

DESCRIPTION

TITLE OF THE INVENTION: ACARINE TRAPPING PRODUCT AND ACARINE TRAPPING METHOD

5

TECHNICAL FIELD

[0001]

The present invention relates to acarine trapping products and acarine trapping methods for trapping acarines
10 living indoors.

BACKGROUND ART

[0002]

In recent dwelling environments that are more air-tight,
15 there has been a problem that acarines are likely to proliferate. It has been considered that acarines are the main cause of atopic dermatitis, asthma, allergic diseases, and the like. Therefore, general people have desired a means and method for reliably and safely getting rid of acarines.

20 [0003]

Acarines may be controlled using chemicals such as pesticides and repellents. However, this does not actively reduce the number of acarines, and leaves the acarine's dead body, which is a problem. In addition, people who are
25 sensitive to chemicals are likely to be affected by those for controlling acarines. Therefore, there is a demand for a means

and method capable of easily getting rid of acarines without using chemicals at all if possible, or using chemicals as little as possible.

[0004]

5 Under the above circumstances, a type of product (acarine sheet) has been developed which gets rid of acarines by attracting and catching acarines instead of killing or repelling acarines (see, for example, Patent Document 1). Patent Document 1 describes an acarine sheet in which an
10 attracting agent is provided on a sticky agent, and these agents are interposed between air-permeable layers. According to Patent Document 1, acarines are attracted by the attracting agent, which is located inside the two air-permeable layers, and thereafter, get stuck on the sticky agent, whereby
15 acarines can be caught by the acarine sheet.

CITATION LIST

PATENT LITERATURE

[0005]

20 Patent Document 1: Japanese Unexamined Patent Application Publication No. 2009-89610

SUMMARY OF INVENTION

TECHNICAL PROBLEM

25 [0006]

 In the above type of product that attracts and catches

acarines, it is critically important that the product has an excellent effect of attracting acarines. Unless the acarine attracting effect is sufficient, acarines approaching the trap product cannot be reliably guided to the sticky agent and thus cannot be caught. If the acarine attracting effect relies only on the attracting agent, then when the efficacy of the attracting agent decreases due to long-term use or the like, the acarine attracting effect decreases significantly.

[0007]

In this regard, in the case of the acarine sheet described in Patent Document 1, it is necessary for acarines to pass through the air-permeable layer before being caught by the sticky agent. Therefore, the acarine attracting effect of the attracting agent may be reduced, depending on the material or characteristics of the air-permeable layer. In addition, the acarine sheet described in Patent Document 1 essentially includes the attracting agent. Therefore, if the attracting agent is no longer effective, it may not be possible to even attract acarines to the proximity of the acarine sheet.

[0008]

Thus, the above conventional type of product that attracts and catches acarines, including the acarine sheet described in Patent Document 1, does not necessarily have a sufficient acarine attracting effect. There is room for improvement in such a type of product.

[0009]

With the above problem in mind, the present invention has been made. It is an object of the present invention to provide an acarine trapping product and acarine trapping method that have an excellent acarine attracting effect and are capable of reliably and safely catching and getting rid of attracted acarines.

SOLUTION TO PROBLEM

[0010]

10 To solve the above problem, an acarine trapping product according to the present invention is characterized by comprising:

a fibrous structural body having nap; and

a sticky body configured to cause acarines to get stuck thereon.

[0011]

Acarines infest fibrous products such as clothing, mats, and rugs. The present inventors have found that acarines are specifically attracted by a fibrous structural body with nap, and has successfully developed a novel acarine trapping product by utilizing such a particular phenomenon. Specifically, in the acarine trapping product having this feature, the fibrous structural body with nap first attracts acarines, and causes the attracted acarines to remain therein or move around therein to end up getting stuck on the sticky body. Thus, this acarine trapping product has excellent

trapping performance. In addition, only by directly throwing away the acarine trapping product, can acarines trapped by the acarine trapping product be gotten rid of. It should be noted that the acarine trapping product having this feature excludes
5 chemicals such as pesticides and repellents, and therefore, can be used by people who are sensitive to chemicals without worrying about safety.

[0012]

In the acarine trapping product of the present
10 invention,

the fibrous structural body preferably includes fibers having an elongation percentage of at most 10%.

[0013]

According to the acarine trapping product having this
15 feature, the fibrous structural body includes fibers having an elongation percentage of at most 10%. Therefore, the fibrous structural body attracts more acarines, resulting in more excellent trapping performance.

[0014]

20 In the acarine trapping product of the present invention,

the fibrous structural body is preferably a woven or knitted fabric having a yarn density of 10 to 100 strands/10 cm.

25 [0015]

According to the acarine trapping product having this

feature, the fibrous structural body is a woven or knitted fabric having a yarn density of 10 to 100 strands/10 cm. Therefore, the fibrous structural body attracts more acarines, resulting in more excellent trapping performance.

5 [0016]

In the acarine trapping product of the present invention,

the fibrous structural body preferably includes at least bast fibers and/or seed hair fibers.

10 [0017]

According to the acarine trapping product having this feature, the fibrous structural body includes at least bast fibers and/or seed hair fibers. Therefore, the fibrous structural body attracts more acarines, resulting in more
15 excellent trapping performance.

[0018]

In the acarine trapping product of the present invention,

an attracting agent is preferably provided between the
20 fibrous structural body and the sticky body.

[0019]

According to the acarine trapping product having this feature, an attracting agent is provided between the fibrous structural body and the sticky body. Therefore, the fibrous
25 structural body and the attracting agent, which have the effect of attracting acarines, exhibit a synergistic effect,

resulting in more excellent trapping performance.

[0020]

In the acarine trapping product of the present invention,

5 at least a portion of the fibrous structural body is preferably covered by an air-permeable sheet that does not have nap.

[0021]

According to the acarine trapping product having this
10 feature, at least a portion of the fibrous structural body is covered by an air-permeable sheet that does not have nap. Therefore, acarines are more likely to enter the product. In addition, the nap of the fibrous structural body is not exposed from the outer surface of the product, and therefore,
15 the acarine trapping product can be easily inserted into a small space, and easily thrown away after use, resulting in excellent handling properties.

