

SPECIFICATION

METHOD OF EXTRACTING AND MANUFACTURING OYSTER MEAT EXTRACT USING DEPRESSURIZED OR PRESSURIZED EXTRACTION METHOD

Technical Field

The present invention relates to a method of extracting and manufacturing an oyster meat extract using a depressurized or pressurized extraction method in which it is possible to efficiently extract an oyster meat extract from, for example, the oyster meat of a raw oyster, and in which a small amount of useful active ingredient present within the oyster meat is extracted without being missed and a product containing the excellent oyster meat extract is manufactured.

Background Art

In recent years, in general, an oyster meat extract product has been increasingly recognized, as a health supplement, to be a significantly excellent product containing a large amount of useful substance.

At present, for example, health supplements of oyster meat extracts that are extracted by various types of extraction methods are being sold (Japanese Unexamined Patent Application Publication No. H10-136946).

Incidentally, in the extraction of oyster meat extract, it is required to extract and manufacture it such that it is possible to contain, with the extracted oyster meat

extract, a large amount of substance that contains useful nutrient sources such as glycogen, taurine, protein, and selenium and zinc or the like and that has, as it is called, the effect of reducing the aggregation of blood platelet or a large amount of active ingredient such as an recently focused antioxidant and that it is possible to efficiently collect it.

Conventionally, in the extraction of the oyster meat extract, the extraction is commonly performed under normal pressure, as it is called, it is not common to perform an extraction operation in a state where the pressure is increased from the normal pressure or an extraction operation in a state where the pressure is decreased from the normal pressure in a hermetically sealed extraction container.

As an operation after the extraction, a so-called natural precipitation method of an extraction solution is adopted in which the extraction solution containing the oyster meat extract is agitated, after a predetermined period of time, a so-called precipitate and a supernatant solution that is not precipitated are naturally separated and the active ingredients of the oyster meat extract are extracted from each of them. However, in an operation of separating the precipitate and the supernatant solution by the agitation and the natural precipitation method described above, it is necessary to wait for the predetermined period of time after the agitation, therefore this method disadvantageously and inevitably requires a predetermined standby time and is not suitable for mass production.

In other words, since there is conventionally no device that can continuously perform the operation of separating the precipitate and the supernatant solution by the agitation and the precipitation described above, in order to perform a processing

operation of extracting a large amount of oyster meat extract, it is disadvantageously necessary to take a long time for the operation of agitation, precipitation and separation.

[Patent document 1] Japanese Unexamined Patent Application Publication No. H10-136946

Disclosure of the Invention

Problems to be Solved by the Invention

In view of the forgoing problem, the present invention is made, and an object of the present invention is to provide a breakthrough method of extracting and manufacturing an oyster meat extract using a depressurized or pressurized extraction method in which an conventional extraction operation of extracting oyster meat in a normal pressure state is changed from the normal pressure state to a pressurized state or to a depressurized state to efficiently perform the extraction and which can perform an operation of significantly efficiently extracting the oyster meat extract because an operation of agitating a solution containing the oyster meat extract, an operation of separating a precipitate by so-called natural precipitation and a supernatant solution which is not precipitated and an operation of extracting active ingredients of the oyster meat extract from the precipitate and the supernatant solution, which are conventionally and inevitably needed, and forcible separation are performed without depending on the natural precipitation, the separation operation can be continuously performed, the operation time for the agitation, the precipitation and the separation can

be significantly reduced and, in particular, it is not necessary to wait for a standby time needed until the precipitate is precipitated.

Means for Solving the Problem

The present invention is characterized as follows.

