing sugars is 110 g / l glucose and 105 g / l of fructose, pH

3.15, and the organic acid content is 8.0 g l^{-1}. As a bio-activator, Fermaid E (Danstar Ferment AG) is used in a ratio of 30 g per 100 l of must.

B) 10 liters of wine must of Laško Riesling sort is prepared, the temperature of which is maintained in the fermenter at a temperature of 15-30 ° C, preferably at 18 ° C, and mixed with a bladed Rushton stirrer with a mixing intensity of 20-80 rpm, preferably about 50 rpm / min, and further the surface over a liquid substrate is blown over with a gaseous nitrogen stream of 0.3-1.2 l / min, preferably 0.5 l / min ranging from 10-30 min, preferably approximately 20 min.

C) the specimen is then added to the conditioned must of 0.1-0.5 g / l, preferably 0.3 g / l, said specimen comprising yeast Saccharomyces cerevisiae (Fermicru, AR2Val de Loire, France), revitalized and heat treated in accordance with paragraph A) and again essentially maintained at temperature of 18 ° C for essentially 60 minutes, said specimen added to said must, conditioned at temperature of 15-30 ° C, preferably at 18 ° C,

D) the further fermentation process is conducted for up to 240 hours at temperature of 15-30 ° C, preferably at 18 ° C, while mixing said mixture with a bladed Rushton stirrer with a mixing intensity of 20 to 80 rpm, preferably about 50 rpm, and further the surface over a liquid substrate is blown over with a gaseous nitrogen stream of 0.3-1.2 l / min, preferably 0.5 l / min.

E) for process control instrumentation redox and pH electrodes (Mettler Toledo) are used, as weill as Mettler Toledo particle carbon dioxide measurement electrode which allows the process to be controlled in the absence of oxygen.

The first experiment

Prepare 10 liters of wine must of the *Sauvignon Blanc Blanc* variety, maintained at a temperature of 15-22 ° C, preferably at 18 ° C, and mixed with a bladed Rushton stirrer with a mixing intensity of 20 to 80 rpm, preferably about 50 rpm while the surface over

a liquid substrate is blown over with a gaseous nitrogen stream of 0.3-1.2 l / min, preferably 0.5 l / min of 10-30 min, preferably around 20 min. Prior to this said must is not to be sulfured.

To the must conditioned in accordance with previous paragraph yeast Saccharomyces cerevisiae (Uvaferm SLO) in the amount of 0.1-0.5 g / l, preferably 0.3 g / l is added, said yeast revitalized in the *Sauvignon blanc blanc* must variety, at a temperature of 15-22 ° C, preferably at 18 ° C,

Further fermentation process is carried out at a temperature of 15-22 ° C., preferably at 18 ° C. and mixed with a bladed Rushton stirrer with a stirring intensity of 20 to 80 rpm, preferably about 50 rpm while the surface over a liquid substrate is blown over with a gaseous nitrogen stream of 0.3-1.2 l / min, preferably 0.5 l / min, from 10 to 30 min, preferably approximately 20 min, to the end of fermentation, which is completed after about 200 hours.

This experiment is carried out without the device according to the invention.

Redox and pH electrodes (Mettler Toledo) and electrode for measurement of partial pressure of carbon dioxide (Mettler Toledo), which allows control of the process in the absence of oxygen are used as the control instrumentation of the process.

In the described case, 2,64 mg / l of total methoxypyrazines and thiols were measured in the wine.

The second experiment

Prepare 10 liters of wine must of the *Sauvignon Blanc Blanc* variety, maintained at a temperature of 15-30 ° C, preferably at 18 ° C, and mixed with a bladed Rushton stirrer with a mixing intensity of 20 to 80 rpm, preferably about 50 rpm while the surface over a liquid substrate is blown over with a gaseous nitrogen stream of 0.3-1.2 l / min,

preferably 0.5 l / min of 10-30 min, preferably around 20 min. Prior to this said must is not to be sulfured.

To the must conditioned in accordance with previous paragraph yeast Saccharomyces cerevisiae (Uvaferm SLO) in the amount of 0.1-0.5 g / l, preferably 0.3 g / l is added, said yeast revitalized in the *Sauvignon blanc blanc* must variety, at a temperature of 15-30 ° C, preferably at 18 ° C,

Further fermentation process is carried out at a temperature of 15-30 ° C., preferably at 18 ° C. and mixed with a bladed Rushton stirrer with a stirring intensity of 20 to 80 rpm, preferably about 50 rpm while the surface over a liquid substrate is blown over with a gaseous nitrogen stream of 0.3-1.2 l / min, preferably 0.5 l / min, from 10 to 30 min, preferably approximately 20 min, to the end of fermentation, which is completed after about 200 hours.