[0022]

In the acarine trapping product of the present
20 invention,

the acarine trapping product preferably satisfies:

$$0.1 \leq (a^2/b) \times 100 \leq 1.0 \quad (1)$$

where a represents a thickness (mm) of the fibrous structural body, and b represents a weight per unit area (g/m²) of the
25 fibrous structural body.

[0023]

According to the acarine trapping product having this feature, expression (1) is satisfied. Therefore, the fibrous structural body attracts more acarines, resulting in more excellent trapping performance.

5 [0024]

In the acarine trapping product of the present invention,

the acarine trapping product preferably excludes pesticides and/or repellents.

10 [0025]

According to the acarine trapping product having this feature, the acarine trapping product excludes pesticides and/or repellents. Therefore, in principle, the effect of attracting acarines does not significantly decrease. In addition, people who are sensitive to chemicals can use the acarine trapping product without worrying about safety.

[0026]

To solve the above problem, an acarine trapping product according to the present invention is characterized in that:

20 the acarine trapping product attracts and catches acarines that have entered a region within a one-meter radius thereof.

[0027]

According to the acarine trapping product having this feature, acarines approaching the product can be reliably caught.

[0028]

In the acarine trapping product of the present invention,

the acarine trapping product preferably attracts and
5 catches acarines within 24 hours.

[0029]

According to the acarine trapping product having this feature, acarines approaching the product can be quickly caught.

10 [0030]

To solve the above problem, an acarine trapping method according to the present invention is characterized by comprising:

placing any one of the above acarine trapping products
15 at or near a place where acarines live.

[0031]

The acarine trapping method having this feature employs the acarine trapping product of the present invention, and therefore, has an excellent acarine attracting effect and is
20 capable of reliably and safely catching and getting rid of attracted acarines.

BRIEF DESCRIPTION OF DRAWINGS

[0032]

25 [FIG. 1] FIG. 1 is a schematic cross-sectional view of an acarine trapping product according to a first embodiment of

the present invention.

[FIG. 2] FIG. 2 is an enlarged image of a fibrous structural body.

[FIG. 3] FIG. 3 is a schematic cross-sectional view of an acarine trapping product according to a second embodiment of the present invention.

[FIG. 4] FIG. 4 is a schematic cross-sectional view of an acarine trapping product according to a third embodiment of the present invention.

[FIG. 5] FIG. 5 is a diagram for describing a procedure for conducting a trap distance test.

DESCRIPTION OF EMBODIMENTS

[0033]

Embodiments concerning an acarine trapping product and an acarine trapping method according to the present invention will be described below with reference to the accompanying drawings. It should be noted that in each figure, parts of the acarine trapping product are not exactly identical to the actual one in terms of shape, size, positional relationship, magnitude relationship between the thicknesses of layers, scale, and the like, and are exaggerated or simplified, as appropriate, for the sake of convenience. Furthermore, the present invention is in no way intended to be limited to embodiments described below or configurations shown in the drawings.

[0034]

<First Embodiment>

[Acarine Trapping Product]

FIG. 1 is a schematic cross-sectional view of an acarine trapping product 100 according to a first embodiment of the present invention. The acarine trapping product 100 includes a fibrous structural body 10 and a sticky body 20, which are put on top of each other. FIG. 1 illustrates that two fibrous structural bodies 10 are layered on the opposite sides of the sticky body 20 (i.e., a fibrous structural body 10 is layered on either side of the sticky body 20). Alternatively, in the acarine trapping product 100, a single fibrous structural body 10 may be layered only on one side of the sticky body 20. In addition, although in FIG. 1, only a single fibrous structural body 10 is layered on either side of the sticky body 20, the acarine trapping product 100 may have a structure in which two or more fibrous structural bodies 10 are layered on either side of the sticky body 20.

[0035]

The acarine trapping product 100 is placed at or near a place where acarines live in order to attract and catch acarines. In the acarine trapping product 100, the fibrous structural body 10 itself attracts acarines, and allows the acarines to remain and settle therein. Furthermore, in the acarine trapping product 100, because the fibrous structural body 10 is layered on the sticky body 20, acarines attracted

by the fibrous structural body 10 are brought into contact with the sticky body 20 to get stuck on a surface of the sticky body 20, so that the acarines can be caught. The acarine trapping product 100 is, for example, inserted, in use, under a mattress, mat, rug, carpet, and the like, where acarines live, and a space between the seat and back-rest of a couch or the like, and therefore, is preferably in the shape of a sheet. The shape of the acarine trapping product 100 as viewed from above is preferably, but is not limited to, rectangular, polygonal, circular, elliptical, or the like, which preferably allows the acarine trapping product 100 to be easily handled.

[0036]

Thus, the acarine trapping product 100 can attract acarines using the fibrous structural body 10, and therefore, can exclude pesticides and/or repellents. Therefore, in principle, the effect of attracting acarines does not significantly decrease. In addition, because pesticides and/or repellents are excluded, people who are sensitive to chemicals can use the acarine trapping product 100 without worrying about safety.

[0037]

The fibrous structural body 10 is a woven or knitted fabric with nap. The texture of the woven fabric and knitted fabric is preferably, but is not limited to, plain texture. The acarine trapping product 100 utilizes the phenomenon that

acarines are specifically attracted by the fibrous structural body 10, which has nap. Thus, the fibrous structural body 10 effectively attracts acarines, and causes the attracted acarines to remain or move around therein.

5 [0038]

Yarn constituting the fibrous structural body 10 preferably has an elongation percentage of at most 10%, more preferably 1 to 5%, and even more preferably 1 to 3%. The elongation percentage is measured in accordance with a JIS procedure described in "JIS L 1095 Testing Methods for Spun Yarn." Specifically, the elongation percentage is obtained by dividing the elongation (cm) of a sample (yarn) at the time when the sample breaks in the presence of a load that is applied thereto using a tensile tester by the original length (cm) of the sample, and is expressed in percent (%). If the elongation percentage of the yarn of the fibrous structural body 10 is at most 10%, more acarines are attracted by the fibrous structural body 10, resulting in an acarine trapping product having more excellent trapping performance. It should be noted that the exact mechanism that allows the fibrous structural body 10 that is made of yarn having an elongation percentage of at most 10%, to exhibit an excellent effect of attracting and settling acarines, has not been clarified. However, it may be contemplated that the elongation percentage of the yarn of the fibrous structural body 10 is involved with preference exhibited by acarines.

