

A bio-collagen mask substrate and use thereof

Technical Field

The present invention relates to a bio-collagen mask substrate and use thereof, and belongs to the technical field of biomaterial application.

5 Background Art

Collagen is a natural protein composed of 19 kinds of amino acids such as glycine, alanine and proline. Collagen mainly exists in the skin, cartilage, ligament, muscle tendon and other connective tissues of animals, and plays a role of support and protection, being an important structural protein of connective tissues.

10 In the past 20 years, with the development of molecular biology, people's understanding of the nature of collagen has been deepened. Studies have shown that collagen has low antigenicity, good biocompatibility and biodegradability. Therefore, the importance and economic status of collagen, as a natural biomass resource, in industrial applications such as foods, biomedicines and cosmetics have become increasingly prominent, and research on
15 collagen films made of collagen is becoming increasingly active in the above fields.

At present, there are many mask products on the market, but most of them contain chemical raw materials. Even though some products claim to use natural raw materials, they still cannot be truly natural. Therefore, there are very few masks that can be used securely for allergic skin consumers, especially those with severe allergies.

20 Summary of the Invention

One purpose of the present invention is to provide a bio-collagen mask substrate and use thereof. The mask substrate is naturally non-irritating and safe to use, prevents the chemical raw materials from harming the skin, and can be used safely for all kinds of skin including allergic skin. The mask substrate is soft and smooth, just like the second layer of
25 skin of the human body, and gives consumers excellent user experience when it is used in combination with a specifically formulated mask liquid.

The present invention adopts the following technical solutions:

A bio-collagen mask substrate prepared by the following method:

S1: placing bio-collagen into an extruder to obtain a tubular bio-collagen film, cutting
30 and flattening the tubular bio-collagen film;

S2: stretching the flattened collagen film onto the roller of a mask forming slicer, pressing on the roller with a customized mold, adjusting the minimum distance between the mold and the roller by a hand wheel, and cutting the collagen film by pressure of a mold cutter driven by rotation of a motor to obtain a collagen film sheet;

5 wherein, in the step (1), the bio-collagen is extracted from animal skin, and the specific method is provided as follows:

(1) washing and dividing the animal skin;

(2) after alkali treatment of the divided animal skin, adding water in a weight ratio of animal skin to water of 1:1, performing enzyme treatment with a protease added in an amount of 0.5% to 2% by weight of the animal skin at 25 to 35°C for 3 to 6 hours, washing and performing acid treatment;

(3) cooling the animal skin after the acid treatment to 10°C or lower, cutting up by dicing, tableting, chopping, grinding or a combination thereof, crushing into pieces, and extracting silky fiber by high pressure filtration;

15 (4) adding edible cellulose or edible cellulose derivatives and an oil emulsion while stirring, controlling the pH value and water content, mixing and stirring well to obtain the biocollagen.

Wherein, in the step (1), the animal skin is preferably divided into 5 to 20 mm². The animal skin is cowhide, pigskin or other animal skin.

20 In the step (2), the protease is pepsin, papain or trypsin.

In the step (2), the alkali treatment is preferably performed by pickling with lime milk for 1 to 2 days, and then rinsing with water; and the acid treatment is preferably performed by soaking with 0.1 to 0.5 M hydrochloric acid or lactic acid solution for 4 hours, then using lactic acid to transform the animal skin to a translucent swelling form, draining the acid solution, and washing with water for 3 to 4 times.

In the step (4), the oil emulsion is prepared by the following method: heating edible oil and fat into liquid, adding water in a weight ratio of edible oil and fat to water of 1:1, heating again, and emulsifying with a colloidal mill. The edible oil and fat is hydrogenated oil and fat, margarines or shortenings.

30 In the step (4), the amount of the edible cellulose or edible cellulose derivatives is 1% to 3% by weight of the animal skin, the amount of the oil emulsion is 1% to 5% by weight of

the animal skin, the pH is controlled to 2.5 to 3.5, and the water content is 88% to 94%.

The shape of the mask substrate of the present invention can be tailored according to actual use requirements. For example, the mask substrate is directly cut into the shape of the whole mask that is most commonly used in the market at present, with holes in the
5 corresponding portions of the eyes, nose and mouth; or the mask substrate is cut into a plurality of flat portions, such as two portions including upper and lower portions, two portions including left and right portions, or more portions, to form a segmented mask substrate; or the mask substrate is tailored into a 3D structure to facilitate different users to perform more targeted facial treatment according to different positions of the face.