A method of extracting and manufacturing an oyster meat extract using pressurized or depressurized extraction, the method includes: an extraction step of storing oyster meat in an extraction container where a solution is stored and extracting, within the extraction container, the oyster meat extract from the oyster meat;

a step of concentrating the oyster meat extract extracted in the extraction step;

an agitation step of adding an ethanol solution to the concentrated oyster meat extract and performing agitation;

a separation step of performing separation into a precipitate and a supernatant solution after a predetermined time after the agitation; and a concentration step of concentrating the obtained precipitate,

wherein the extraction step is a step in which the extraction is performed in a state where a pressure is increased to a normal pressure or more or in a state where a pressure is reduced to the normal pressure or less such that it is possible to perform the extraction from all portions without damaging the oyster meat and extract a large number of types of active ingredients of the oyster meat extract,

the agitation step and the separation step are a centrifuging step using a continuous centrifuge,

the continuous centrifuge includes: a storage member that has a storage space

portion therewithin; a rotary shaft portion that is arranged within the storage member and that is configured to be rotatable with a longitudinal direction being a center shaft direction; a rotary member that has a plurality of rotary blades spaced a distance apart from an outer circumference of the rotary shaft portion; a rotary means that rotates the rotary member; an injection portion that continuously injects a solution to be separated into the storage space portion; a discharge portion that centrifuges the solution injected from the injection portion and that continuously discharges a separated fluid from a side portion of the storage space portion; and a solution discharge portion that continuously discharges a remaining solution separated from the fluid,

in the centrifuging step, the solution containing the extracted and concentrated oyster meat extract is fed out from a left-side pipe to a feed-out tube such that an amount of the solution which is fed out can be adjusted, the ethanol solution is fed out from a right-side pipe to the feed-out tube such that an amount of the ethanol solution which is fed out can be adjusted, both the solutions are continuously fed out to the injection portion and both the solutions continuously fed out are stored in the storage member,

both the solutions are agitated by rotating the rotary member, and a centrifuging operation is performed, the fluid is brought, by the rotation, close to a side of an apex angle portion of a side wall of the storage member which is recessed in a triangular shape,

when the fluid is collected in the side of the apex angle portion of the side wall of the storage member which is recessed in the triangular shape, an opening and closing operation is performed by an operation liquid, and a plurality of discharge

holes that are spaced a predetermined distance apart in a circumferential direction in the apex angle portion of the side wall which is recessed in the triangular shape are opened,

the fluid is continuously discharged by a plurality of the discharge holes through the discharge portion to an outside,

the remaining solution separated from the fluid is moved to an upper portion of the storage member by rotation of a plurality of the rotary blades extending outward in a shape of a skirt from the outer circumference of the rotary shaft portion, and is continuously discharged from the solution discharge portion arranged in the upper portion of the storage member, and

the remaining solution continuously discharged is concentrated, thereafter the ethanol solution of a predetermined concentration is added again thereto, the resulting solution is separated with a second continuous centrifuge and is continuously discharged from the solution discharge portion or

a plurality of the rotary blades are spaced the distance apart from the outer circumference of the rotary shaft portion provided in the center shaft in the center shaft direction, and are formed to extend radially or

the rotary shaft portion is formed with a tube-shaped member, and a hollow portion therewithin is used as an introduction path for the solution injected from the injection portion.

Advantages of the Invention

In the present invention, the following excellent effects are made. An operation

of extraction from oyster meat in a normal pressure state is changed from the normal pressure state to a pressurized state or to a depressurized state, and thus a large number of types of active ingredients can be efficiently extracted. Furthermore, an operation of separating a precipitate by natural precipitation and a supernatant solution that is not precipitated, which is conventionally and inevitably needed, and forcible separation are performed without depending on the natural precipitation, the separation operation can be continuously performed, the operation time for the agitation and the separation can be significantly reduced and moreover, it is not necessary to wait for a standby time needed until the precipitate is precipitated, therefore it is possible to significantly efficiently perform the extraction, and extract and manufacture the oyster meat extract using a breakthrough depressurized or pressurized extraction method in which an operation of manufacturing an oyster meat extract product containing a large number of types of active ingredients can be performed.