[0039]

A fibrous material for the yarn of the fibrous structural body 10 is preferably natural plant fibers, and more preferably includes bast fibers and/or seed hair fibers. Examples of bast fibers include jute, linen, ramie, hemp, and kenaf. Yarn made of bast fibers has nap, and therefore, have a high ability to attract acarines, and can be preferably used. Of them, jute and ramie, which have a very high ability to attract acarines, are more preferably used. Jute is even more preferably used. Examples of seed hair fibers include cotton and kapok. In the case in which yarn made of seed hair fibers is used, the yarn is preferably carded in order to provide appropriate nap to the fibrous structural body 10. Yarn made of these bast fibers and seed hair fibers has an elongation percentage of at most 10%.

[0040]

FIG. 2 is an enlarged image of the fibrous structural body 10. Strands of the yarn of the fibrous structural body 10 are preferably arranged so as to provide spaces that allow acarines to pass therethrough. In addition, the fibrous structural body 10 is preferably woven or knitted fabric, and the yarn density thereof is preferably 10 to 100 strands/10 cm, more preferably 15 to 60 strands/10 cm, and even more preferably 30 to 50 strands/10 cm. As used herein, the term "yarn density" refers to the number of warp or weft strands of yarn included in 10 cm-width woven fabric in the case in which

the fibrous structural body 10 is a woven fabric, and the number of course or wale strands of yarn in 10 cm-width knitted fabric in the case in which the fibrous structural body 10 is a knitted fabric. If the yarn density of the fibrous structural body 10 is in the above range, nap 12 is present to an appropriate extent between strands of yarn 11 included in the fibrous structural body 10 as illustrated in the image of FIG. 2, which can attract more acarines. In addition, the interval between each strand of yarn included in the fibrous structural body 10 is such that the fibrous structural body 10 has air permeability and allows acarines to pass therethrough, and is preferably 0.05 to 15 mm, more preferably 0.3 to 10 mm, and even more preferably 0.5 to 5 mm. If the interval between each strand of yarn included in the fibrous structural body 10 is in the above range, nap is present to an appropriate extent between each strand of yarn included in the fibrous structural body 10, which can attract more acarines.

[0041]

The fibrous structural body 10 preferably has a thickness of 0.2 to 5 mm, more preferably 0.4 to 3 mm, and even more preferably 0.5 to 1.5 mm. If the thickness of the fibrous structural body 10 is in the above range, attracted acarines are likely to remain in the fibrous structural body 10, resulting in more excellent trapping performance. It should be noted that the term "thickness" with respect to the

fibrous structural body 10 refers to a thickness of the fibrous structural body 10 itself. In the case in which the fibrous structural body 10 is a single layer of woven or knitted fabric, the thickness of the yarn of the fibrous structural body 10 may be considered as the thickness of the fibrous structural body 10.

[0042]

The fibrous structural body 10 preferably has a weight per unit area of 10 to 1500 g/m², more preferably 20 to 1000 g/m², even more preferably 100 to 700 g/m², and most preferably 200 to 600 g/m². If the weight per unit area of the fibrous structural body 10 is in the above range, attracted acarines are likely to remain in the fibrous structural body 10, resulting in more excellent trapping performance.

[0043]

Next, the present inventors have found that acarine attracting and catching performance can be assessed using a novel specific parameter obtained from the thickness and weight per unit area of the fibrous structural body 10. Specifically, the fibrous structural body 10 preferably satisfies the following expression:

$$0.1 \leq (a^2/b) \times 100 \leq 1.0 \quad (1)$$

where a represents the thickness (mm) of the fibrous structural body 10, and b represents the weight per unit area (g/m²) of the fibrous structural body 10.

The fibrous structural body 10 more preferably satisfies

the following expression:

$$0.2 \leq (a^2/b) \times 100 \leq 0.7 \quad (2)$$

If the fibrous structural body 10 satisfies the above expression, the fibrous structural body 10 contains
5 appropriately dense fibers, and attracts more acarines, resulting in more excellent trapping performance.

[0044]

It should be noted that as long as the acarine attracting performance of the fibrous structural body 10 is
10 not affected, the fibrous structural body 10 may be subjected to a softening treatment or the like to adjust the feel thereof, or a coloring treatment to add, to the fibrous structural body 10, a color that is more likely to attract acarines or a color that makes the fibrous structural body 10
15 less noticeable when the fibrous structural body 10 is placed in a room.

[0045]

In the sticky body 20, a sticky layer 22 is formed on a sheet-shaped base 21. When acarines come into contact with the
20 sticky layer 22, the acarines get stuck. Although the sticky layer 22 is preferably formed on either side of the base 21, the sticky layer 22 may be formed only on one side of the base 21. If the sticky layer 22 is formed on either side of the base 21, acarines have a greater chance of coming into contact
25 with the sticky layer 22, resulting in an improvement in trapping performance. If the sticky layer 22 is formed only on

one side of the base 21, the handling properties of the acarine trapping product 100 can be improved.

[0046]

The base 21 preferably has both appropriate elasticity
5 and flexibility so that the acarine trapping product 100 can be easily inserted into a small space. The base 21 may, for example, be formed of paper such as cardboard or corrugated fiberboard, a resin sheet of PE, PP, PET, PVC, or the like, or a metal sheet. The base 21 preferably has a thickness of 0.02
10 to 3 mm. If the thickness of the base 21 is in the above range, the base 21 has both such appropriate elasticity and flexibility that the acarine trapping product 100 can be easily inserted into a small space.

[0047]

15 The sticky layer 22 is configured by attaching a double-sided tape to the base 21 or applying a sticky agent to the base 21. Examples of the sticky agent include general-purpose sticky agents, such as rubber sticky agents, acrylic sticky agents, hot-melt sticky agents, and silicone sticky agents.
20 Examples of rubber sticky agents include natural rubber sticky agents, styrene-butadiene rubber sticky agents, reclaimed rubber sticky agents, polyisobutylene-butylene rubber sticky agents, polybutene sticky agents, and block copolymer sticky agents. These sticky agents may be used alone or in
25 combination.

