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METHOD FOR COLLECTING HIGH-CONTENT NATURAL MELATONIN RAW MILK AS WELL AS PRODUCT AND APPLICATION THEREOF.

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The present invention provides a method for collecting high-content natural melatonin raw milk, including the following steps: collecting nighttime milk of animals from sunset to sunrise to obtain high-content natural melatonin raw milk. The method is easy to operate and suitable for any kind of dairy cattle farm, dairy goat farm and dairy sheep farm, not restricted by the type of animal houses.

**METHOD FOR COLLECTING HIGH-CONTENT NATURAL MELATONIN
RAW MILK AS WELL AS PRODUCT AND APPLICATION THEREOF**

TECHNICAL FIELD

5 [01] The present invention relates to the technical field of biotechnology, in particular to a method for collecting high-content natural melatonin raw milk as well as a product and an application thereof.

BACKGROUND ART

10 [02] Melatonin (MT) is one of hormones secreted by the pineal body. It can improve the sleep quality, shorten the pre-sleep arousal time and sleep latency, significantly reduce the number of awakening times in sleep, shorten the light sleep stage, prolong the deep sleep stage, and drop awakening threshold on the next morning, with a strong jet lag regulation function. Meanwhile, melatonin can regulate the central nervous
15 system, immune system, cardiovascular system and endocrine system; moreover, it can also remove free radicals to resist oxidation and delay aging. Raw milk contains natural melatonin, and the melatonin in the raw milk of animals is mostly improved by controlling the illumination time and intensity in the prior art. However, animal houses need to be closed, the procedure is relatively complicated, and excessive control of
20 illumination will cause changes in animals' physiology. Therefore, it is a problem that needs to be settled at the present stage to design a method for collecting high-content natural melatonin raw milk that is easy to operate, has no restriction on the type of animal houses, and produces no effect on the animals' physiology.

25 **SUMMARY**

[03] The present invention is intended to provide a method for collecting high-content natural melatonin raw milk, which is easy to operate and suitable for any kind of dairy cattle farm, dairy goat farm and dairy sheep farm.

30 [04] To achieve the above-mentioned purpose, the present invention provides the following technical solution:

[05] The present invention provides a method for collecting high-content natural melatonin raw milk, including the following steps: collecting nighttime milk of animals from sunset to sunrise to obtain high-content natural melatonin raw milk.

[06] Preferably, the nighttime milk is collected within 1 h.

35 [07] Preferably, the sunset time is 17:00-21:00.

[08] Preferably, the sunrise time is 03:00-07:00.

[09] Preferably, the animals are one of dairy cattle, dairy goats and dairy sheep.

[10] Preferably, the high-content natural melatonin raw milk is stored and transported away from light after being collected, and processed within 24 h.

40 [11] The present invention provides high-content natural melatonin raw milk obtained by the collecting method.

[12] The present invention further provides an application of the high-content natural melatonin raw milk in food.

[13] Compared to the prior art, the present invention has the following beneficial

effects:

[14] The collecting method provided in the present invention is easy to operate and suitable for any kind of dairy cattle farm, dairy goat farm and dairy sheep farm, not restricted by the type of animal houses.

- 5 [15] High-content natural melatonin raw milk can be obtained through the collecting method provided in the present invention, and the raw milk can be directly processed into edible dairy products for public consumption.

DETAILED DESCRIPTION OF THE EMBODIMENTS

- 10 [16] The present invention provides a method for collecting high-content natural melatonin raw milk, including the following steps: collecting nighttime milk of animals from sunset to sunrise to obtain high-content natural melatonin raw milk.

[17] In the present invention, the nighttime milk is preferably collected within 1 h, and more preferably 0.5 h.

- 15 [18] In the present invention, the sunset time is preferably 17:00-21:00, and more preferably 17:30-19:30; and the sunrise time is preferably 03:00-07:00, and more preferably 03:30-06:30. In the present invention, when the animals are bred in winter, the nighttime milk of the animals is preferably collected from 17:00-19:00 to 05:00-07:00, and more preferably from 18:00 to 06:00; and when the animals are bred
20 in spring, autumn and summer, the nighttime milk of the animals is preferably collected from 19:00-21:00 to 03:00-05:00, and more preferably from 20:00 to 04:00.

[19] In the present invention, the animals are preferably one of dairy cattle, dairy goats and dairy sheep, and more preferably dairy cattle or dairy goats.

- 25 [20] In the present invention, the high-content natural melatonin raw milk is stored and transported away from light after being collected, and processed within 24 h.

[21] The present invention provides a high-content natural melatonin raw milk obtained by the collecting method.

- 30 [22] The present invention further provides an application of the high-content natural melatonin raw milk in food. The food in the present invention includes but is not limited to fresh milk, yogurt, cheese, milk tablets, milk powder, cream and condensed milk.

- [23] The technical solution in the present invention will be clearly and fully described below in combination with the embodiments of the present invention. Obviously, the embodiments described below are only a part of, rather than all of, the embodiments of the present invention. All other embodiments obtained on the basis of
35 the embodiments of the present invention by those of ordinary skills in the art without making creative efforts should fall within the protection scope of the present invention.