Brief Description of Drawings

Fig. 1 is a configuration illustrative diagram (part 1) that illustrates the configuration of the present invention;

Fig. 2 is a configuration illustrative diagram (part 2) that illustrates the configuration of the present invention;

Fig. 3 is a configuration illustrative diagram (part 3) that illustrates the configuration of the present invention; and

Fig. 4 is a configuration illustrative diagram (part 4) that illustrates the configuration

of the present invention.

Best Mode for Carrying Out the Invention

A preferred embodiment of the present invention will be described below.

First, oyster meat 21, as it is, is put into an extraction container 20 for extraction without the oyster meat 21 being ground. This is because, for example, the oyster meat after the extraction is effectively utilized, which will be described later.

Then, the extraction container 20 is hermetically sealed, and the extraction operation is performed by applying a pressure from a normal pressure state (a pressure without depressurization and pressurization in particular. Normally, it is equal to atmospheric pressure, about one atmosphere) or the extraction operation is performed by reducing the pressure from the normal pressure state.

In the present invention, the extraction container 20 can be used as an extraction container 20 in the pressurized state or also as an extraction container 20 in the depressurized state. Pressure adjustment members such as a pressurization pump and a depressurization pump are used for the pressurization and depressurization.

A merit of the pressurized extraction is that it is possible to elute the active ingredients such that, for example, the active ingredients within the oyster meat cells are actively moved by the pressurization and thereby pass through the cell membrane of the oyster meat to the outside of the cells. Thus, it is possible to perform, with this elution phenomenon, the extraction without the oyster meat being damaged.

The pressurized extraction is excellent for, for example, the extraction of components present in a deep portion of the oyster meat cells. For example, it is

suitable for the extraction of components such as mitochondria. This is because, even though the active ingredients are present in the deep portion, the active ingredients are actively moved by the pressurization, and consequently, the active ingredients pass through the cell membrane of the oyster meat and further move out of the cells.

Furthermore, in the pressurized extraction, it is advantageously possible to extract a large amount of oyster meat extract in a short period of time. It is effective to acquire a large amount of highly stable trace elements in the pressurized state and the like such as zinc (Zn), selenium (Se) and iron (Fe), in particular.

The degree of the pressurization is not limited at all, and a pressure is applied such that the pressure is 1 atmosphere or more. For example, about 1.1 to 2.5 atmospheres are preferable. A time for the pressurization is not limited at all, and the time for the pressurization is preferably about 5 to 60 minutes. The temperature in this case ranges from 75 to 120°C, and as the pressure is increased, the temperature is increased as compared with the temperature at the normal pressure.

In the pressurized extraction described above, it is not necessary to perform agitation within the extraction container 20 so as not to damage the strip-off oyster meat 21. This is because, in the pressurized extraction of the present invention, it is possible to efficiently perform extraction without agitation. If agitation is performed, active ingredients to be extracted may be damaged.

Hence, various types of active ingredients are efficiently extracted from the strip-off oyster meat 21. Then, the various types of active ingredients are efficiently dissolved into a solution 22 such as water within the extraction container 20.

A significantly larger extraction amount has been confirmed as compared with extraction under normal pressure. Even when the extraction time is significantly reduced as compared with the conventional method, it is possible to extract the same amount.

A merit of the depressurized extraction in a state where the normal pressure is reduced will now be described. In the depressurized extraction in the state where the normal pressure is reduced, for example, since the pressure outside the oyster meat cell is lower than the pressure within the oyster meat cell, the components within the oyster meat cell are extracted and diluted so as to be sucked out of the cell. Hence, the depressurized extraction is especially excellent for the extraction of the active ingredients of the oyster meat present near the surface of the oyster meat cell. Although a large amount of active ingredients is present in the deep portion of the oyster meat, a large amount of active ingredients is also present near the surface of the oyster meat cell. Hence, with the pressurized and depressurized extraction method, it is possible to efficiently and completely extract the active ingredients of the oyster meat. Moreover, since the extraction is performed without the oyster meat being ground such as by being cut up, the shape of the oyster meat after the extraction is not damaged, and thus it is highly suitable to reuse it.