[0048]

[Attracting and Catching Performance]

The acarine trapping product 100 preferably attracts and catches acarines that have entered a region within a one-meter radius thereof. As used therein, the term "attract and catch" refers to not only a state in which attracted acarines get stuck on a surface of the sticky body 20, but also a state in which attracted acarines remain in the acarine trapping product 100, particularly in the fibrous structural body 10. By attracting and catching acarines that have entered a region within a one-meter radius thereof, the acarine trapping product 100 can reliably catch and get rid of acarines approaching theretoward.

[0049]

The acarine trapping product 100 can attract and catch acarines approaching theretoward within 24 hours, which depends on the degree of infestation of acarines or where the acarine trapping product 100 is placed. Twenty-four hours are sufficient to trap acarines, and are short enough for the acarine trapping product 100 to be practical.

[0050]

The acarine trapping product 100 can attract and catch acarines over at least 20 days and at most 90 days. Twenty days are a practical period of time during which the acarine trapping product 100 continues to trap acarines. The acarine trapping product 100 can trap and get rid of acarines over a longer period of time. For example, the acarine trapping

product 100 can be designed to trap acarines over 90 days, which depends on what are selected as the attracting agent and the sticky agent, or the like.

[0051]

5 The acarine trapping product 100 thus configured includes the fibrous structural body 10, which has nap, and the sticky body 20, on which acarines get stuck. Therefore, acarines are first attracted by the fibrous structural body 10, which has nap, and thereafter, the attracted acarine
10 remain in the fibrous structural body 10, or move around in the fibrous structural body 10 to end up getting stuck on the sticky body 20. Thus, the acarine trapping product 100 has excellent trapping performance. In addition, only by directly throwing away the acarine trapping product 100, can acarines
15 trapped by the acarine trapping product 100 be gotten rid of. It should be noted that the acarine trapping product 100 excludes chemicals such as pesticides and repellents, and therefore, can be used by people who are sensitive to chemicals, without worrying about safety.

20 [0052]

<Second Embodiment>

[Acarine Trapping Product]

FIG. 3 is a schematic cross-sectional view of an acarine trapping product 200 according to a second embodiment of the
25 present invention. The acarine trapping product 200 has the same configuration as that of the acarine trapping product 100

described in the first embodiment, except that the acarine trapping product 200 includes an attracting agent 30 between the fibrous structural body 10 and the sticky body 20. Because the acarine trapping product 200 includes the attracting agent 30, the fibrous structural body 10 and the attracting agent 30, which have the effect of attracting acarines, exhibit a synergistic effect, resulting in more excellent trapping performance.

[0053]

The attracting agent 30 may be any one that has the effect of attracting acarines, and contains, for example, a pulverized powder or extract of a food component of an animal, plant, yeast, or the like, or an aroma chemical component having an acarine attracting effect. The attracting agent 30 may be a powder or granular pulverized food product, a product obtained by solidifying such a pulverized food product, an air-permeable, nonwoven-fabric bag containing such a pulverized food product, various products that adsorb and hold an extract, or the like. For example, the attracting agent 30 illustrated in FIG. 3 is a solid tablet arranged between the fibrous structural body 10 and the sticky body 20. Alternatively, the attracting agent 30 may, for example, be added by: spraying or dropping a liquid extract onto the sticky body 20; spreading and pressing a liquid extract over and into the fibrous structural body 10; causing a liquid extract to be adsorbed by the fibrous structural body 10;

impregnating the fibrous structural body 10 with a liquid extract; or the like. Alternatively, when a sticky agent is applied to the base 21 of the sticky body 20 to form the sticky layer 22, the attracting agent 30 may be directly
5 applied together with the sticky agent to the base 21.

[0054]

<Third Embodiment>

[Acarine Trapping Product]

FIG. 4 is a schematic cross-sectional view of an acarine
10 trapping product 300 according to a third embodiment of the present invention. The acarine trapping product 300 has the same configuration as that of the acarine trapping product 200 described in the second embodiment, except that the fibrous structural body 10 is covered by an air-permeable sheet 40.

15 [0055]

The air-permeable sheet 40 has pores that are large enough to allow acarines to pass therethrough. The air-permeable sheet 40 preferably does not have nap. Although the exact mechanism has not been clarified, if at least a portion
20 of the fibrous structural body 10, which has nap, is covered by the air-permeable sheet 40, which does not have nap, the ability to attract acarines is further improved, so that acarines are more likely to enter the product. Therefore, the acarine trapping product 300 has more excellent trapping
25 performance. The material for the air-permeable sheet 40 is not limited as long as the material does not repel acarines.

Examples of the material for the air-permeable sheet 40 include net or nonwoven fabric made of a resin such as polyethylene, polyester, or nylon, woven or knitted fabric made of chemical fibers, and woven or knitted fabric made of natural fibers. Examples of natural fibers used in the air-permeable sheet 40 include animal fibers such as wool and silk, and seed hair fibers. In the case in which seed hair fibers are used in the air-permeable sheet 40, combed yarn is preferably used in order to avoid nap. Of them, the air-permeable sheet 40 is preferably net or nonwoven fabric made of a resin such as polyethylene, polyester, or nylon, or woven or knitted fabric made of chemical fibers, more preferably net or nonwoven fabric made of a resin such as polyethylene, polyester, or nylon, and most preferably net made of a resin such as polyethylene, polyester, or nylon.

[0056]

The air-permeable sheet 40 is configured to cover at least a portion of the fibrous structural body 10. For example, the air-permeable sheet 40 is a bag that contains the fibrous structural body 10 and the sticky body 20. The acarine trapping product 300, which includes the air-permeable sheet 40, has a further improved ability to attract acarines. In addition, the nap of the fibrous structural body 10 is not exposed from the outer surface of the product, and therefore, the acarine trapping product 300 can be easily inserted into a small space (e.g., under a rug that cannot be completely

turned up, between blankets stored in a closet, or between the seat and back-rest of a couch). Furthermore, when the acarine trapping product 300 is placed, or thrown away after use, stimuli to the user's hand or finger are reduced, resulting in
5 excellent handling properties.