[24] **Example 1** Method for collecting high-content natural melatonin raw milk of dairy cattle in winter

- 40 [25] In winter, daytime milk and nighttime milk of dairy cattle were separately collected, with the nighttime milk being collected from 18:00 to 06:00 and the daytime milk being collected in the rest of a day. Melatonin concentrations were tested in the nighttime milk and the daytime milk. The test results showed that the melatonin concentration was 9.25 pg/ml in the nighttime milk and 5.87 pg/ml in the daytime milk, and the melatonin concentration in the nighttime milk obtained was significantly higher

than that in the daytime milk.

[26] A melatonin concentration test includes the following steps: a milk sample was degreased and centrifuged at 4,000g at 4°C for 15 min, a lower layer of liquid was taken, and the melatonin concentration of the milk was tested by using an ELISA method. The test method was conducted according to the operating steps of RE54021 instructions from IBL International GmbH, Germany. (Extraction was performed using an extraction column kit, with the following operating steps: extraction column modulation, sample extraction, washing, extract elution, solvent evaporation and solvent redissolution; and ELISA test was performed by using a competition method after extraction.)

[27] **Example 2** Method for collecting high-content natural melatonin raw milk of dairy cattle in summer

[28] In summer, daytime milk and nighttime milk of dairy cattle were separately collected. A difference in the collecting method from example 1 was that the nighttime milk was collected from 20:00 to 04:00 and the daytime milk was collected in the rest of a day. All the other methods were the same as those in example 1.

[29] The test results showed that in summer, a melatonin concentration was 3.88 pg/ml in the nighttime milk and 1.92 pg/ml in the daytime milk, and the melatonin concentration in the nighttime milk obtained was significantly higher than that in the daytime milk.

[30] **Example 3** Method for collecting high-content natural melatonin raw milk of dairy cattle in spring

[31] (1) Dairy cattle with a daily milk yield of no less than 20 kg in spring were high-yielding dairy cattle, and dairy cattle with a daily milk yield of less than 20 kg were low-yielding dairy cattle.

[32] (2) Nighttime milk of the high-yielding dairy cattle and nighttime milk of the low-yielding dairy cattle were collected from 20:00 to 04:00, and daytime milk was collected in the rest of a day. Melatonin concentrations were tested in the nighttime milk and the daytime milk, and the test method was the same as that in example 1.

[33] The test results showed that for the low-yielding dairy cattle, the melatonin concentration was 8.81 pg/ml in the nighttime milk and 3.48 pg/ml in the daytime milk; and for the high-yielding dairy cattle, the melatonin concentration was 6.05 pg/ml in nighttime milk and 2.39 pg/ml in the daytime milk. It can be seen that the melatonin concentration in the nighttime milk obtained was significantly higher than that in the daytime milk, and the melatonin content in the nighttime milk of the low-yielding dairy cattle was significantly higher than that of the high-yielding dairy cattle.

[34] The above-mentioned embodiments are only the preferred embodiments of the present invention. It should be noted that improvements and modifications may also be made by those of ordinary skill in the art without departing from the principles of the present invention. Such improvements and modifications should also fall within the protection scope of the present invention.

CLAIMS

- 5 1. A method for collecting high-content natural melatonin raw milk, comprising the following steps: collecting nighttime milk of animals from sunset to sunrise to obtain high-content natural melatonin raw milk.
2. The collecting method of claim 1, wherein the nighttime milk is collected within 1 h.
3. The collecting method of claim 1, wherein the sunset is 17:00-21:00.
4. The collecting method of claim 1, wherein the sunrise is 03:00-07:00.
- 10 5. The collecting method of claim 1, wherein the animals are one of dairy cattle, dairy goats and dairy sheep.
6. The collecting method of claim 1, wherein the high-content natural melatonin raw milk is stored and transported away from light after being collected, and processed within 24 h.
- 15 7. High-content natural melatonin raw milk obtained by the collecting method of claim 1.
8. An application of the high-content natural melatonin raw milk of claim 7 in food.

Ansprüche

1. Verfahren zum Sammeln von Rohmilch mit einem hohen Gehalt an natürlichem Melatonin, welches die folgenden Schritte umfasst: Sammeln von Nachtmilch von Tieren vom Sonnenuntergang bis zum Sonnenaufgang, um Rohmilch mit einem hohen Gehalt an natürlichem Melatonin zu erhalten.
2. Sammelverfahren nach Anspruch 1, wobei die Nachtmilch innerhalb von einer Stunde gesammelt wird.
3. Sammelverfahren nach Anspruch 1, wobei der Sonnenuntergang von 17.00 bis 21.00 Uhr stattfindet.
4. Sammelverfahren nach Anspruch 1, wobei der Sonnenaufgang von 03.00 bis 07.00 Uhr stattfindet.
5. Sammelverfahren nach Anspruch 1, wobei die Tiere eines von Milchkühen, Milchziegen und Milchschafen sind.
6. Sammelverfahren nach Anspruch 1, wobei die Rohmilch mit einem hohen Gehalt an natürlichem Melatonin nach dem Sammeln lichtgeschützt gelagert und abtransportiert und innerhalb von 24 Stunden verarbeitet wird.
7. Rohmilch mit einem hohen Gehalt an natürlichem Melatonin, die durch das Sammelverfahren nach Anspruch 1 erhalten wurde.
8. Anwendung der Rohmilch mit einem hohen Gehalt an natürlichem Melatonin nach Anspruch 7 in Nahrungsmitteln.