Moreover, in the depressurized extraction, for example, the boiling point is decreased by the depressurization, and a state where the temperature is not relatively increased or the like is utilized. In other words, the depressurized extraction is an extraction method effective for the acquisition of nutrient components, such as vitamins or proteins, that are relatively likely to be denatured by heating or the like, in

particular, trace element vitamins and the like present on the surface of the cell.

The degree of the depressurization is not limited at all, and a pressure is applied such that the pressure is 1 atmosphere or more. For example, about 0.01 (0.001 megapascal) to 0.99 atmosphere (0.099 megapascal), in particular, about 0.1 (0.01 megapascal) to 0.2 atmosphere (0.02 megapascal), is preferable. A time for the depressurization is not limited at all, and the time for the depressurization is about 30 to 70 minutes.

Even in the depressurized extraction, various types of active ingredients are efficiently extracted from the oyster meat 21. Then, the various types of active ingredients are efficiently dissolved in the solution 22 within the extraction container 20. As described above, in particular, easily denatured and damaged vitamins and proteins can be extracted without being denatured and in a state where these active ingredients are not damaged.

Moreover, it has been confirmed that the extraction amount is increased as compared with a case where extraction is performed under a normal pressure of 1 atmosphere (0.1 megapascal).

For example, oyster meat data such as the state of the oyster meat 21 (such as whether or not the oyster meat is thick) and the weight of the oyster meat 21 are referenced, and thus in the present invention, it is possible to selectively determine, in the extraction of the oyster meat extract from the predetermined oyster meat 21, whether the pressurized extraction, the depressurized extraction or an extraction of repeating both types of extraction is preferable, the time for the extraction, the temperature for the extraction, the concentration of the ethanol solution added in the

extraction and the like.

For example, a selectively determining operation of repeating the pressurized extraction and the depressurized extraction on an oyster meat group stored in the extraction container 20 and thereby completely extracting different active ingredients present on the deep portion of the oyster meat and on the surface of the oyster meat is performed.

As described above, the oyster meat 21 after the repeated extraction of the oyster meat extract is not damaged at all, therefore the oyster meat 21 can be taken out and used, without any waste, as another food material, for example, a raw material for food such as an oyster cookie or an oyster rice cracker.

Then, the extraction solution 27 extracted by the pressurization or the depressurization or their repetition is concentrated to have a predetermined concentration.

Here, the method of concentrating the extraction solution 27 is not limited at all. Preferably, the concentration can be performed such that a solid content of the extracted oyster meat extract is, for example, about 15 to 45 (W/W)% .

In the concentration, the temperature is normally increased, and the operation is performed at a temperature range of 60 to 70°C or more. However, when a depressurization low-temperature heating concentration method is adopted, it is possible to perform the operation at a lower temperature.

What type of concentration operation is performed is not limited at all in the present invention. Instead of the depressurization low-temperature heating concentration method described above, for example, concentration by normal-pressure

heating, concentration using a membrane, concentration by pressurizing heating or the like may be performed.

Then, in the present invention, the concentrated liquid of the extraction solution 27 is forcibly centrifuged with the continuous centrifuge 1. It will be described below.

Fig. 2 shows the configuration of a continuous centrifuge 1 according to the present invention. The continuous centrifuge 1 is configured to include: a storage member 3 that has a storage space portion 2 therewithin; a rotary member 5 that are arranged in the center position within the storage member 3 and that has a plurality of rotary blades 4 which can be rotated in a longitudinal direction, here, with a vertical direction being a center shaft direction; a rotary device 6 that rotates the rotary member 5; an injection portion 7 that continuously injects, into the storage space portion 2, an extraction mixture solution 23 obtained by mixing an extraction solution 27 which extracts and concentrates an oyster meat extract from oyster meat and an ethanol solution 28 of a predetermined concentration; a discharge portion 8 that centrifuges the extraction mixture solution 23 injected from the injection portion 7 and that continuously discharges, from a side portion of the storage space portion 2, a separated fluid 12 (a natural precipitate by the conventional natural precipitation method) ; and a remaining solution discharge portion 9 that continuously discharges the remaining solution 19 (an supernatant solution by the conventional natural precipitation method) separated from the fluid 12.

