

MILK FIBRE-

A POTENTIAL PROTEIN FIBER



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From child hood, we had been hearing that milk is good for health and it should be included in our daily food menu. Despite of the fact that it's healthy, many people are there who do not drink milk. Now these people can get the benefits of milk without even drinking it. That is now they can wear the benefits of milk in the form of milk fabrics made from milk fibre.

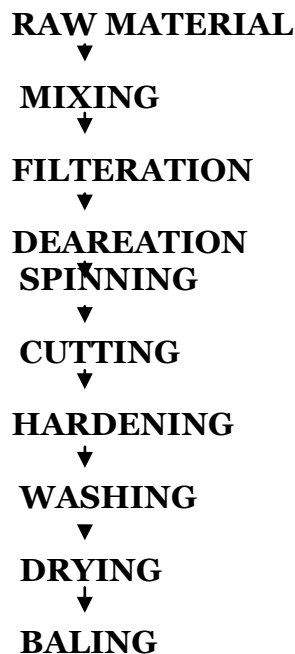


In the late 19th century studies were done on renewable protein fibres. In 1945, a milk protein fibre was developed by United States and Italy which was used as a substitute for wool. But as it was costlier it was not of use. Later in 1970s a new type of fibre containing milk proteins and synthetic amino acid molecules was developed by Japan which is today's milk fibre.

ARALAC, lanatil and merinova are the common names of milk fibre.

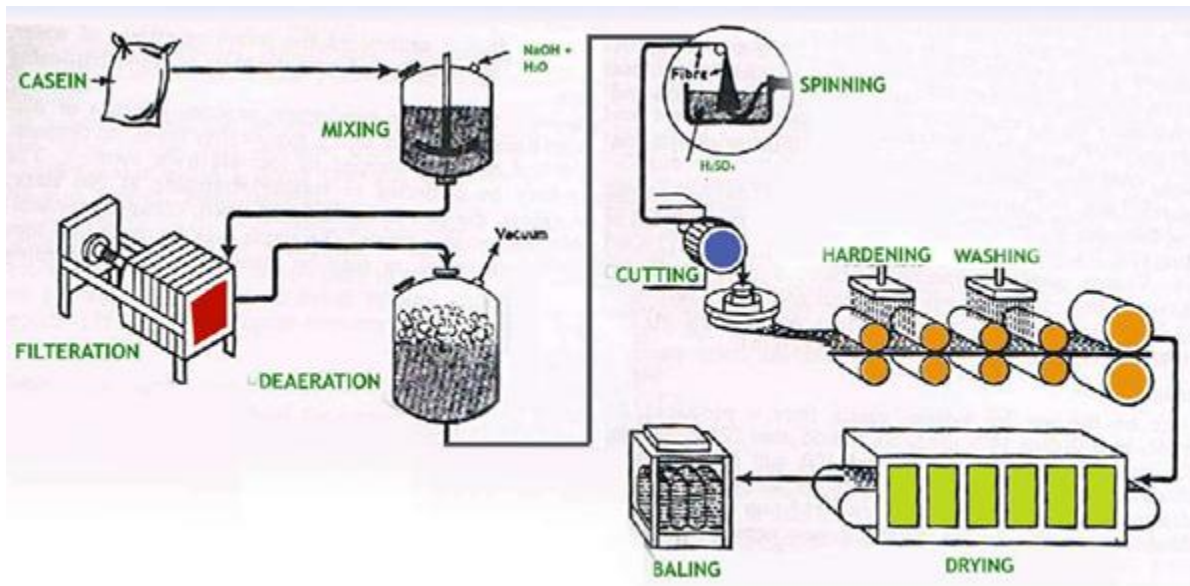
Milk fibres are manufactured from milk casein. Casein is a protein in milk which is used to make the continuous fibre. Casein belongs to phosphoprotein protein family. Mammalian milk consists of this kind of proteins generally. Casein supplies essential amino acids, carbohydrates along with calcium and phosphorous.