This experiment is carried out using a device according to this invention which is connected to the fermentor cover at all times, and connected to said fermenter in such a way that gases flow from fermenter to said device according to this invention through non –return valve in accordance with this invention. The coolant temperature in the condenser is between 4°C and 10°C, preferably around 6°C.

Redox and pH electrodes (Mettler Toledo) and electrode for measurement of partial pressure of carbon dioxide (Mettler Toledo), which allows control of the process in the absence of oxygen are used as the control instrumentation of the process.

In the described case, 7.73 mg / l methoxypyrazines and thiols were measured in the wine.

The third experiment

Prepare 10 liters of wine must of the *Sauvignon Blanc* variety, maintained at a temperature of 15-22 ° C, preferably at 18 ° C, and mixed with a bladed Rushton stirrer

with a mixing intensity of 20 to 80 rpm, preferably about 50 rpm while the surface over a liquid substrate is blown over with a gaseous nitrogen stream of 0.3-1.2 l / min, preferably 0.5 l / min of 10-30 min, preferably around 20 min. Prior to this said must is not to be sulfured.

To the must conditioned in accordance with previous paragraph yeast Saccharomyces cerevisiae (Uvaferm SLO) in the amount of 0.1-0.5 g / l, preferably 0.3 g / l is added, said yeast revitalized in the *Sauvignon blanc* must variety, at a temperature of 15-28 ° C, preferably at 24 ° C,

Further fermentation process is carried out up to 4 hours at a temperature of 15-28 ° C., preferably at 24 ° C. and mixed with a bladed Rushton stirrer with a stirring intensity of 20 to 80 rpm, preferably about 50 rpm while the surface over a liquid substrate is blown over with a gaseous nitrogen stream of 0.3-1.2 l / min, preferably 0.5 l / min, from 10 to 30 min, preferably approximately 20 min,

After 4 hours, the fermentation temperature is increased from 24 ° C to a temperature of 28-36 ° C, preferably at 34 ° C, and the fermentation process is maintained at this temperature until the end of fermentation, which is completed after about 200 hours.

This experiment is carried out without using the device according to the invention.

Redox and pH electrodes (Mettler Toledo) and electrode for measurement of partial pressure of carbon dioxide (Mettler Toledo), which allows control of the process in the absence of oxygen are used as the control instrumentation of the process.

In the described case, 2.94 mg / l of total methoxypyrazines and thiols were measured in the wine.

The fourth experiment

Prepare 10 liters of wine must of the *Sauvignon Blanc* variety, maintained at a temperature of 15-22 ° C, preferably at 18 ° C, and mixed with a bladed Rushton stirrer with a mixing intensity of 20 to 80 rpm, preferably about 50 rpm while the surface over a liquid substrate is blown over with a gaseous nitrogen stream of 0.3-1.2 l / min, preferably 0.5 l / min of 10-30 min, preferably around 20 min. Prior to this said must is not to be sulfured.

To the must conditioned in accordance with previous paragraph yeast Saccharomyces cerevisiae (Uvaferm SLO) in the amount of 0.1-0.5 g / l, preferably 0.3 g / l is added, said yeast revitalized in the *Sauvignon blanc* must variety, at a temperature of 15-28 ° C, preferably at 24 ° C,

Further fermentation process is carried out up to 4 hours at a temperature of 15-28 ° C., preferably at 24 ° C. and mixed with a bladed Rushton stirrer with a stirring intensity of 20 to 80 rpm, preferably about 50 rpm while the surface over a liquid substrate is blown over with a gaseous nitrogen stream of 0.3-1.2 l / min, preferably 0.5 l / min, from 10 to 30 min, preferably approximately 20 min,

After 4 hours, the fermentation temperature is increased from 24 ° C to a temperature of 28-36 ° C, preferably at 34 ° C, and the fermentation process is maintained at this temperature until the end of fermentation, which is completed after about 200 hours.

In the described experiment, a device according to the invention is used, which is substantially all the time of fermentation connected to the lid of the fermenter. In addition, a non-return valve according to the invention is used. The temperature of the coolant in the reflux condenser is from 1 to 6 ° C, preferably around 3 ° C.