10 As one of the preferred embodiments of the present invention, the mask substrate is a segmented mask substrate. With the lower part of the nose as a dividing line, the face portion is divided into an upper half part and a lower half part. The shape of the mold is adjusted according to the upper half part and the lower half part of the face, and each portion of the mask substrate is prepared according to the manufacture method of the above-mentioned
15 mask substrate, as shown in Figures 1 to 4.

The specific size of the segmented mask substrate is provided as follows: the upper half part of the mask substrate has a length of 230 ± 5 mm and a width of 102 ± 5 mm, wherein the upper half part of the mask substrate is provided with eye openings at the positions corresponding to the eyes, and the eye openings have an elliptical shape with a long axis of
20 50 ± 2 mm and a short axis of 20 ± 2 mm; six openings are provided on the lower edge of the upper half part of the mask substrate, wherein two openings are located adjacent to two ends of the lower edge, with a distance of 190 ± 5 mm therebetween; the other four openings are located on both sides of the nose portion of the mask substrate, so that the user can adjust the mask substrate to make it more conformable to the face; the openings on both sides of
25 the nose portion of the mask substrate are symmetrically arranged, the distance between the two most distal openings is 60 ± 2 mm, and the distance between the two middle openings is 40 ± 2 mm.

The lower half part of the mask substrate has a length of 230 ± 5 mm and a width of 100 ± 5 mm, wherein a gap with a width of 45 ± 2 mm is provided corresponding to the nose
30 portion so as to prevent the mask liquid from affecting the user's breathing; an elliptical lip opening is provided in the lower half part of the mask substrate, with a long axis of 63 ± 2

mm, and a short axis of 20 ± 2 mm, and the lower end of the gap of the nose portion is 13 ± 2 mm away from the upper end of the lip opening. Similarly, four openings are arranged symmetrically with the central axis of the face portion as the central axis at the lower end of the lower part of the mask substrate, wherein the distance between the two most distal openings is 125 ± 2 mm, and the distance between the two middle openings is 63 ± 2 mm.

As one of the preferred embodiments of the present invention, the mask substrate is a 3D mask substrate, and the shape of the mold can be adjusted according to the left face, the right face, and the mouth-nose triangular portion, then each portion of the mask is prepared according to the above method, and a special adhesive for collagen is used to bond each portion of the mask, and a 3D round face is formed by cutting the periphery utilizing the shape of the mold, so as to obtain a 3D collagen mask substrate, as shown in Figures 5 to 10.

As one of the preferred embodiments of the present invention, the 3D mask substrate is divided into three portions including a left-face portion, a right-face portion and a mouth-nose triangular portion, wherein the length of the left-face portion of the 3D mask substrate is 203 ± 5 mm, the width of the upper end is 88 ± 5 mm, and the width of the lower end is 106 ± 5 mm; the eye opening has an elliptical shape, with a long axis of 46 ± 2 mm, and a short axis of 19 ± 2 mm; and the right-face portion and the left-face portion are mirror structures.

The mouth-nose triangular portion of the 3D mask substrate has a three-dimensional structure with high middle and low sides, the length of the middle ridge is 109 ± 5 mm, and the distance between the left or right end and the middle ridge is 48 ± 2 mm; the mouth-nose triangular portion of the 3D mask substrate is provided with a nose opening and a lip opening corresponding to the tip portion of the nose and the lip portion, and the middle ridge is divided into five segments, sequentially being 20 ± 2 mm, 13 ± 2 mm, 13 ± 2 mm, 20 ± 2 mm, and 43 ± 2 mm in length; and the most distal end of the nose opening is 26 ± 2 mm away from the middle ridge, and the most distal end of the lip opening is 35 ± 2 mm away from the middle ridge.

The present invention also provides a mask comprising the above-mentioned bio-collagen mask substrate and a mask liquid.

