

# MOSQUITO NET PROPERTIES AND APPLICATIONS

VIJAYASEKAR. R<sup>1</sup>, KARTHICK. T<sup>2</sup>, KARTHIKEYAN. S<sup>3</sup>, KOTA VINESH KUMAR REDDY<sup>4</sup>

<sup>1</sup>Assistant Professor – Department of Textile Technology, Bannari Amman Institute of Technology, Sathyamangalam, Erode.

<sup>2,3,4</sup>-Students - Department of Textile Technology, Bannari Amman Institute of Technology, Sathyamangalam, Erode

\*\*\*

**Abstract-** This article is based on the mosquito nets their properties and its application.

## 1. INTRODUCTION:

A mosquito net is a type of meshed curtain that is circular shape wrap over the bed or in a sleeping area. This mosquito net are protectors against bites and stings from mosquitos and other pest inserts and these nets are used to protect us against diseases. For example, it prevents diseases like malaria, dengue, yellow fever by covering our self from pest inserts. Mosquito nets are mainly used in home textiles material, military uniforms etc. The mosquito net is to be finer in order to avoid allow of mosquitos into the inner area. This can also be avoided by pretreating with mosquito repellents on the outer layer of net. The mosquito net was first introduced in the 18th century.



Fig.1 Cotton Mosquito Net

## 1.1 FIBER PRODUCTS:

Naturally many fiber are used for production of mosquito net but mainly cotton is a naturally cellulosic fiber widely used for this process throughout the world. like all Fibers cotton has its own physical and chemical properties for better processing in fiber production. Physically properties such as good color, tensile strength, moisture regain similarly due to this such properties cotton is mainly preferred for manufacturing mosquito net fiber mosquito net can be manufactured using polyester, cotton, nylon ..etc. this fibers gives the enough strength and fineness to the mosquito net

## 1.2 IMPORTANCE OF MOSQUITO NET:

Different fever health issue such as malaria, dengue and other diseases are transmitted by mosquito through biting pregnant women babies and children the risk of mosquito bite can be reduce by sleeping under mosquito net with pre-treated mosquito repellent and also ordinary mosquito net provide a limited protection for humans but in insecticide treated nets gives good protection by avoid from us and also kills them mainly uncertified treatment is recommended for synthetic nets than natural nets due to the long-lasting property synthetic nets.

## 1.3 PROBLEM WHILE USING THE MOSQUITO NET:

- Mosquito net reduces the air flow inside the sleeping area and increases hot temperature which affect the sleep time of humans this can be solved by increasing air flow such as using fans.
- Chemical that use to repellent the mosquito may cause harm to the skin.

## 1.4 QUALITY OF NETS:

The quality of the product plays a vital role because people prefer better quality at their affordable costs. This is the usual practice followed all the world. The quality is more important in netting materials as they give more protection from the insects which is being called as insecticide. The nets which is used are differing as less intense and more intense from country to country. Whereas, the people in Asia, prefer the nets with the less intense. But in African countries prefer more intense as they are having the risk of getting affected by many diseases. The quality of the nets in Asian countries tend to be giving similar protection as it provides good quality.

## 2. NETTING MATERIALS:

The netting materials for the mosquito are made from the cotton, polyester, polyethylene, polypropylene, and nylon. The cotton mosquito nets are made from the city called "Karur" in the state of Tamil Nadu.

### 2.1 Cotton:

Cotton mosquito nets are usually made with the smaller number of requirements where they are made quite easy without much requirements. At present, they have been used north part of the India and in several countries. It is been used mostly in the southern parts of china.

### 2.2 Polyester:

It has more advantage while compared with cotton nets. As they have more durability, more air flow through the nets. Also, it is cheaper, good quality level maintained and it is more popular in the South India.

### 2.3 Polyethylene:

Most of the polyethylene manufacturers produce monofilament nets by poly filaments. The minimum standard of polyethylene 100 denier is equal to 75 denier of polyester. But it readily breaks when it is been exposed to sunlight. Also the 150 denier polyethylene nets are been tested in the West Africa and in some villages of Senegal. They found that 50% of the nets where in the proper condition with no holes in it. This type of nets is been appreciated by the villagers in many parts of the country.

### 2.4 Nylon:

It was once been used instead of polyester nets. It is easily attracting dust, the shape will be lost soon, it is less UV resistant getting worse much faster than the polyester. Nylon nets are made available in some parts of Africa but it does not give good benefits to the users. And it is considered as the suitable material for the netting materials.