Redox and pH electrodes (Mettler Toledo) and electrode for measurement of partial pressure of carbon dioxide (Mettler Toledo), which allows control of the process in the absence of oxygen are used as the control instrumentation of the process.

In the described case, 9.88 mg / l of total methoxypyrazines and thiols were measured in the wine.

PATENT CLAIMS

1. A process for the return of aromatics to a fermentation broth, characterized in that it comprises the following steps:
- obtaining a fermentation broth, comprising yeast for processing into wine;
- regulating temperature of the fermentation broth to a temperature between 16 ° C and 30 ° C;
- collecting a mixture of CO_2 and aromatics;
- guiding said mixture into a condenser;
- cooling said mixture in said condenser in order to condense said aromatics;
- returning said condensed aromatics to said fermentation broth.

2. Process for returning aromatics to the fermentation broth according to claim 1, wherein said process further comprises the following steps:
- preparing of a suspension of wine yeast;
- preparing of wine must;
- adding suspension of wine yeast to ready-made wine must;
- further fermenting of the resulting mixture.

3. Process for returning aromatics to the fermentation broth according to any one of the preceding claims, wherein the step of preparing the wine must further comprises:
- preparing said must in fermenter at a temperature range between 15 ° C and 30 ° C, preferably at about 18 ° C.

4. Process for returning aromatics to the fermentation broth according to any one of the preceding claims, wherein said wine must is mixed with a stirrer, preferably at 20 to 80 rpm, even more preferably about 50 rpm while simultaneously blowing over the surface of the liquid with gaseous nitrogen flow, said flow preferably with a range of 0.3-1.2 l / min, more preferably 0.5 l / min from 10 to 30 min, preferably 20 min.

5. Process for returning aromatics to the fermentation broth according to any one of the preceding claims, wherein the step of adding the suspension of the yeast to the prepared wine must further comprises:
- adding the amount of 0.1-0.5 g / l, preferably 0.3 g / l of yeast to said wine must;
- maintaining the temperature of the mixture so obtained at a temperature between 15 ° C and 30 ° C, preferably at about 18 ° C for a period of 45 minutes to 75 minutes, preferably about 60 minutes.

6. Process for returning aromatics to the fermentation broth according to any one of the preceding claims, wherein the step of fermentation of the thus obtained mixture further comprises:
- fermenting said mixture of said wine must and said suspension of wine yeasts for a time up to 360 hours, preferably up to 240 hours, with mixing said mixture with a stirrer, preferably at 20-80 rpm, even more preferably about 50 rpm while simultaneously blowing Of the liquid gaseous surface area, preferably with a flow of 0.3-1.2 l / min.

7. A device for returning aromatics to a fermentation broth, characterized in that the process according to any one of the preceding claims is carried out therein.

8. Device for returning aromatics to a fermentation broth according to claim 7, wherein the device comprises a non-return valve (3), preferably in the form of a flap with a spring that opens the opening of the flap, to prevent the injection of gases into the fermenter in the direction opposite to the resulting CO_2 mixture and aromatics during the fermentation broth fermentation.

9. Device for returning aromatics to a fermentation broth according to claim 7 or claim 8, wherein the device comprises a condenser (1) comprising a housing (8), a non-return valve, preferably in the form of a pivoting flap (3), and cooling means selected from the group consisting of helical coil (4) or plurality thereof, cooling fins (6), combination of helical coil (4) or plurality thereof and cooling fins (6).