The mask liquid is composed of the following components by weight parts: 80.0-90.0 parts of water, 1.0-5.0 parts of 1,3-propanediol, 1.0-5.0 parts of glycerol, 0.05-3.0 parts of

methysilanol hydroxyproline aspartate, 0.01-1.0 parts of hydrolyzed jojoba esters, 0.1-2.0 parts of sodium hyaluronate, 0.1-2.0 parts of CHAMOMILLA RECUTITA extract, 0.1-1.0 parts of glycoprotein, 0.2-3.0 parts of ALOE BARBADENSIS leaf extract, 0.1-1.0 parts of CENTELLA ASIATICA extract, 0.1-1.0 parts of STEPHANIA TETRANTRA extract, 0.1-0.8 parts of ubiquinone, 0.1-0.8 parts of MACADAMIA TERNIFOLIA seed oil, 0.1-1.0 parts of PEG/PPG/polybutylene glycol-8/5/3 glycerol, 0.3-0.6 parts of p-hydroxyacetophenone, 0.1-3.0 parts of butanediol, 0.4-2.0 parts of 1,2-hexanediol, 0.1-1.0 parts of xanthan gum, 0.01-0.05 parts of ROSARUGOSA oil, 0.5-0.8 parts of PEG-40 hydrogenated castor oil, and 0.5-0.8 parts of PPG-26-buteth-26.

As one of the preferred embodiments of the present invention, the mask liquid is composed of the following components by weight parts: 85-88 parts of water, 4-5 parts of 1,3-propanediol, 3-5 parts of glycerol, 0.1-0.2 parts of methysilanol hydroxyproline aspartate, 0.01-0.02 parts of hydrolyzed jojoba esters, 0.1-0.15 parts of sodium hyaluronate, 0.1-0.15 parts of CHAMOMILLA RECUTITA extract, 0.1-0.15 parts of glycoprotein, 0.2-0.25 parts of ALOE BARBADENSIS leaf extract, 0.1-0.15 parts of CENTELLA ASIATICA extract, 0.1-0.15 parts of STEPHANIA TETRANTRA extract, 0.1-0.15 parts of ubiquinone, 0.1-0.15 parts of MACADAMIA TERNIFOLIA seed oil, 0.4-0.6 parts of PEG/PPG/polybutylene glycol-8/5/3 glycerol, 0.5-0.6 parts of p-hydroxyacetophenone, 0.1-0.15 parts of butanediol, 0.4-0.5 parts of 1,2-hexanediol, 0.5-0.7 parts of xanthan gum, 0.01-0.02 parts of ROSARUGOSA oil, 0.7-0.8 parts of PEG-40 hydrogenated castor oil, and 0.7-0.8 parts of PPG-26-buteth-26.

The beneficial effects of the technical solution of the present invention:

The invention successfully solves the problem of allergy and the like existing in the prior non-woven fabric mask substrate by using bio-collagen as a raw material and creatively making it into a mask substrate. The mask substrate of the present invention has good permeability, is naturally non-irritating, and can make the essence penetrate better into the skin by the unique structural features and the perfect fitting ability to the skin with no reverse absorption, no residues, and highly effective moisturizing effect, so as to make the mask skin-care essence be absorbed more thoroughly.

Brief Description of the Drawings

Figure 1 is a schematic overall diagram of the collagen film sheet of Example 1.

Figure 2 is an overall dimension diagram of the collagen film sheet of Example 1.

Figure 3 is a dimension diagram of the upper facial collagen film sheet in Example 1.

Figure 4 is a dimension diagram of the lower facial collagen film sheet in Example 1.

Figure 5 is a space diagram of the 3D collagen film sheet mask according to Example 2.

5 Figure 6 is a planar diagram of the whole facial collagen film sheet of the mask of Example 2.

Figure 7 is a diagram showing a collagen film sheet of the upper facial portion of the mask of Example 2.

10 Figure 8 is a diagram showing a collagen film sheet of the mouth-nose triangular portion of the mask of Example 2.

Figure 9 is a diagram showing the left-face collagen film sheet of the mask of Example 2.

Figure 10 is a diagram showing the right-face collagen film sheet of the mask of Example 2.

15 **Specific Modes for Carrying Out the Embodiments**

The following examples are intended to illustrate the present invention, but are not intended to limit the scope of the present invention.