Production process of milk fibre:



The casein from skimmed milk is made to dissolve in aqueous zinc chloride and is grafted with acrylonitrile. This process is known as graft copolymerization. Now the solution is extruded through a spinneret containing fine holes. The solution as it streams from the holes of spinneret is made to immerse in water bath containing acid. The acid neutralises the alkali. Later on continuous fibres are stretched, cooled in a quenching chamber and are collected on the rollers which are later sent for packing according to the requirement. The diameter of the fibre depends upon the level of stretching.

There is no harm to the environment because of this production process. So we can say that milk fibre is a green product.



Identification of fibre:

Combustion:

- **Near the flame:** the fibre Melts and curls
- **Then into flame:** the fiber Burns
- **Leave the flame:** combustion and sometimes eliminate
- **Burning Smell:** hair burning

Identification by dissolution:

- Milk fiber in 2.5% NaOH solution, 100 degree for 30minutes after heating the colour gradually changes from dark red and then fade to pale yellow.

Properties:

- **Tensile Strength**
- Casein fiber has the tenacity of 2.8cN/tex when it is dry. When wet the fibers lose much of their strength then tenacity falls to, 2.4 to 2.6Cn/tex
- **Effect Of Moisture**

Casein tends to absorb moisture readily and the fibers become swollen and soft. They may become plastic and sticky as the temperature is raised.

- **Thermal Properties**

Casein fibers soften on heating, particularly when wet. Fibers become brittle and yellow on prolonged heating

- **Elongation :** 60- 70 Percent, Wet Or Dry
- **Effect Of age :**Very Resistant
- **Effect Of Acids:** It Is Stable To Acids Of Moderate Strength Under Normal Conditions.
- **Effect Of Alkalis:** It Is Sensitive To Alkali
- **Effect Of Organic Solvents:**Dry Cleaning Solvents Do Not Cause Damage.
- **Micro-Organisms:** Milk Fibres Are Attacked By Moth When Wet.
- **Electrical properties :** Dielectric strength is low for milk fibres

Also,

- As it is a regenerated protein fibre, it acts as wool. It dyes like wool and even smells like wool when burnt.
- Milk fibre has a good moisture absorption rate.
- The fibre has an excellent dyeing ability with bright colours of reactive, acid and cationic dyes.

- The fabrics made of milk fibres have excellent drapability when compared to silk and cotton.
- They can nourish the skin and are comfortable to wear.
- They have excellent water transportation and air permeability.
- They possess good lustre and luxurious in appearance like silk.

Advantages:

- Milk fibres act as antimicrobial and antifungal because of the amino acids present in them. It contains about 17 amino acids in it.
- They possess good fastness properties.
- Milk fibre has a pH of 6.8, same as human skin.
- It has got the advantage of natural fibre combined with synthetic fibre.

Applications:

Milk fibre can be considered as perfect material for manufacturing lounge wear because of its healthy and bacteriostatic nature.

The major use is:



- sportswear,
- ladies outer wear,
- sweaters and
- house hold textiles,
- t-shirts



Other End Uses:

- Plastic
- Glues
- Cosmetics
- Knitting needles
- Pigments
- Pens
- Coating paper
- Leather Chemicals
- Aluminum Foil
- Paints

Conclusion:

Milk Fabrics are so skin-friendly that it itself makes us feel better. To educate designers about these revolutionary materials, the future fashion initiative offers a textile research team. Advances in science are also helping to fill the green wardrobe of tomorrow. Sweaters are knit from spun milk protein. These textiles are where the future innovations are going to lie. It's taking fashion to a whole new level where it never really existed before- where it's not just about looking good. It's about feeling good, too. The milk protein fiber is a fresh product as a superior green, healthy and comfortable fiber, which will certainly become popular goods in the market.

References:

1. Cyarn.com
2. Swicofil.com
3. Teonline.com
4. Fibre2fashion.com
5. Doshi-group.com

Image Courtesy:

1. Swicofil.com
2. Nairaland.com
3. Fibre2fashion.com
4. Doshi-group.com

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