

In addition, it is another object of the present invention to set the indicator, which is easily detected upon the preparation and which is common among the various kinds of the peptides, so as to easily prepare the homogeneous emulsion and so as to allow the completion of the emulsion to be easily known.

Means for solving the Problems

In order to solve the above-mentioned problems with the conventional technology, according to the present invention, a syringe pressing apparatus includes: a syringe fixing mechanism for fixing two syringes to a casing, the two syringes being coupled to each other through a connector; and a pressing mechanism for alternately pressing syringe plungers of the two syringes.

Further, in the syringe pressing apparatus, the syringe fixing mechanism detachably fixes syringe bodies of the two syringes to the casing, the two syringes being coupled to each other through the connector. Further, the pressing mechanism includes: at least one pair of pressing sections for alternately pressing the syringe plungers of the two syringes; a driving source for driving the pressing sections; and a power transmission mechanism for transmitting a movement of the driving source to the pressing sections so as to cause the pressing sections to linearly and reciprocatingly move.

Further, the syringe pressing apparatus further includes a plunger-pressure-measuring device for measuring a pressure with

CLAIMS

1. A syringe pressing apparatus, comprising:

a syringe fixing mechanism for fixing two syringes to a casing, the two syringes being coupled to each other through a connector; a pressing mechanism for alternately pressing syringe plungers of the two syringes;

a plunger-pressure-measuring device for measuring a pressure with which the pressing mechanism presses the syringe plungers; and

a control device for controlling the pressing mechanism correspondingly to the pressure with which the pressing mechanism presses the syringe plungers, the pressure being measured by the plunger-pressure-measuring device, wherein

the syringe fixing mechanism detachably fixes syringe bodies of the two syringes to the casing, the two syringes being coupled to each other through the connector; and

the pressing mechanism comprises:

at least one pair of pressing sections for alternately pressing the syringe plungers of the two syringes;

a driving source for driving the pressing sections; and

a power transmission mechanism for transmitting a movement of the driving source to the pressing sections so as to cause the pressing sections to linearly and reciprocatingly move.

2. The syringe pressing apparatus according to claim 1, wherein the control device controls the pressing mechanism, when the pressure with which the pressing mechanism presses the syringe plungers reaches a pressure which is predetermined times as large as an initial pressure of pressing the syringe plungers or when the pressure with which the pressing mechanism presses the syringe plungers reaches a predetermined pressing pressure.

3. The syringe pressing apparatus according to claim 1, wherein the control device stops the pressing mechanism, after a predetermined time period is passed since the pressure with which the pressing mechanism presses the syringe plungers has reached a pressure which is predetermined times as large as an initial pressure of pressing the syringe plungers or since the pressure with which the pressing mechanism presses the syringe plungers has reached a predetermined pressing pressure.

4. The syringe pressing apparatus according to any one of claims 1 to 3, further comprising a cooling device for cooling the driving source.

5. The syringe pressing apparatus according to any one of claims 1 to 4, further comprising a timer for managing a driving time period of the pressing mechanism.

6. The syringe pressing apparatus according to any one of claims 1 to 5, further comprising a pressure-informing mechanism for informing that the pressure of pressing the syringe plungers reaches a predetermined pressure, the pressure being measured by the plunger-pressure-measuring device.

7. The syringe pressing apparatus according to any one of claims 1 to 6, further comprising a stopping-informing mechanism for informing stopping of the pressing mechanism.

8. The syringe pressing apparatus according to any one of claims 1 to 7, wherein each of the pressing sections is provided with an adjusting member for adjusting a distance between each of the pressing sections and each of the syringe plungers.

9. The syringe pressing apparatus according to any one of claims 1 to 8, wherein the syringe pressing apparatus is a syringe pressing apparatus for emulsion production, for producing an emulsion by agitating a raw material of the emulsion in the syringes.

10. The syringe pressing apparatus according to any one of claims 1 to 8, wherein:

the syringe pressing apparatus is a syringe pressing apparatus

for emulsion production, for producing an emulsion by agitating a raw material of the emulsion in the syringes; and

the control device controls the pressing mechanism with use of the pressure with which the pressing mechanism presses the syringe plungers as an indicator of the completion of the emulsion, the pressure being measured by the plunger-pressure-measuring device.

11. The syringe pressing apparatus according to any one of claims 1 to 8, wherein the syringe pressing apparatus is a pressing force-measuring apparatus for the syringe plungers, for measuring a pressure with which the syringe plungers press an object injected into the syringes.

12. A method of producing an emulsion, comprising:

installing two syringes, into which a raw material of the emulsion is injected and which are coupled to each other through a connector, in the syringe pressing apparatus according to claim 9 or 10;

causing the raw material of the emulsion to move between the syringes via the connector so as to be agitated by alternately pressing syringe plungers;

measuring a pressure with which the pressing mechanism presses the syringe plungers;

controlling a pressing pressure of the syringe plungers

correspondingly to the measured pressure, and consequently the emulsion is prepared.