Example 1: Segmented mask

The manufacture of the segmented mask comprises the following steps:

20 (I) Preparation of the mask liquid:

15.7212 g of water, 0.9 g of 1,3-propanediol, 0.54 g of glycerol, 0.018 g of methylsilanol hydroxyproline aspartate, 0.0018 g of hydrolyzed jojoba esters, 0.0252 g of sodium hyaluronate, 0.018 g of Chamomilla Recutita extract, 0.018 g of glycoprotein, 0.036 g of Aloe Barbadensis leaf extract, 0.018 g of Centella Asiatica extract, 0.018 g of Stephania
25 Tetrandra extract, 0.018 g of ubiquinone, 0.018 g of Macadamia Ternifolia seed oil, 0.09 g of PEG/PPG/polybutylene glycol-8/5/3 glycerol, 0.09 g of p-hydroxyacetophenone, 0.018 g of butanediol, 0.072 g of 1,2-hexanediol, 0.108 g of xanthan gum, 0.0018 g of ROSARUGOSA oil, 0.135 g of PEG-40 hydrogenated castor oil, and 0.135 g of PPG-26- buteth-26.

(II) Manufacture of the segmented mask substrate

30 Working environment requirement: in a clean room with 100,000 grade GMP

Temperature requirement: controlled at 22 to 26°C

Relative humidity requirement: controlled at 45% to 55%

1. Manufacture steps of an upper facial collagen film sheet with a length of 230 mm and a width of 102 mm:

1) bio-collagen was obtained according to the method described in CN100548127C, the
5 bio-collagen was placed in an extruder to obtain a tubular bio-collagen film, and the tubular collagen film having a diameter of 52 to 54 mm was placed on the pulley shaft of the fixed bracket of a tubular edger, and fixed;

2) the tubular collagen film was cut and edged by a cutter, and flattened by a fold flattening shaft device; and

10 3) the flattened collagen film was stretched onto the roller of a mask forming slicer, and pressed on the roller with a customized upper facial mold, the minimum distance between the upper facial mold and the roller was adjusted by a hand wheel, and the collagen film was cut by pressure of a mold cutter driven by rotation of a motor to obtain an upper facial collagen film sheet.

15 2. Manufacture steps of a lower facial collagen film sheet with a length of 230 mm and a width of 100 mm:

4) a tubular collagen film having a diameter of 52 to 54 mm was placed on the pulley shaft of the fixed bracket of a tubular edger, and fixed;

5) the tubular collagen film was cut and edged by a cutter, and flattened by a fold
20 flattening shaft device;

6) the flattened collagen film was stretched onto the roller of a mask forming slicer, and pressed on the roller with a customized lower facial mold, the minimum distance between the lower facial mold and the roller was adjusted by a hand wheel, and the collagen film was cut by pressure of a mold cutter driven by rotation of a motor to obtain a lower facial
25 collagen film sheet.

3. An upper facial collagen film sheet and a lower facial collagen film sheet constitute a set in the manufacture, and they can be respectively applied on face when used.

The obtained masks were shown in Figures 1-4.

Example 2: 3D collagen mask

30 The manufacture of the 3D collagen mask comprises the following steps:

(I) Preparation of the mask liquid: the same formula as the mask liquid described in

Example 1 was adopted.

(II) Manufacture steps of 3D collagen mask:

Working environment requirement: in a clean room with 100,000 grade GMP

Temperature requirement: controlled at 22 to 26°C

5 Relative humidity requirement: controlled at 45% to 55%

1. bio-collagen was obtained according to the method described in CN100548127C, the bio-collagen was placed in an extruder to obtain a tubular bio-collagen film, and the tubular collagen film having a diameter of 52 to 54 mm was placed on the pulley shaft of the fixed bracket of a tubular edger, and fixed;

10 2. the tubular collagen film was cut and edged by a cutter, and flattened by a fold flattening shaft device;

3. the flattened collagen film was stretched onto the roller of a mask forming slicer, and pressed on the roller using a customized left-face mold, with the edged and flattened biocollagen film sandwiched therebetween, the minimum distance between the left-face
15 mold and the roller was adjusted by a hand wheel, and the collagen film was cut by pressure of a mold cutter driven by rotation of a motor to obtain a left-face collagen film sheet;

4. a right-face mold was used instead and the above method was employed to obtain a right-face collagen film sheet;

5. a mouth-nose triangular portion mold was used instead and the above method was
20 employed to obtain a collagen film sheet of the mouth-nose triangular portion;

6. the left-face collagen film sheet, the collagen film sheet of the mouth-nose triangular portion and the right-face collagen film sheet was bonded with a special adhesive for collagen, and the periphery was cut utilizing the shape of the mold to make a 3D round face, so as to obtain a 3D collagen mask.

