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(54) **KAPOK FABRIC AND USE THEREOF**

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(57) **ABSTRACT**

A fabric made from fibers containing 1 to 100% of kapok.

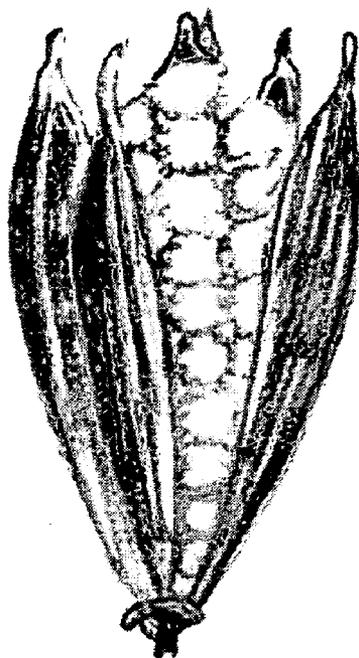


FIG. 1



FIG. 2

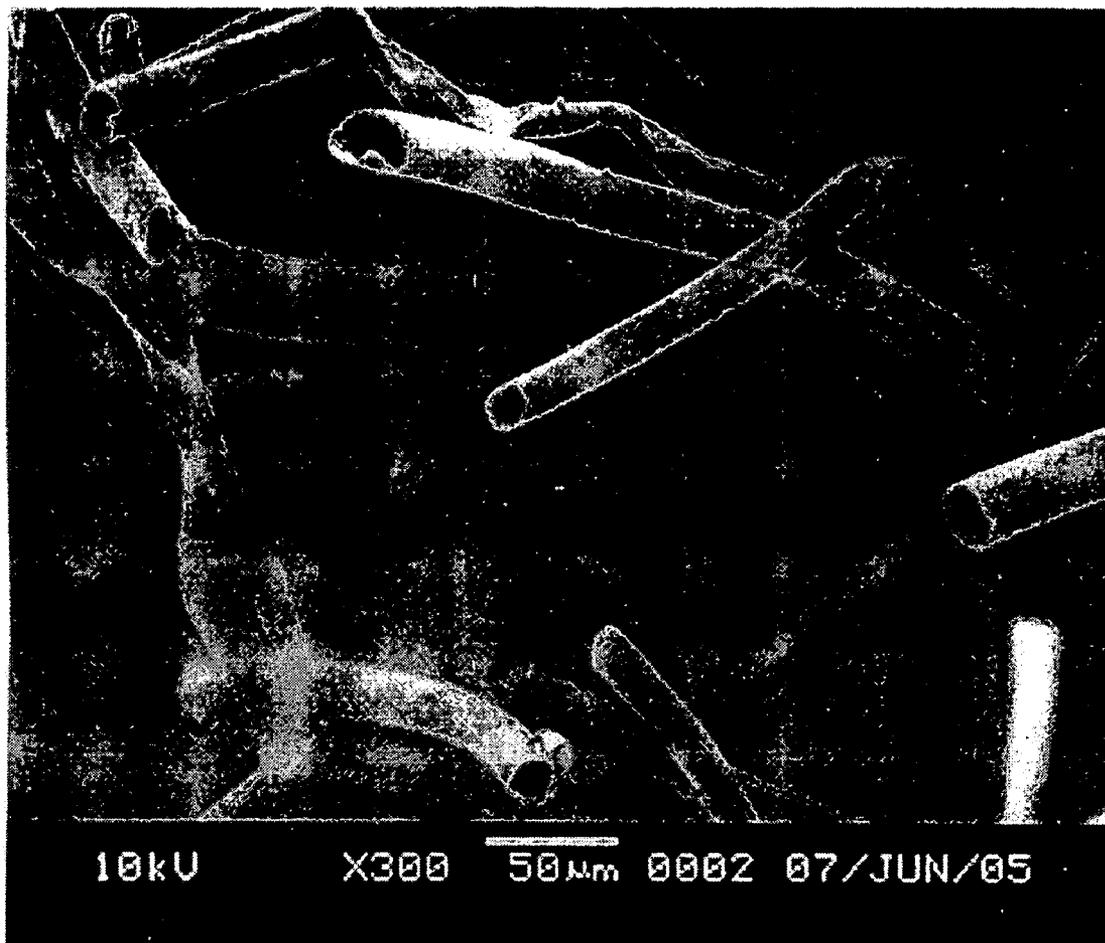


FIG. 3

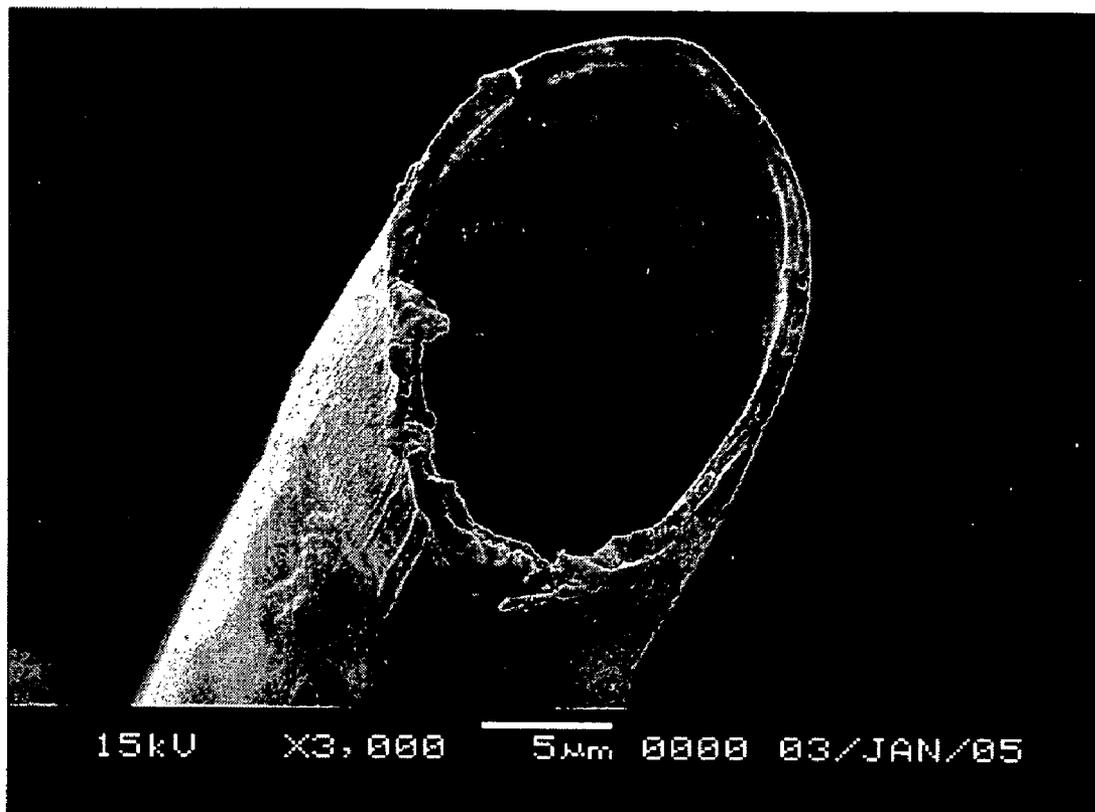


FIG. 4

**KAPOK FABRIC AND USE THEREOF**

**FIELD OF THE INVENTION**

[0001] The present invention relates generally to fabrics made of natural fibers and, more particularly, to a fabric made from kapok and use thereof.

**BACKGROUND OF THE INVENTION**

[0002] Many different natural and artificial fabrics are currently available. Examples of natural fabrics include those made from cotton, angora, linen, silk, and other fibers. Examples of artificial or synthetic fabrics include those made from acrylic, nylon, polyester, vinyl, rayon, polytri-methylene terephthalate (PTT), and others. Different fibers have different properties. In general, natural fibers breathe, and are thus usually cool in warm weather and warm in cold weather. In contrast, synthetic fibers do not breathe well, and therefore are not very comfortable in warm weather.