## 3. SPECIFICATION FOR COTTON NETS:

As said earlier, these nets are been used in Asian countries and in china, they have been produced with the parameters. The cotton are the natural fibers where they produce nets according to the requirements of the user. This type of nets is mostly used in the northern part of the India.

## 4. PARAMETERS OF NETS:

The different parameters test are carried out in order to find the standard of the nets. They are followed by the test methods

### 4.1 Fiber Composition:

It is determined by

- The filament observation through microscope.
- Infra-red methods are used.
- Have the property to dissolve in solvents.

#### 4.2 Air Permeability:

It is done in order to give the comfort to the user. It enables the flow of good air flow through the nets. Standardized pressure is to be maintained.

#### 4.3 Tear Resistance:

Dynamometer is used and standard weights are applied. The pendulum methods are used. And the force is measured in newtons.

#### 4.4 Bursting Strength:

This test is considered as the good measurements of strength. The diaphragm method is used. The netting sample is clamped on an elastic diaphragm and increasing pressure is applied to another side. Once the specimen bursts then the readings have been calculated. It is shown in pascal or kilopascal (KPa).

#### 4.5 Flammability:

Propane flame is used all over the given sample. The flame is applied for one second to all the fabric and the required calculations are noted.

- Class 1:  $t > 7s$
- Class 2:  $t = 4s$  or  $< 7s$
- Class 3:  $t < 4s$

#### 5. DEET [N,N-Diethyl-m-toluamide]:

Mosquito-repellent are categorized into two types. They are repellent insecticides and contact insecticides. In that DEET is the most important type. DEET is commonly used as a insect repellent where they are used from sucking insects and mosquitos, etc., it is applied on the skins as a protective measure or it is also used on the clothes. This is available in form of lotion or applied on the skin. This is one form of a pesticide where they are applied on skins but the applied area gives the protection from the insects. As they are less toxic it tends to be protective from the surroundings. When it is applied on the human skin it penetrates through the human skin. But it is still not an advisable one for the person who is having a skin allergy. They are found in the stores and the sales of DEET is increased widely. There is a major drawback in it as they can cause very severe skin reaction in certain individuals.

#### 6. MANUFACTURE OF MOSQUITO NET:

Mosquito net is unique in design, manufacture and distribution of high quality. The quality of a product depends upon many factors like appearance, feel, functionality, price. Cotton mosquito nets are made with fabric ribbons so that we can prevent the shrinkage to our product. In a study that a light cotton knitting fabric was containing the citronella oil which is microencapsulated in mosquito repellent finishes of cotton textiles. Mosquito and citronella oil was used more in cotton fabric than in non-synthetic once in a survey the report was saying that using synthetic repellents like DEET and rayon acetate.... etc. will cause damage to our skin due to chemical content. In a flammability test, DEET was mixed with polyester and clothes which immediately ignited in flame.

- The materials important to the way of tissue selection when doing rejection tests. So that company started using traditional mesh materials like raffia, linen, palm fibers and hemp and compared with modern material like net made of synthetic fibers such as polyester, cotton, polyethylene and nylon
- The mesh of mosquito net size must be 0.5 to 1.5mm. if it is greater than 1.5 the mosquito can easily penetrate and we must prefer white colour to net compared to dark colors so that mosquito can easily be notified to the person
- The cotton mosquito net is superior to muslin cloth and it tends to pull untied and shrink and it is very useful to the customers who want to use for long lasting and repels mosquito and looks good
- Mosquito bites are not only the annoying because of itching, if you love travel to other place then the country where there is a problem of malaria or dengue and if you are unlucky enough to be bitten by a mosquito, it is not very common to you to wake up with sore throat, fever, headache, and rash. In this type of situation you will be need with mosquito net which act as physical barrier to you against diseases like fevers... etc. and these nets have become more popular in united states and many other countries like Africa, Asia, Latin America and the Middle East and their was a fact that In West Africa, sleeping using bed net has increased the survival of children under 6

years of age from 3.5% to 4-5% and improved their lives of many more. Mosquito nets are like net curtains that cover your bed or sleeping area to protect against mosquitos and other diseases that they transmit

- There is something you can hate while using this mosquito net that look nasty feels like plastic and spread claustrophobia and can be increase it effectiveness of mosquito net by pre-treating them with appropriate insert repellent and the best design in mosquito net is TTTM Parachute Hammock is well designed to withstand harsh condition and is easy to wash by hand or machine. If you love travelling around the places and this hammock is preferable and it offers the greatest value of money

## **7. TREATMENT METHODS:**

### **7.1 Collection of necessary equipment:**

In this process equipment consists of mosquito net, measuring container insecticide, rubber gloves ...etc. Before treating the net fabric, it is to be washed cleanly the treatment is to be carried indoor and outdoor areas. The gloves are to be used for protection from chemicals and other damages. Water content is to be taken according to the size and shape of the net. Similarly, the insecticides are also taken in the size and shape of the fiber. Generally, 10-15mm(millimeter) of insecticide is taken for processing of net fabric. The treated insecticide fabric is to be stored in a dark container and mix the required amount of water in the same container after the treated few hours. Take out the fabric and dry it by spreading over. After the above all processing quality is to be checked for good market value such tests are shrinkage test, stiffness test.