[0057]

<Acarine Trapping Method>

An acarine trapping method according to the present invention is for attracting and catching acarines by placing
10 the acarine trapping products 100 to 300 at or around a place where acarines live. The acarine trapping method of the present invention employs the acarine trapping products 100 to 300 of the present invention, and therefore, has an excellent acarine attracting effect and is capable of reliably and
15 safely catching and getting rid of attracted acarines.

[Examples]

[0058]

Acarine trapping products having the features of the present invention (Examples 1 to 16) were prepared, and an
20 acarine trap test and elongation percentage measurement were performed. In addition, for comparison, acarine trapping products that do not have any of the features of the present invention (Comparative Examples 1 to 7) were prepared, and similarly tested and measured.

25 [0059]

[Example 1]

A sticky body was produced by applying a rubber hot-melt sticky agent to either side of a PET resin sheet having a thickness of 0.05 mm. A woven fabric as a fibrous structural body was layered on either side of the sticky body. Thus, a three-layer acarine trapping product according to Example 1 was obtained. The woven fabric used as the fibrous structural body was plain woven fabric of jute yarn that has a yarn density of 28 to 38 strands/10 cm, a thickness of 0.86 mm, and a weight per unit area of 128 g/m².

10 [0060]

[Example 2]

An acarine trapping product according to Example 2 was prepared which was the same as that of Example 1, except that the fibrous structural body was made of plain woven fabric of jute yarn having a yarn density of 45 to 48 strands/10 cm, a thickness of 1.11 mm, and a weight per unit area of 600 g/m².

[0061]

[Example 3]

An acarine trapping product according to Example 3 was prepared which was the same as that of Example 1, except that the fibrous structural body was made of plain woven fabric of jute yarn having a yarn density of 43 to 47 strands/10 cm, a thickness of 0.86 mm, and a weight per unit area of 255 g/m².

[0062]

25 [Example 4]

An acarine trapping product according to Example 4 was

prepared which was the same as that of Example 1, except that the fibrous structural body was made of plain woven fabric of jute yarn having a yarn density of 35 to 38 strands/10 cm, a thickness of 0.61 mm, and a weight per unit area of 227 g/m².

5 [0063]

[Example 5]

An acarine trapping product according to Example 5 was prepared which was the same as that of Example 1, except that the fibrous structural body was made of plain woven fabric of
10 jute yarn having a yarn density of 31 to 38 strands/10 cm, a thickness of 0.9 mm, and a weight per unit area of 215 g/m².

[0064]

[Example 6]

An acarine trapping product according to Example 6 was
15 prepared which was the same as that of Example 1, except that the fibrous structural body was made of plain woven fabric of jute yarn having a yarn density of 19 to 22 strands/10 cm, a thickness of 2.64 mm, and a weight per unit area of 946 g/m².

[0065]

20 [Example 7]

An acarine trapping product according to Example 7 was prepared which was the same as that of Example 1, except that the fibrous structural body was made of plain woven fabric of jute yarn having a yarn density of 19 to 22 strands/10 cm, a
25 thickness of 0.75 mm, and a weight per unit area of 113 g/m².

[0066]

[Example 8]

An acarine trapping product according to Example 8 was prepared which was the same as that of Example 1, except that the fibrous structural body was made of plain woven fabric of
5 jute yarn having a yarn density of 10 to 12 strands/10 cm, a thickness of 0.75 mm, and a weight per unit area of 72 g/m².

[0067]

[Example 9]

An acarine trapping product according to Example 9 was
10 prepared which was the same as that of Example 1, except that the fibrous structural body was made of plain woven fabric of hemp yarn having a yarn density of 19 to 22 strands/10 cm, a thickness of 0.36 mm, and a weight per unit area of 26 g/m².

[0068]

15 [Example 10]

An acarine trapping product according to Example 10 was prepared which was the same as that of Example 1, except that the fibrous structural body was made of plain woven fabric of ramie yarn having a yarn density of 19 to 22 strands/10 cm, a
20 thickness of 0.59 mm, and a weight per unit area of 118 g/m².

[0069]

[Example 11]

An acarine trapping product according to Example 11 was prepared which was the same as that of Example 1, except that
25 the fibrous structural body was made of plain woven fabric of linen yarn having a yarn density of 19 to 22 strands/10 cm, a

thickness of 0.57 mm, and a weight per unit area of 89 g/m².

[0070]

[Example 12]

An acarine trapping product according to Example 12 was
5 prepared which was the same as that of Example 1, except that
the fibrous structural body was made of plain woven fabric of
kenaf yarn having a yarn density of 19 to 22 strands/10 cm, a
thickness of 0.75 mm, and a weight per unit area of 131 g/m².

[0071]

10 [Example 13]

A sticky body was produced by applying a rubber hot-melt
sticky agent to either side of a PET resin sheet having a
thickness of 0.05 mm. A woven fabric as a fibrous structure
body was layered on either side of the sticky body. Thus, a
15 three-layer laminate was obtained. The woven fabric used as
the fibrous structural body was plain woven fabric of jute
yarn having a yarn density of 43 to 47 strands/10 cm, a
thickness of 0.86 mm, and a weight per unit area of 255 g/m².
The laminate was enclosed in a bag made of polyethylene net
20 (air-permeable sheet). Thus, a five-layer acarine trapping
product according to Example 13 was obtained. The polyethylene
net had a mesh size (interval between each constituent strand
(bar)) of 1 mm, a thickness of 0.03 mm, and a weight per unit
area of 67 g/m². The polyethylene net did not have nap. When
25 a line segment of 10 cm was put on the polyethylene net, the
number of fibers that crossed the line segment was 95 to 110.

[0072]

[Example 14]

A sticky body was produced by applying a rubber hot-melt sticky agent to either side of a PET resin sheet having a thickness of 0.05 mm. A woven fabric as a fibrous structure body was layered on either side of the sticky body. Thus, a three-layer laminate was obtained. The woven fabric used as the fibrous structural body was plain woven fabric of jute yarn having a yarn density of 35 to 38 strands/10 cm, a thickness of 0.61 mm, and a weight per unit area of 227 g/m². The laminate was enclosed in a bag made of polyethylene net (air-permeable sheet). Thus, a five-layer acarine trapping product according to Example 14 was obtained. The polyethylene net had a mesh size of 1 mm, a thickness of 0.03 mm, and a weight per unit area of 67 g/m². The polyethylene net did not have nap. When a line segment of 10 cm was put on the polyethylene net, the number of fibers that crossed the line segment was 95 to 110.