[0003] Kapok is the fine, silkily lustrous fruit fibers from the fruit walls of the capsules, 10-20 cm in length and approximately 3 cm in thickness, of the kapok tree (Ceiba pentandra). The kapok tree is a member of the bombax family (Bombacaceae). Other common names for the kapok tree include the silk cotton tree, ceiba, Java cotton, and Java kapok, etc. Originally native to South America, it can now be found in all tropical countries. Growing to a height of 50 meters, kapok trees are among the tallest of tropical rain forest trees.

[0004] The kapok floss or fibers, approximately 10-35 mm in length, are brittle and lustrous. The fibers are thermally insulating and water-repellent, and are thus traditionally used as a stuffing in life jackets. Kapok fibers may be white, light gray, and yellowish to brown.

[0005] Kapok has a density of 0.4-0.7 dtex, which is approximately half of the density of cotton. A kapok fiber has a hollow interior that constitutes 80% of its entire volume (see FIGS. 3 and 4), which makes it an ideal thermal insulator.

[0006] In addition to its superior physical properties when compared with those of other natural or synthetic fibers, the cost of kapok is less than half of the cost of cotton.

**SUMMARY OF THE INVENTION**

[0007] The present invention discloses a fabric made from kapok fibers and using kapok fibers to make various types of fabrics.

[0008] In accordance with the present invention, a fabric made from kapok contains fibers that include 1 to 100% kapok.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0009] The foregoing and other objects, aspects and advantages will be better understood from the following description of a preferred embodiment in accordance with the present invention with reference to the accompanying drawings, in which like numerals reference like elements, and wherein:

[0010] FIG. 1 is an elevated view of an open fruit capsule of a kapok tree;

[0011] FIG. 2 is an elevated view of burst fruit capsules of a kapok tree;

[0012] FIG. 3 is a microscopic image of kapok fibers enlarged 300 times;

[0013] FIG. 4 is a microscopic image of a kapok fiber enlarged 3000 times;

**DETAILED DESCRIPTION OF THE INVENTION**

[0014] Turning first to FIGS. 1 and 2, kapok fibers are harvested and separated from fruit capsules of kapok trees. The harvested kapok fibers are a mix of lignin and cellulose, and are light, buoyant, resilient and lustrous. Due to the lignification and lustrous exteriors of kapok fibers, carding and spinning machines must be adjusted to operate at a low speed in order to spin the fibers into yarns, which is discussed in further details below. The general process of turning kapok fibers into yarns and then into fabrics, including using pure kapok fibers and blends of different natural and/or synthetic fibers that include kapok, is the same as the process for making cotton or cotton-blended fabrics. Such a process is well known in the art.

[0015] Kapok can be used alone or in combination with any other natural and/or synthetic fibers in manufacturing fabrics with desired physical properties. For example, Cotton is absorbent. Linen is extremely durable. Polyester is resistant to wrinkles. Silk has a high tensile strength and resists abrasion. Spandex is highly elastic. Vinyl is waterproof. Wool retains warmth even when wet, and tends to cease burning when removed from a source of flame. Depending on the desired physical properties of the fabric, one skilled in the art can easily use kapok alone or blend it with any other fiber or fibers in making the desired fabric.

[0016] Examples of natural fibers that can be blended with kapok include angora, cotton, hemp, linen, ramie, silk, wool, and other natural fibers. Examples of artificial fibers that can be blended with kapok include acetate, acrylic, lyocell, nylon, olefin, polyester, rayon, spandex, vinyl, and others.

[0017] In general, the manufacturing process of a kapok fabric is much like that of a cotton fabric. Raw kapok fibers need to first go through a plucker and a carding machine in order to comb the fibers into alignment with each other. Once carded, the fibers are spun or twisted together to form a yarn. At least two types of spinning equipments well known in the art can be used for spinning kapok fibers into a yarn: break spinning and ring spinning machines. To avoid fiber breakage, the speed of these spinning equipments must be adjusted to a low setting in comparison with the speed suitable for spinning cotton and other natural fibers. The exact speed is dependent on the type of machines used, and is readily apparent to one skilled in the art via trial and error.