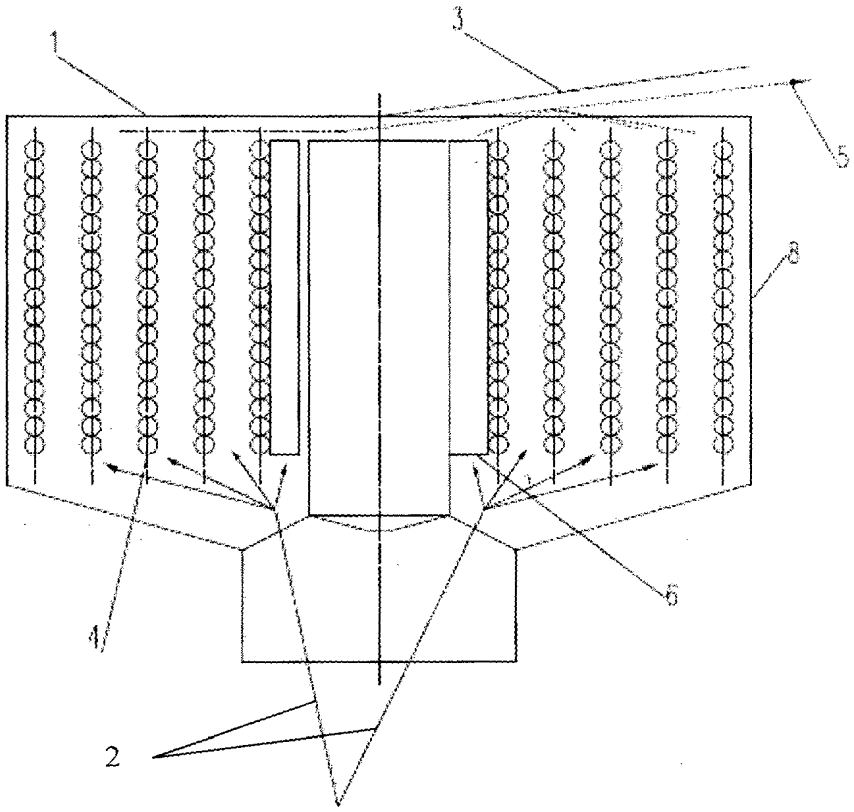

Fig. 1

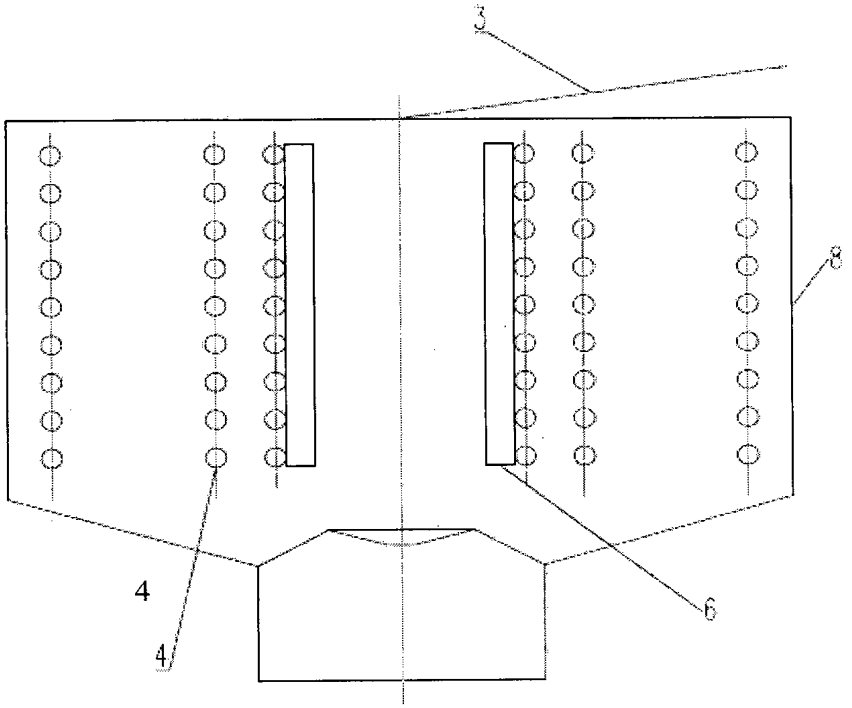

Fig. 2

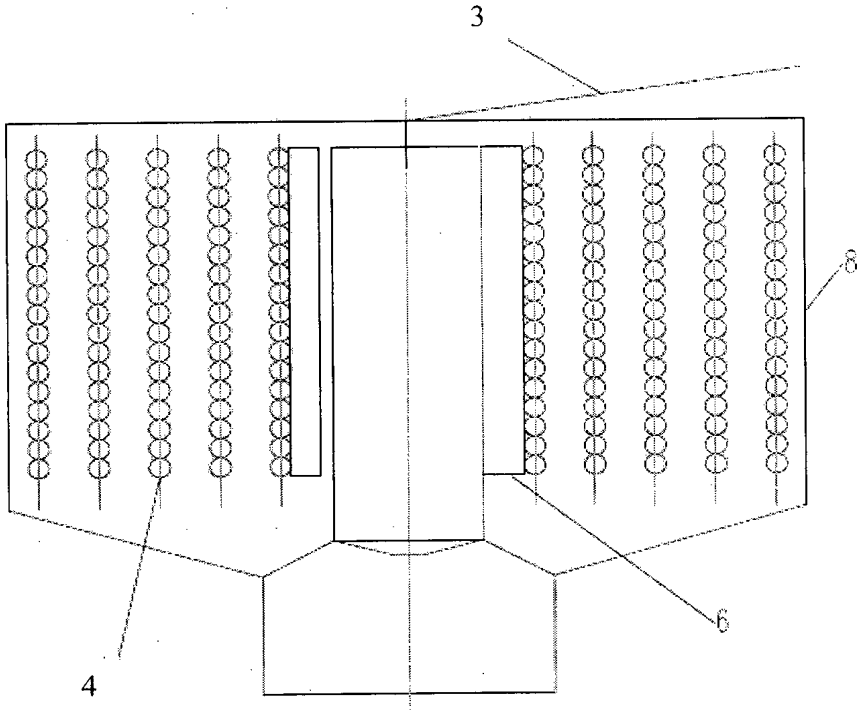

Fig. 3

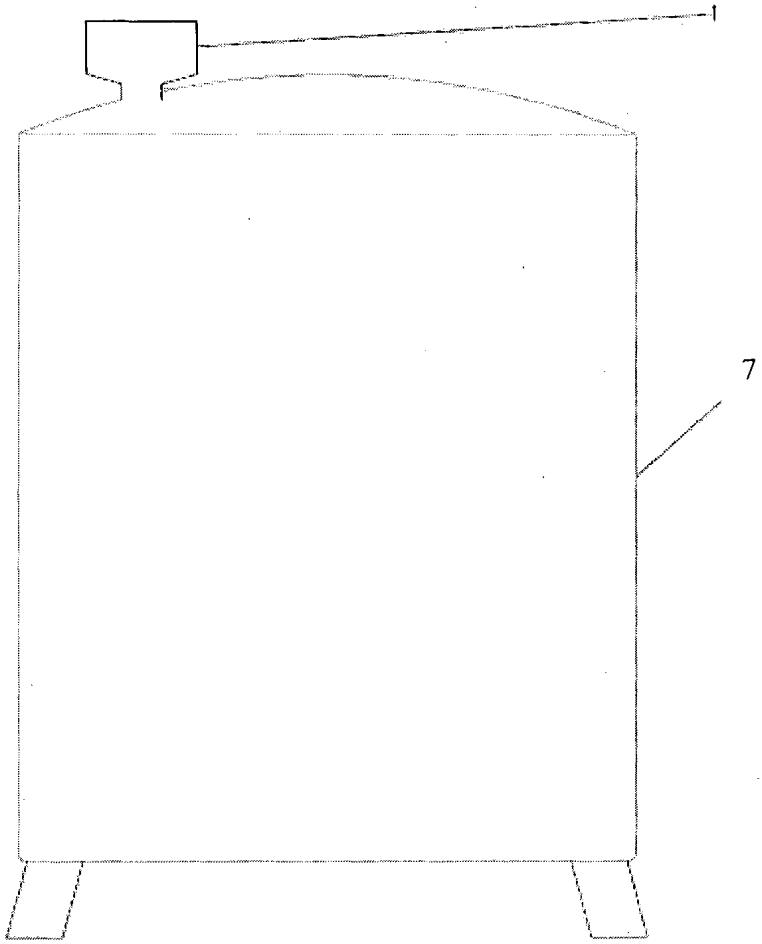

Fig. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/SI2017/000015

A. CLASSIFICATION OF SUBJECT MATTER
INV. C12F3/04
ADD.

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)
C12F

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 practicable, search terms used)
EPO-Internal, BIOSIS, FSTA, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 617 184 A1 (RECH OENOLOGIQUES ET [FR]) 30 December 1988 (1988-12-30) claims 1-10 page 4, line 9 - page 6, line 15 -----	1-9
X	FR 2 459 280 A1 (POINSARD ROBERT) 9 January 1981 (1981-01-09) cited in the application claims 1-4 page 1, lines 35-39 page 2, lines 29-37 page 3, lines 28-34 -----	7-9
X	FR 2 307 037 A1 (POINSARD ROBERT [FR]) 5 November 1976 (1976-11-05) cited in the application claims 1-10 -----	7-9

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

☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
16 November 2017	23/11/2017

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/SI2017/000015

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2617184 A1	30-12-1988	NONE	
FR 2459280 A1	09-01-1981	NONE	
FR 2307037 A1	05-11-1976	NONE	