[0073]

[Example 15]

An acarine trapping product according to Example 15 was prepared which was the same as that of Example 1, except that the fibrous structural body was made of plain woven fabric of carded cotton yarn (count: 30) having a yarn density of 19 to 22 strands/10 cm, a thickness of 0.2 mm, and a weight per unit area of 31 g/m².

[0074]

[Example 16]

An acarine trapping product according to Example 16 was prepared which was the same as that of Example 1, except that
5 the fibrous structural body was made of plain woven fabric of carded kapok yarn having a yarn density of 19 to 22 strands/10 cm, a thickness of 1.11 mm, and a weight per unit area of 311 g/m².

[0075]

10 [Comparative Example 1]

An acarine trapping product according to Comparative Example 1 was prepared which was the same as that of Example 1, except that the fibrous structural body was made of plain woven fabric of wool yarn having a yarn density of 19 to 22
15 strands/10 cm, a thickness of 0.67 mm, and a weight per unit area of 189 g/m².

[0076]

[Comparative Example 2]

An acarine trapping product according to Comparative
20 Example 2 was prepared which was the same as that of Example 1, except that the fibrous structural body was made of plain woven fabric of nylon yarn (count: 60) having a yarn density of 19 to 22 strands/10 cm, a thickness of 0.03 mm, and a weight per unit area of 16 g/m².

25 [0077]

[Comparative Example 3]

An acarine trapping product according to Comparative Example 3 was prepared which was the same as that of Example 1, except that the fibrous structural body was made of plain woven fabric of polyester yarn (count: 50) having a yarn density of 19 to 22 strands/10 cm, a thickness of 0.04 mm, and a weight per unit area of 22 g/m².

[0078]

[Comparative Example 4]

An acarine trapping product according to Comparative Example 4 was prepared which was the same as that of Example 1, except that the fibrous structural body was made of plain woven fabric of acrylic yarn having a yarn density of 19 to 22 strands/10 cm, a thickness of 0.44 mm, and a weight per unit area of 375 g/m².

[0079]

[Comparative Example 5]

A sticky body was produced by applying a rubber hot-melt sticky agent to either side of a PET resin sheet having a thickness of 0.05 mm. A polyurethane sponge having a thickness of 6 mm was layered on either side of the sticky body. Thus, a three-layer acarine trapping product according to Comparative Example 5 was obtained.

[0080]

[Comparative Example 6]

A polyethylene net as a fibrous structural body was layered on either side of a sticky body produced by applying a

rubber hot-melt sticky agent to either side of a PET resin sheet having a thickness of 0.05 mm. Thus, a three-layer acarine trapping product according to Comparative Example 6 was obtained. The polyethylene net had a mesh size of 1 mm, a thickness of 0.03 mm, and a weight per unit area of 67 g/m². The polyethylene net did not have nap. When a line segment of 10 cm was put on the polyethylene net, the number of fibers that crossed the line segment was 95 to 110.

[0081]

10 [Comparative Example 7]

A sticky body was produced by applying a rubber hot-melt sticky agent to either side of a PET resin sheet having a thickness of 0.05 mm. A woven fabric as a fibrous structure body was layered on either side of the sticky body. Thus, a three-layer laminate was obtained. The woven fabric used as the fibrous structural body was plain woven fabric of wool yarn having a yarn density of 19 to 22 strands/10 cm, a thickness of 0.67 mm, and a weight per unit area of 189 g/m². The laminate was enclosed in a bag made of polyethylene net (air-permeable sheet). Thus, a five-layer acarine trapping product according to Comparative Example 7 was obtained. The polyethylene net had a mesh size of 1 mm, a thickness of 0.03 mm, and a weight per unit area of 67 g/m². The polyethylene net did not have nap. When a line segment of 10 cm was put on the polyethylene net, the number of fibers that crossed the line segment was 95 to 110.

[0082]

(1) Acarine Trapping Test

A test piece having a size of 3 cm × 3 cm was cut from each of the acarine trapping products of Examples 1 to 16 and Comparative Examples 1 to 7, and was placed at the center of a glass petri dish having a diameter of 4.5 cm (height: 1.5 cm). The petri dish having a diameter of 4.5 cm was placed at the center of a glass petri dish having a diameter of 9 cm (height: 2 cm). About 10,000 house dust mites were released into the glass petri dish having a diameter of 9 cm, which was allowed to stand in a dark place at room temperature (25°C) and a humidity of 80%. After 24 hours, acarines that got stuck on the sticky body of the test piece were counted. The resultant count is referred to as a trap count. The trial was conducted three times for each of the acarine trapping products of Examples 1 to 16 and Comparative Examples 1 to 7, and the average value of trap counts was calculated for each acarine trapping product. As a control, a test piece having a size of 3 cm × 3 cm was cut only from the sticky body used in the acarine trapping product of Example 1, and placed at the center of a glass petri dish having a diameter of 4.5 cm. A test similar to that for the acarine trapping products of the examples and comparative examples was conducted, and acarines that got stuck on the sticky body were counted. A value was calculated by dividing the trap count of the acarine trapping product of an example (Examples 1 to 16) or a comparative

example (Comparative Examples 1 to 7) by the trap count of the control. The value is referred to as a trap ratio.

[0083]

(2) Elongation percentage

5 Yarn was collected from the woven fabric included in the fibrous structural body of each of the acarine trapping products of Examples 1 to 16 and Comparative Examples 1 to 4 and 7. The elongation percentage (%) of the yarn was measured in accordance with a JIS procedure described in "JIS L 1095
10 Testing Methods for Spun Yarn."

[0084]

 The specifications, test results, and measurement results of the acarine trapping products of Examples 1 to 16 and Comparative Examples 1 to 7 are described in the following
15 table.