[0018] Referring now to FIGS. 3 and 4, Kapok has a density of 0.4-0.7 dtex, which is approximately half of the density of cotton. A kapok fiber has a hollow interior that constitutes 80% of its entire volume, which makes it an ideal thermal insulator superior to cotton and other natural or synthetic fibers. For example, synthetic fibers can only achieve a percentage void of up to 35 to 40%.

[0019] The following table shows a cost comparison between cotton and kapok:

FIBER	CLASS	PRICE (per ton)
Cotton	1-3	\$1,600-\$1,850
Kapok	1-3	\$750-\$950

[0020] Cotton, on the other hand, has a market price lower than that of most synthetic and other natural fibers. The low cost and superior physical properties of kapok, therefore, make kapok an excellent raw material for the textile industry.

#### EXAMPLES

1. Using a break spinning equipment, fibers that contained 100% kapok were spun into a yarn in counts 7s to 32s.
2. Using a break spinning equipment, kapok was blended with other natural or synthetic fibers in a 55 to 45 ratio (i.e., 55% kapok) and spun into yarns in counts at and below 50s.
3. Using a ring spinning equipment with a roving frame, kapok was blended with other natural or synthetic fibers in a 55 to 45 ratio and spun into yarns in counts 60s and below.
4. Using a ring spinning equipment with a roving frame, kapok was blended with other natural or synthetic fibers in a 70 to 30 ratio (i.e., 70% kapok) and spun into yarns in counts of 40s and below.

[0021] Although the invention herein has been described with reference to a particular embodiment, it is to be understood that the embodiment is merely illustrative of the principles and application of the present invention. It is therefore to be understood that various modifications may be made to the above mentioned embodiment and that other arrangements may be devised without departing from the spirit and scope of the present invention as defined by the appended claims. For example, the present invention applies to all species of kapok, including the lower-grade Indian kapok.

What is claimed is:

1. A fabric made from fibers comprising kapok.
2. The fabric of claim 1, wherein the fibers comprise 1-100% kapok.
3. The fabric of claim 2, wherein the fibers is 100% kapok and are spun into a yarn in counts 7s to 32s.

4. The fabric of claim 3, wherein the fibers are spun by a break spinning machine.

5. The fabric of claim 2, wherein the fibers comprise 1-55% kapok and are spun into a yarn in counts below or at 50s.

6. The fabric of claim 5, wherein the fibers are spun by a break spinning machine.

7. The fabric of claim 2, wherein the fibers comprise 1-75% kapok.

8. The fabric of claim 7, wherein the fibers comprise 1-70% kapok and are spun into a yarn in counts below or at 40s.

9. The fabric of claim 8, wherein the fibers are spun by a ring spinning machine.

10. The fabric of claim 7, wherein the fibers comprise 1-55% kapok and are spun into a yarn in counts below or at 60s.

11. The fabric of claim 10, wherein the fibers are spun by a ring spinning machine.

12. The fabric of claim 1, said fibers further comprising at least one other natural fiber.

13. The fabric of claim 12, wherein the at least one other natural fiber comprises at least one member of the group consisting of cotton, angora, linen, silk, hemp, ramie, and wool.

14. The fabric of claim 1, said fibers further comprising at least one artificial fiber.

15. The fabric of claim 14, wherein the at least one artificial fiber comprises at least one member of the group consisting of acetate, acrylic, lyocell, nylon, olefin, polyester, vinyl, rayon, spandex and polytrimethylene terephthalate.

16. The fabric of claim 1, said fibers further comprising at least one other natural fiber and at least one artificial fiber.

17. The fabric of claim 16, wherein the at least one other natural fiber comprises at least one member of the group consisting of cotton, angora, linen, silk, hemp, ramie, and wool; and wherein the at least one artificial fiber comprises at least one member of the group consisting of acetate, acrylic, lyocell, nylon, olefin, polyester, vinyl, rayon, spandex and polytrimethylene terephthalate.

18. A yarn comprising kapok.

19. An article of clothing made from the fabric of claim 1.

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