25 The obtained 3D mask substrate was shown in Figures 5-10.

Although the present invention has been described in detail using general description and specific embodiments hereinabove, it is obvious to a person skilled in the art that some modifications or improvements can be made based on the present invention. Therefore, all these modifications or improvements made on the basis of not deviating from the spirit of
30 the present invention fall into the protection scope claimed in the present invention.

Industrial applicability

The present invention provides a bio-collagen mask substrate. The bio-collagen mask substrate of the present invention is obtained by the following method: S1: placing bio-collagen into an extruder to obtain a tubular bio-collagen film, cutting and flattening the tubular bio-collagen film; S2: stretching the flattened collagen film onto the roller of a mask forming slicer, pressing on the roller with a customized mold, adjusting the minimum distance between the mold and the roller by a hand wheel, and cutting the collagen film by pressure of a mold cutter driven by rotation of a motor to obtain a collagen film sheet. The bio-collagen mask substrate provided by the present invention is naturally non-irritating, has good permeability, is safe to use, and prevents chemical raw materials from harming the skin. All kinds of skin including allergic skin can use safely. Furthermore, the mask substrate can make the essence penetrate better into the skin by the unique structural features and the perfect fitting ability to the skin, with no reverse absorption, no residues, and highly effective moisturizing effect, so as to make the mask skin-care essence be absorbed more thoroughly. The mask substrate of the present invention has high economic value and good application prospect.

What is claimed is:

1. A bio-collagen mask substrate, characterized in that, it is manufactured by the following methods:

S1: placing bio-collagen into an extruder to obtain a tubular bio-collagen film, cutting
5 and flattening the tubular bio-collagen film; and

S2: stretching the flattened collagen film onto the roller of a mask forming slicer, pressing on the roller with a customized mold, adjusting the minimum distance between the mold and the roller by a hand wheel, and cutting the collagen film by pressure of a mold cutter driven by rotation of a motor to obtain a collagen film sheet;

10 wherein, in the step (1), the bio-collagen is extracted from animal skin, and the specific method is provided as follows:

(1) washing and dividing the animal skin;

(2) after alkali treatment of the divided animal skin, adding water in a weight ratio of animal skin to water of 1:1, performing enzyme treatment with protease added in an amount
15 of 0.5% to 2% by weight of the animal skin at 25 to 35°C for 3 to 6 hours, washing and performing acid treatment;

(3) cooling the animal skin after the acid treatment to 10°C or lower, cutting up by dicing, tableting, chopping, grinding or a combination thereof, crushing into pieces, and extracting silky fiber by high pressure filtration; and

20 (4) adding edible cellulose or edible cellulose derivatives and an oil emulsion while stirring, controlling the pH value and water content, mixing and stirring well, to obtain the bio-collagen.

2. The bio-collagen mask substrate according to claim 1, characterized in that, in the step (2), the protease is pepsin, papain or trypsin.

25 3. The bio-collagen mask substrate according to claim 1, characterized in that, in the step (2), the alkali treatment is performed by pickling with lime milk for 1 to 2 days, and then rinsing with water; and the acid treatment is performed by soaking with 0.1 to 0.5 M hydrochloric acid or lactic acid solution for 4 hours, then using lactic acid to make the animal skin present a translucent swelling form, draining the acid solution, and washing with
30 water for 3 to 4 times.

4. The bio-collagen mask substrate according to claim 1, characterized in that, in the

step (4), the amount of the edible cellulose or edible cellulose derivatives is 1% to 3% by weight of the animal skin, the amount of the oil emulsion is 1% to 5% by weight of the animal skin, the pH is controlled to 2.5 to 3.5, and the water content is 88% to 94%.

5. The bio-collagen mask substrate according to claim 1, characterized in that, the shape of the mask substrate is a planar whole mask substrate, a segmented mask substrate, and a 3D structural mask substrate.