Here, the rotary device 6 is configured to include a rotary shaft 10 that is provided to protrude upward from the substantially center of the bottom portion of the continuous centrifuge 1 and a rotary member (not shown), such as a motor, that rotates

the rotary shaft 10 in the longitudinal direction (in the present embodiment, in the vertical direction) as the direction of rotation.

In the direction of an end of the rotary shaft 10, the rotary member 5 is attached, and the rotary member 5 is configured to rotate together with the rotary shaft 10. As is understood from Fig. 2, the rotary member 5 includes a rotary shaft portion 11 which has a hollow portion therewithin and which is formed in the shape of a cylinder, and, on the outer circumference of the rotary shaft portion 11, the rotary blades 4 extending outward in the shape of a skirt are attached to be spaced a predetermined distance apart in the vertical direction.

In the end side of the rotary shaft portion 11, the end portion of a pipe-shaped injection tube 13 provided to droop from above is inserted, and a portion between the injection tube 13 and the rotary shaft portion 11 is hermetically configured such that the rotary shaft portion 11 can rotate.

As described above and shown in Fig. 2, from the base end side 24 of the injection tube 13, the extraction mixture solution 23 obtained by adding the ethanol solution 28 of the predetermined concentration to a concentrated liquid (the concentrated liquid of the extraction solution 27) where the extraction liquid of the oyster meat extract to be centrifuged is concentrated is continuously fed out from a feed-out tube 14 to the injection tube 13.

As a description will be given with reference to Fig. 3, a left branch tube 25 and a right branch tube 26 are connected to the upper portion of the feed-out tube 14 such that the left branch tube 25 and the right branch tube 26 communicate with the feed-out tube 14 in leftward and rightward directions. The concentrated liquid (the

concentrated liquid of the extraction solution 27) of the extracted oyster meat extract is continuously fed out from the left branch tube 25 to the feed-out tube 14, and the ethanol solution 28 set at the predetermined concentration is continuously fed out from the right branch tube 26 to the feed-out tube 14. Here, the amount of concentrated liquid (the concentrated liquid of the extraction solution 27) of the extracted oyster meat extract that is fed out from the left branch tube 25 and the amount of ethanol solution 28 set at the predetermined concentration that is continuously fed out from the right branch tube 26 are controlled by a control device 29.

Specifically, an opening and closing member 30 is provided in each of the left branch tube 25 and the right branch tube 26, and, with the opening and closing member 30, it is possible to adjust, by an instruction from the control device 29, the amount of concentrated liquid (the concentrated liquid of the extraction solution 27) of the extracted oyster meat extract that is fed out from the left branch tube 25 and the amount of ethanol solution 28 set at the predetermined concentration that is fed out from the right branch tube 26.

In this way, it is possible to freely adjust the ratio between the concentrated liquid of the extraction solution 27 and the ethanol solution 28 set at the predetermined concentration in the extraction mixture solution 23.

As described above, it is possible not only to change the concentration of the ethanol solution but also to control the ratio between the amount of concentrated liquid of the extraction solution 27 and the amount of ethanol solution 28 set at the predetermined concentration, and thus it is possible to control the amount of active ingredient of the oyster meat extract acquired by being centrifuged and the type of

active ingredient that can be acquired.

As described above, the fluid 12 (the conventional precipitate) is continuously discharged from the discharge portion 8 by the continuous centrifuging operation, and the remaining solution 19 (the conventional supernatant solution) separated from the fluid 12 is continuously discharged from the remaining solution discharge portion 9, and in order to be able to correspond to these amounts of discharge, the control device 29 adjusts the amount of concentrated liquid (the extraction solution 27) of the oyster meat extract that is fed out and the amount of ethanol solution 28 set at the predetermined concentration that is fed out.