13. The method of producing an emulsion according to claim 12, further comprising:

controlling a pressing pressure of the syringe plungers with use of the pressure with which the pressing mechanism presses the syringe plungers as an indicator of the completion of the emulsion.

14. The method of producing an emulsion according to claim 12 or 13, further comprising stopping the pressing of the syringe plunger after a predetermined time period is passed since the pressure with which the pressing mechanism presses the syringe plungers has reached a pressure which is predetermined times as large as an initial pressure of pressing the syringe plungers or since the pressure with which the pressing mechanism presses the syringe plungers has reached a predetermined pressing pressure.

15. A method of evaluating completion of an emulsion, comprising:

installing two syringes, into which a raw material of the emulsion is injected, and which are coupled to each other through a connector, in the syringe pressing apparatus according to claim 10;

causing the raw material of the emulsion to move between the syringes via the connector so as to be agitated by alternately pressing syringe plungers and measuring a pressure of pressing the syringe plungers; and

informing that the measured pressure reaches a predetermined pressure.

CLAIMS

1. A syringe pressing apparatus, comprising:

a syringe fixing mechanism for fixing two syringes to a casing, the two syringes being coupled to each other through a connector; and

a pressing mechanism for alternately pressing syringe plungers of the two syringes.

2. The syringe pressing apparatus according to claim 1, wherein:

the syringe fixing mechanism detachably fixes the two syringes to the casing, the two syringes being coupled to each other through the connector; and

the pressing mechanism comprises:

at least one pair of pressing sections for alternately pressing the syringe plungers of the two syringes;

a driving source for driving the pressing sections; and

a power transmission mechanism for transmitting a movement of the driving source to the pressing sections so as to cause the pressing sections to linearly and reciprocatingly move.

3. The syringe pressing apparatus according to claim 1 or 2, further comprising a plunger-pressure-measuring device for measuring a pressure with which the pressing mechanism presses the

syringe plungers.

4. The syringe pressing apparatus according to claim 3, further comprising a control device for controlling the pressing mechanism correspondingly to the pressure with which the pressing mechanism presses the syringe plungers, the pressure being measured by the plunger-pressure-measuring device.

5. The syringe pressing apparatus according to claim 4, wherein the control device controls the pressing mechanism, when the pressure of pressing the syringe plungers reaches a pressure which is predetermined times as large as an initial pressure of pressing the syringe plungers or when the pressure of pressing the syringe plungers reaches a predetermined pressing pressure.

6. The syringe pressing apparatus according to any one of claims 2 to 5, further comprising a cooling device for cooling the driving source.

7. The syringe pressing apparatus according to any one of claims 1 to 6, further comprising a timer for managing a driving time period of the pressing mechanism.

8. The syringe pressing apparatus according to any one of claims

1 to 7, further comprising a pressure-informing mechanism for informing that the pressure of pressing the syringe plungers reaches a predetermined pressure, the pressure being measured by the plunger-pressure-measuring device.

9. The syringe pressing apparatus according to any one of claims 1 to 8, further comprising a stopping-informing mechanism for informing stopping of the pressing mechanism.

10. The syringe pressing apparatus according to any one of claims 1 to 9, wherein each of the pressing sections is provided with an adjusting member for adjusting a distance between each of the pressing sections and each of the syringe plungers.

11. The syringe pressing apparatus according to any one of claims 1 to 10, wherein the syringe pressing apparatus is a syringe pressing apparatus for emulsion production, for producing an emulsion by agitating a raw material of the emulsion in the syringes.

12. The syringe pressing apparatus according to any one of claims 3 to 10, wherein the syringe pressing apparatus is a pressing force-measuring apparatus for the syringe plungers, for measuring a pressure with which the syringe plungers press an object injected into the syringes.

13. A method of producing an emulsion, comprising:

installing two syringes, into which a raw material of the emulsion is injected and which are coupled to each other through a connector, in the syringe pressing apparatus according to claim 11;

causing the raw material of the emulsion to move between the syringes via the connector so as to be agitated by alternately pressing syringe plungers, and consequently the emulsion is prepared.

14. The method of producing an emulsion according to claim 13, further comprising:

measuring a pressure of pressing the syringe plungers; and

controlling a pressing pressure of the syringe plungers correspondingly to the measured pressure.

15. A method of evaluating completion of an emulsion, comprising:

installing two syringes, into which a raw material of the emulsion is injected, and which are coupled to each other through a connector, in the syringe pressing apparatus according to claim 11;

causing the raw material of the emulsion to move between the syringes via the connector so as to be agitated by alternately pressing

syringe plungers and measuring a pressure of pressing the syringe plungers; and

informing that the measured pressure reaches a predetermined pressure.