6. The bio-collagen mask substrate according to claim 5, characterized in that, the mask substrate is a segmented mask substrate, and it has the following specific structure: with the lower part of the nose as a dividing line, the face portion is divided into an upper half part and a lower half part; the upper half part has a length of 230 ± 5 mm and a width of 102 ± 5 mm; and the lower half part of the mask substrate has a length of 230 ± 5 mm and a width of 100 ± 5 mm.

7. The bio-collagen mask substrate according to claim 6, characterized in that, the upper half part of the mask substrate is provided with elliptical eye openings at corresponding positions of the eyes, with a long axis of 50 ± 2 mm, and a short axis of 20 ± 2 mm;

six openings are provided on the lower edge of the upper half part of the mask substrate, wherein two openings are close to the two ends of the mask substrate, with a distance of 190 ± 5 mm therebetween, and the other four openings are provided on both sides of the nose portion of the mask substrate, in symmetrical arrangement, with a distance between the two most distal openings of 60 ± 2 mm, and a distance between the two middle openings of 40 ± 2 mm;

a gap is provided corresponding to the nose portion of the lower half part of the mask substrate, with a width of 45 ± 2 mm; and an elliptical lip opening is provided at the position corresponding to the lip portion of the lower half part of the mask substrate, with a long axis of 63 ± 2 mm, and a short axis of 20 ± 2 mm, and the lower end of the gap of the nose portion is 13 ± 2 mm away from the upper end of the lip opening;

four openings are arranged symmetrically with the central axis of the face portion as the central axis at the lower end of the lower half part of the mask substrate, wherein the distance between the two most distal openings is 125 ± 2 mm, and the distance between the two middle openings is 63 ± 2 mm.

8. The bio-collagen mask substrate according to claim 5, characterized in that, the mask

substrate is a 3D mask substrate, and is divided into three portions including a left-face portion, a right-face portion and a mouth-nose triangular portion;

wherein the length of the left-face portion of the 3D mask substrate is 203 ± 5 mm, the width of the upper end is 88 ± 5 mm, and the width of the lower end is 106 ± 5 mm; the eye opening has an elliptical shape, with a long axis of 46 ± 2 mm, and a short axis of 19 ± 2 mm; and the right-face portion and the left-face portion are mirror structures;

the mouth-nose triangular portion of the 3D mask substrate is a three-dimensional structure with high middle and low sides, the length of the middle ridge is 109 ± 5 mm, and the distance between the left or right end and the middle ridge is 48 ± 2 mm; the mouth-nose triangular portion of the 3D mask substrate is provided with nose opening and lip opening corresponding to the tip portion of the nose and the lip portion, and the middle ridge is divided into five segments, sequentially being 20 ± 2 mm, 13 ± 2 mm, 13 ± 2 mm, 20 ± 2 mm, and 43 ± 2 mm in length; and the most distal end of the nose opening is 26 ± 2 mm away from the middle ridge, and the most distal end of the lip opening is 35 ± 2 mm away from the middle ridge.

9. A mask, characterized in that, it comprises the bio-collagen mask substrate according to any one of claims 1 to 8 and mask liquid.

10. The mask according to claim 9, characterized in that, the mask liquid is composed of the following components by weight parts: 80.0-90.0 parts of water, 1.0-5.0 parts of 1,3-propanediol, 1.0-5.0 parts of glycerol, 0.05-3.0 parts of methylsilanol hydroxyproline aspartate, 0.01-1.0 parts of hydrolyzed jojoba esters, 0.1-2.0 parts of sodium hyaluronate, 0.1-2.0 parts of Chamomilla Recutita extract, 0.1-1.0 parts of glycoprotein, 0.2-3.0 parts of Aloe Barbadensis leaf extract, 0.1-1.0 parts of Centella Asiatica extract, 0.1-1.0 parts of Stephania Tetrandra extract, 0.1-0.8 parts of ubiquinone, 0.1-0.8 parts of Macadamia Ternifolia seed oil, 0.1-1.0 parts of PEG/PPG/polybutylene glycol-8/5/3 glycerol, 0.3-0.6 parts of p-hydroxyacetophenone, 0.1-3.0 parts of butanediol, 0.4-2.0 parts of 1,2-hexanediol, 0.1-1.0 parts of xanthan gum, 0.01-0.05 parts of Rosa Rugosa oil, 0.5-0.8 parts of PEG-40 hydrogenated castor oil, and 0.5-0.8 parts of PPG-26-buteth-26.