One way to perform such adjustment is that the control device 29 detects, with a sensor, the amount of extraction mixture solution 23 stored in the storage member 3, detects a detection signal indicating, for example, a reduction in the amount of storage and controls the adjustment with the detection signal.

Then, the extraction mixture solution 23 of the concentrated liquid (the concentrated liquid of the extraction solution 27) of the oyster meat extract fed out from the injection tube 13 and the ethanol solution 28 set at the predetermined concentration passes through an introduction path 15 formed within the rotary shaft portion 11 and is introduced from the lower side of the introduction path 15 into the storage member 3.

When a predetermined amount of extraction mixture solution 23 is stored in the storage member 3, the rotary member 5 described above rotates about the vertical direction as the rotary shaft at high speed. As described above, the rotary member 5 is provided with a plurality of rotary blades 4, and while a plurality of the rotary

blades 4 are rotating, the extraction mixture solution 23 within the storage member 3 is agitated and the centrifuging operation is performed.

Although in general, conventionally, the natural precipitation of a precipitate is waited for a predetermined time period after the agitation and, after the completion of the natural precipitation, the extraction mixture solution 23 is separated into the supernatant solution in the upper portion and the precipitate and they are taken out. However, in this continuous centrifuge 1, the conventional precipitate to be precipitated is brought close to the side of an apex angle portion of the side wall of the storage member 3 that is recessed in a triangular shape, and is continuously discharged from a discharge hole 16 provided in the apex angle portion of the side wall recessed in the triangular shape. In other words, without depending on the natural precipitation as in the conventional method, the extraction mixture solution 23 is forcibly separated into the precipitate and the supernatant solution in a short period of time.

A plurality of discharge holes 16 are spaced a predetermined distance apart in a circumferential direction in the apex angle portion of the side wall of the storage member 3 that is recessed in the triangular shape.

Incidentally, the discharge hole 16 is first not opened. When in a position close to the discharge hole 16, a predetermined amount of fluid 12 is collected as the conventional precipitate by the centrifuging operation, and is detected, for example, an operation liquid 18 is operated, and thus the discharge hole 16 is opened or closed. When the discharge hole 16 is opened, the fluid 12 can be smoothly discharged to the outside (see Fig. 3).

In the continuous centrifuge 1 of the present invention, it is possible to control, with a rotation control portion 32, the number of revolutions of the rotary member 5 described above.

Although, in general, the continuous centrifuge 1 is operated at a number of revolutions of, for example, about 2000 rpm, when the number of revolutions is increased to be equal to or more than that, the centrifugal acceleration is rapidly increased, and it is possible to obtain a value of, for example, about $8000 \times g$, with the result that it is possible to expect to extract a large amount of active ingredient of the oyster meat extract in a short period of time.

The number of revolutions described above is controlled to be changed, and thus it is possible to select or increase or decrease the amount of or the type of active ingredient of the oyster meat extract contained within the separated fluid 12 (the natural precipitate by the conventional natural precipitation method). This is because, by performing the forcible centrifuging operation, even an active ingredient that is not precipitated by the conventional natural precipitation method is contained within the fluid 12.

Furthermore, it is possible to select or increase or decrease the amount of or the type of active ingredient of the oyster meat extract contained within the remaining solution 19 (the supernatant solution by the conventional natural precipitation method) separated from the fluid 12.

It is found that, as will be described later, the remaining solution 19 (the supernatant solution by the conventional natural precipitation method) separated forcibly by the continuous centrifuge is further concentrated to produce the

concentrated liquid, the ethanol solution 28 of the predetermined concentration is added to the concentrated liquid, they are centrifuged again with, for example, a second continuous centrifuge 33, and thus a large amount of antioxidant is contained within the remaining solution 34 (the supernatant solution by the conventional natural precipitation method) by the centrifuging operation.