[0085]

[Table 1]

		Fibrous structural body					Trap ratio	Elongation percentage (%)
		Fibrous material	Thickness a (mm)	Weight per unit area b (g/m^2)	Yarn density (strands/10 cm)	$(a^2/b) \times 100$		
Examples	1	Jute	0.86	128	28~38	0.58	80.1	1.7~1.8
	2	Jute	1.11	600	45~48	0.21	177.2	1.7~1.8
	3	Jute	0.86	255	43~47	0.29	138.4	1.7~1.8
	4	Jute	0.61	227	35~38	0.16	121	1.7~1.8
	5	Jute	0.9	215	31~38	0.38	86.9	1.7~1.8
	6	Jute	2.64	946	19~22	0.74	147.8	1.7~1.8
	7	Jute	0.75	113	19~22	0.50	78.6	1.7~1.8
	8	Jute	0.75	72	10~12	0.78	33.4	1.7~1.8
	9	Hemp	0.36	26	19~22	0.50	27	1.6~2.0
	10	Ramie	0.59	118	19~22	0.30	101.2	1.8~2.2
	11	Linen	0.57	89	19~22	0.37	54.2	1.5~2.3
	12	Kenaf	0.75	131	19~22	0.43	49.9	1.7~2.0
	13	Jute+polyethylene net	0.89	255	43~47	0.31	162.2	1.7~1.8
	14	Jute+polyethylene net	0.64	227	35~38	0.18	160.6	1.7~1.8
	15	Cotton	0.2	31	19~22	0.13	57.7	3~7
	16	Kapok	1.11	311	19~22	0.40	24.5	3~7
Comparative Examples	1	Wool	0.67	189	19~22	0.24	11.6	25~35
	2	Nylon	0.03	16	19~22	0.01	0.9	28~45
	3	Polyester	0.04	22	19~22	0.01	2.4	20~40
	4	Acryl	0.44	375	19~22	0.05	16.2	12~20
	5	Polyurethane sponge	6	-	-	-	7.3	-
	6	Polyethylene net	0.03	67	95~110	0.00	4.8	-
	7	Wool+polyethylene net	0.7	189	19~22	0.26	10.5	25~35

[0086]

The result of the acarine trap test demonstrated that all of the acarine trapping products of Examples 1 to 16, which employed woven fabric with nap as the fibrous structural body, had a greater trap ratio than those of the acarine trapping products of Comparative Examples 1 to 7, which employed a material without nap as the fibrous structural body, and therefore, had an excellent effect of attracting and settling acarines. In particular, the acarine trapping products of Examples 1 to 7 and 10, which employed bast

fibers, particularly jute or ramie, as the fibrous material for the fibrous structural body, had a greater trap ratio than those of Examples 15 and 16, which employed cotton or kapok, which is seed hair fiber. The acarine trapping product of Example 8, which employed jute having a low yarn density and a low weight per unit area, had a greater trap ratio than that of Example 16, which employed kapok. Therefore, it is considered that if jute or ramie is used as the fibrous material for the fibrous structural body, a more excellent effect of attracting and settling acarines is obtained.

[0087]

For the acarine trapping products of Examples 1 to 16, a parameter that is calculated by $(a^2/b) \times 100$, where a represents the thickness of the fibrous structural body and b represents the weight per unit area of fibrous structural body, was 0.13 to 0.78. Therefore, it is considered that if a woven fabric with nap is used as the fibrous structural body, then when the above parameter is in the range of about 0.1 to 1.0, an excellent effect of attracting and settling acarines is obtained.

[0088]

For the acarine trapping products of Examples 1-5, 7, and 8, which employed jute as the fibrous material for the fibrous structural body, the trap ratio increases with an increase in the weight per unit area. It should be noted that for the acarine trapping product of Example 6, which employed

jute as the fibrous material for the fibrous structural body,
and in which the weight per unit area of the fibrous
structural body is 946 g/m^2 , had a smaller trap ratio than that
of the acarine trapping product of Example 2, in which the
5 weight per unit area of the fibrous structural body is 600 g/m^2 . Therefore, it is considered that if jute is used as the
fibrous material for the fibrous structural body, then when
the weight per unit area of the fibrous structural body is in
the range of 72 to 600 g/m^2 , the effect of attracting and
10 settling acarines increases with an increase in the weight per
unit area of the fibrous structural body.

[0089]

The acarine trapping products of Examples 13 and 14 were
obtained by enclosing the acarine trapping products of
15 Examples 3 and 4, respectively, in a bag made of polyethylene
net (air-permeable sheet). The polyethylene net used as an
air-permeable sheet in the acarine trapping products of
Examples 13 and 14 was used alone as the fibrous structural
body in the acarine trapping product of Comparative Example 6.
20 In those cases, the trap ratios of the acarine trapping
products of Examples 13 and 14 were 162.2 and 160.6,
respectively, which are greater than the sum (143.2) of the
trap ratio (138.4) of the acarine trapping product of Example
3 and the trap ratio (4.8) of the acarine trapping product of
25 Comparative Example 6, and the sum (125.8) of the trap ratio
(121) of the acarine trapping product of Example 4 and the

trap ratio (4.8) of the acarine trapping product of Comparative Example 6, demonstrating that the trapping performance was improved. Meanwhile, in Comparative Example 7, in which the acarine trapping product of Comparative Example 1, in which the fibrous material is wool, was enclosed in a bag made of polyethylene net (air-permeable sheet), the effect of improving the trapping performance was not observed. Based on these results, it is considered that if the fibrous structural body with nap is covered by an air-permeable sheet without nap, not only the attracting and settling effect of each of the fibrous structural body and the air-permeable sheet, but also some synergistic effect, are obtained, although the exact mechanism therefor has not been clarified, resulting in an improvement in the effect of attracting and settling acarines.

[0090]

An acarine trapping product including the characteristic configuration of the present invention (Example 17) and a product obtained by enclosing a sticky body in a bag (Comparative Example 8) were prepared, and a trap distance test was conducted.