Then, for example, the fluid 12 that is obtained as a precipitate by performing two rounds of continuous centrifuging is acquired individually and continuously, and the fluid 12 is individually dried, with the result that it is also possible to individually produce the dried product of the oyster meat extract which is formed in the shape of a tablet.

As described above, in the present invention, it is possible to extract and manufacture the oyster meat extract in a short period of time and continuously while having a high content and a high degree of extraction of a substance that contains taurine, glycogen, protein, zinc or the like and that has, as it is called, the effect of reducing the aggregation of blood platelet, a vitamin and another useful substance.

In other words, in the present invention, it is possible to extract and manufacture, with the pressurized and depressurized extraction method and the continuous centrifuge 1 described above, a large amount of oyster meat extract in a short period of time while having a high content and a high degree of extraction of a substance that contains taurine, glycogen, protein, zinc or the like and that has, as it is called, the effect of reducing the aggregation of blood platelet, a vitamin and another useful substance.

In the centrifuging operation with the continuous centrifuge 1 of the present

invention, it is found that, within the so-called remaining solution 19 corresponding to the supernatant solution in the conventional precipitation method, a large amount of adenosine or antioxidant is contained. Hence, as described above, in the present invention, the concentrated liquid 31 is produced from the remaining solution 19 separated with the continuous centrifuge 1, and is fed out to the second continuous centrifuge 33 shown in Fig. 4.

As a description will be given with reference to Fig. 4, the left branch tube 25 and the right branch tube 26 are connected to the upper portion of the feed-out tube 14 in the second continuous centrifuge 33 such that the left branch tube 25 and the right branch tube 26 communicate with the feed-out tube 14 in leftward and rightward directions. The concentrated liquid 31 of the remaining solution 19 centrifuged once is continuously fed out from the left branch tube 25 to the feed-out tube 14. The ethanol solution 28 set at the predetermined concentration, for example, 80% is continuously fed out from the right branch tube 26 to the feed-out tube 14.

Even in the second continuous centrifuge 33, the opening and closing member 30 is provided in each of the left branch tube 25 and the right branch tube 26, and it is possible to adjust, by an instruction from the control device 29, the amount of concentrated liquid 31 of the remaining solution 19 that is fed out from the left branch tube 25 and the amount of ethanol solution 28 set at the predetermined concentration that is fed out from the right branch tube 26.

Then, by the continuous centrifuging operation with the second continuous centrifuge 33, the extraction mixture solution 35 composed of the concentrated liquid 31 of the remaining solution 19 centrifuged once and the ethanol solution 28 of the

predetermined concentration is centrifuged with the second continuous centrifuge 33, and the fluid 12 (the conventional precipitate) is continuously discharged from the discharge portion 8, and the remaining solution 34 separated from the fluid 12 is continuously discharged from the remaining solution discharge portion 9.

Hence, as described above, the remaining solution 19 corresponding to the conventional supernatant solution is concentrated again, the ethanol solution 28 of the predetermined concentration is added to the concentrated liquid 31 to obtain the remaining solution 34, and it is centrifuged again.

In this way, it is possible to confirm the extraction of the oyster meat extract containing a large amount of adenosine or antioxidant from the remaining solution 34 corresponding to the conventional supernatant solution.

Although in this embodiment, the description has been given using the example where the continuous centrifuging is performed twice, the present invention is not limited to the continuous centrifuging operation in which continuous centrifuging is performed twice. A continuous centrifuging operation in which continuous centrifuging is performed twice or more may be performed.

List of Reference Symbols

- 1 continuous centrifuge
- 2 storage space portion
- 3 storage member
- 4 rotary blade
- 5 rotary member

- 6 rotary device
- 7 injection portion
- 8 discharge portion
- 9 remaining solution discharge portion
- 10 rotary shaft
- 11 rotary shaft portion
- 12 fluid
- 13 injection tube
- 14 feed-out tube
- 15 introduction path
- 16 discharge hole
- 17 feed-out hole
- 18 operation liquid
- 19 remaining solution
- 20 extraction container
- 21 oyster meat
- 22 solution
- 23 extraction mixture solution
- 24 base end side of the injection tube
- 25 left branch tube
- 26 right branch tube
- 27 extraction solution
- 28 ethanol solution

29 control device

30 opening and closing member

31 concentrated liquid of the remaining solution

32 rotation control portion

33 second continuous centrifuge

34 remaining solution

35 extraction mixture solution

CLAIMS

1. A method of extracting and manufacturing an oyster meat extract using pressurized or depressurized extraction, the method comprising:

an extraction step of storing oyster meat in an extraction container where a solution is stored and extracting, within the extraction container, the oyster meat extract from the oyster meat;

a step of concentrating the oyster meat extract extracted in the extraction step;

an agitation step of adding an ethanol solution to the concentrated oyster meat extract and performing agitation;

a separation step of performing separation into a precipitate and a supernatant solution after a predetermined time after the agitation; and

a concentration step of concentrating the obtained precipitate,

wherein the extraction step is a step in which the extraction is performed in a state where a pressure is increased to a normal pressure or more or in a state where a pressure is reduced to the normal pressure or less such that it is possible to perform the extraction from all portions without damaging the oyster meat and extract a large number of types of active ingredients of the oyster meat extract;

the agitation step and the separation step are a centrifuging step using a continuous centrifuge,

the continuous centrifuge includes:

a storage member that has a storage space portion therewithin;

a rotary shaft portion that is arranged within the storage member and that is configured

to be rotatable with a longitudinal direction being a center shaft direction;

a rotary member that has a plurality of rotary blades spaced a distance apart from an outer circumference of the rotary shaft portion;

a rotary means that rotates the rotary member;

an injection portion that continuously injects a solution to be separated into the storage space portion;

a discharge portion that centrifuges the solution injected from the injection portion and that continuously discharges a separated fluid from a side portion of the storage space portion; and

a solution discharge portion that continuously discharges a remaining solution separated from the fluid,

in the centrifuging step, the solution containing the extracted and concentrated oyster meat extract is fed out from a left-side pipe to a feed-out tube such that an amount of the solution which is fed out can be adjusted, the ethanol solution is fed out from a right-side pipe to the feed-out tube such that an amount of the ethanol solution which is fed out can be adjusted, both the solutions are continuously fed out to the injection portion and both the solutions continuously fed out are stored in the storage member,

both the solutions are agitated by rotating the rotary member, and a centrifuging operation is performed,

the fluid is brought, by the rotation, close to a side of an apex angle portion of a side wall of the storage member which is recessed in a triangular shape,

when the fluid is collected in the side of the apex angle portion of the side wall of the storage member which is recessed in the triangular shape, an opening and closing operation is

performed by an operation liquid, and a plurality of discharge holes that are spaced a predetermined distance apart in a circumferential direction in the apex angle portion of the side wall which is recessed in the triangular shape are opened,

the fluid is continuously discharged by a plurality of the discharge holes through the discharge portion to an outside,

the remaining solution separated from the fluid is moved to an upper portion of the storage member by rotation of a plurality of the rotary blades extending outward in a shape of a skirt from the outer circumference of the rotary shaft portion, and is continuously discharged from the solution discharge portion arranged in the upper portion of the storage member, and

the remaining solution continuously discharged is concentrated, thereafter the ethanol solution of a predetermined concentration is added again thereto, the resulting solution is separated with a second continuous centrifuge and is continuously discharged from the solution discharge portion.

2. A method of extracting and manufacturing the oyster meat extract using the pressurized or depressurized extraction of claim 1,

wherein a plurality of the rotary blades are spaced the distance apart from the outer circumference of the rotary shaft portion provided in the center shaft in the center shaft direction, and are formed to extend radially.

3. A method of extracting and manufacturing the oyster meat extract using the pressurized or depressurized extraction of claim 2,

wherein the rotary shaft portion is formed with a tube-shaped member, and a hollow portion therewithin is used as an introduction path for the solution injected from the injection portion.