[0091]

[Example 17]

A sticky body was produced by applying a rubber hot-melt sticky agent to either side of a cardboard having a thickness of 2 mm and a size of 90 mm × 105 mm. A kneaded and solidified

tablet (diameter: 15 mm, thickness: 3 mm) containing animal and plant food components was arranged on one side of the sticky body. In addition, a woven fabric having a size of 100 mm × 115 mm as a fibrous structural body was layered on either
5 side of the sticky body. Thus, a three-layer laminate was obtained. The woven fabric used as the fibrous structural body was plain woven fabric of jute yarn having a yarn density of 43 to 47 strands/10 cm, a thickness of 0.86 mm, and a weight per unit area of 255 g/m². The laminate was enclosed in a bag
10 made of polyethylene net having a size of 120 mm × 150 mm. Thus, a five-layer acarine trapping product according to Example 17 was obtained. The polyethylene net had a mesh size of 1 mm, a thickness of 0.03 mm, and a weight per unit area of 67 g/m². The polyethylene net did not have nap. When a line
15 segment of 10 cm was put on the polyethylene net, the number of fibers that crossed the line segment was 95 to 110.

[0092]

[Comparative Example 8]

A product according to Comparative Example 8 was
20 obtained by enclosing the sticky body used in Example 17 in the bag made of polyethylene net used in Example 17. That is, the product of Comparative Example 8 is the same as the acarine trapping product of Example 17, except that neither the kneaded and solidified tablet containing animal and plant
25 food components nor the fibrous structural body was used in Comparative Example 8.

[0093]

(3) Trap Distance Test

FIG. 5 is for describing a procedure for conducting a trap distance test. An unused polyester sheet X having a size of 50 cm × 100 cm, which is 1/4 of the size (100 cm × 200 cm) of a commonly used mattress, was laid on and fixed to a wooden board. A groove was provided in the wooden board at a portion W corresponding to an outer periphery of the sheet X. The groove was filled with water in order to prevent acarines from escaping from the sheet X or to prevent foreign acarines from entering the sheet X. Here, as illustrated in FIG. 5, a corner portion A, a corner portion B, and a shorter-side middle portion C were set on the sheet X. A distance D1 between the corner portion B and the corner portion A is about 110 cm. A distance D2 between the corner portion B and the shorter-side middle portion C is about 25 cm. The acarine trapping product Y of Example 17 was placed at the corner portion A and the shorter-side middle portion C of the sheet X. About 1,000 house dust mites were released at the corner portion B of the sheet X. Three of this wooden board were prepared, and were placed in a dark place at 25°C and 75%RH. After 24 hours and after 20 days, acarines that got stuck on the sticky body of the acarine trapping product Y were counted. A similar trap distance test was conducted on the product of Comparative Example 8.

[0094]

The result of the trap distance test showed that the number of acarines trapped by the acarine trapping product Y of Example 17 set at the shorter-side middle portion C was 252 to 334 after 24 hours. In contrast to this, the number of acarines trapped by the product of Comparative Example 8 under the same conditions was zero. In addition, the number of acarines trapped by the acarine trapping product Y of Example 17 set at the corner portion A was 37 to 76 after 20 days. In contrast to this, the number of acarines trapped by the product of Comparative Example 8 under the same conditions was zero. These results demonstrated that the acarine trapping product Y of Example 17 can attract and catch acarines that have entered a region within a distance of at least one meter therefrom. The distance D1 corresponds to about the distance between each corner and the center (the intersection of the diagonals) of a commonly used mattress. Therefore, it is considered that if the acarine trapping product Y of Example 17 is placed at or near the center of a mattress in actual use, acarines living in the mattress can be effectively attracted and caught, and gotten rid of. In addition, the distance D2 corresponds to about the distance between an end of a commonly used mattress and an end of a pillow. Therefore, it is considered that if the acarine trapping product Y of Example 17 is placed at or near a pillow, acarines living in the pillow can be attracted and caught, and gotten rid of, within 24 hours. Furthermore, it is, of course, considered

that if the acarine trapping product Y is placed at or near a shoulder or foot, acarines can also be effectively attracted and caught, and gotten rid of.

5 INDUSTRIAL APPLICABILITY

[0095]

The acarine trapping product and acarine trapping method of the present invention can be used in order to get rid of acarines living indoors.

10

REFERENCE SIGNS LIST

[0096]

- | | |
|--------|--------------------------|
| 10 | FIBROUS STRUCTURAL BODY |
| 12 | NAP |
| 15 20 | STICKY BODY |
| 30 | ATTRACTING AGENT |
| 40 | AIR-PERMEABLE SHEET |
| 100 | ACARINE TRAPPING PRODUCT |
| 200 | ACARINE TRAPPING PRODUCT |
| 20 300 | ACARINE TRAPPING PRODUCT |

CLAIMS

1. An acarine trapping product comprising:

a fibrous structural body having nap; and

5 a sticky body configured to cause acarines to get stuck thereon.

2. The acarine trapping product according to claim 1, wherein

10 the fibrous structural body includes fibers having an elongation percentage of at most 10%.

3. The acarine trapping product according to claim 1 or 2, wherein

15 the fibrous structural body is a woven or knitted fabric having a yarn density of 10 to 100 strands/10 cm.

4. The acarine trapping product according to any one of claims 1 to 3, wherein

20 the fibrous structural body includes at least bast fibers and/or seed hair fibers.

5. The acarine trapping product according to any one of claims 1 to 4, wherein

25 an attracting agent is provided between the fibrous structural body and the sticky body.

6. The acarine trapping product according to any one of claims 1 to 5, wherein

at least a portion of the fibrous structural body is covered by an air-permeable sheet that does not have nap.

7. The acarine trapping product according to any one of claims 1 to 6, wherein

the acarine trapping product satisfies:

$$0.1 \leq (a^2/b) \times 100 \leq 1.0 \quad (1)$$

where a represents a thickness (mm) of the fibrous structural body, and b represents a weight per unit area (g/m²) of the fibrous structural body.

8. The acarine trapping product according to any one of claims 1 to 7, wherein

the acarine trapping product excludes pesticides and/or repellents.

9. An acarine trapping product for attracting and catching acarines that have entered a region within a one-meter radius thereof.

10. The acarine trapping product according to claim 9, wherein

the acarine trapping product attracts and catches

acarines within 24 hours.

11. An acarine trapping method for attracting and catching acarines, comprising:

5 placing the acarine trapping product according to any one of claims 1 to 10 at or near a place where acarines live.