### **7.2 Transparent:**

Transparent is the first and foremost quality of a net fabric. Transparent of the fabric varies the net fabric by using the different types of materials in it and also the stiffness in knotting. There are many examples such has chicken knot is transparent because of wide knot is used. Bug knotting is transparent even the knot is closely arranged. The bug knotting is transparent because thin and fine structure of knot takes place in that. The other knotting fabrics like sports wear has some small holes where it allows air to pas through. Advantage in drying.

### **7.3 Pattern in knot:**

Each and every pattern of knot have netting. Constructing netting through the patterns of knotting is possible by stretching the designs. Some patterns are visible and totally same as the part of a design. The mesh fabrics consist of invisible patterns. Some of the netting designs have shapes like oval, square and hexagon.

### **7.4 Breathable through little tiny holes:**

The cotton fabric could breath through the little holes. It can breathe constantly as a part through the design. Mostly this type of netting used in catching animals and reptiles because it allows passes through light and air constantly. These types of netting is not applicable for cotton fabric.

### **7.5 Flexibility of the fabric:**

The cotton nets are always softer than we think. Because the patterns are compiled softer and stiffer. The cotton net is also called has butterfly net which denotes the softness of the wing of a butterfly. This butterfly nets are used in clothing for wedding and functions also for cultural. It has a good potential stiffness and the flexibility depends on the quantity and the knots in the material.

### **7.6 Fabric stretch:**

The stretches in a cotton fabric is much lesser when comparing to other types of fabric nets. For example a fish net is expanded more and more length because of its ability. Where cotton fabric could damage when it catch up high stretch

## **8. PROPERTIES:**

- Major properties are transparency.
- Patterns are available for all the knots of a fabric.
- Tiny holes between the fabric leads to pass air between them.

- Flexibility.
- Stretch.

#### **9. ADVANTAGES OF NET FABRIC:**

- Catching high amount of fish in netting could yields more profit than older methods.
- Mostly used in fishing because it carry heavy weight and still it is light weight material.
- These fibres are eco-friendly. Naturally decomposed in the case of trashing.
- Does not harmful to human.
- Burns easily and fast.
- Dried quickly even in the cold weather.
- Less weight wear

#### **10. DISADVANTAGES OF NET FABRIC:**

- It is a high cost material.
- It will damage quickly because it is an natural fibre.
- Does not shrink.
- Keeps the moisture for long time. Maybe advantage in warm weather.

#### **11. CONCLUSION:**

The nets are being used all over the world and its usage is being increased day by day. The nets are available at the affordable price and it makes the people to buy it. The nets are being used have different quality and the quality varies from place to place. The nets used in Asian countries are different from the nets which are used in the African countries. It is the way to protect ourselves from the diseases like malaria, dengue, etc., The nets are made from different fibres like Cotton, Nylon, Polyester, etc.,

#### **12. REFERENCES:**

- [https://www.researchgate.net/publication/324066843\\_Mosquito\\_repellent\\_activity\\_of\\_cotton\\_functionalized\\_with\\_inclusion\\_complexes\\_of\\_b-cyclodextrin\\_citrate\\_and\\_essential\\_oils](https://www.researchgate.net/publication/324066843_Mosquito_repellent_activity_of_cotton_functionalized_with_inclusion_complexes_of_b-cyclodextrin_citrate_and_essential_oils)
- [https://www.researchgate.net/publication/295421877\\_Cotton\\_mosquito\\_repellent\\_fabrics\\_and\\_their\\_performance](https://www.researchgate.net/publication/295421877_Cotton_mosquito_repellent_fabrics_and_their_performance)
- [https://www.researchgate.net/publication/338294131\\_IMPACT\\_OF\\_MOSQUITO\\_REPELLENT\\_FINISHING\\_ON\\_COTTONPOLYESTER\\_BLENDED\\_FABRIC\\_USING\\_EXTRACT\\_OF\\_SENNA\\_AURICULATA\\_FLOWERS](https://www.researchgate.net/publication/338294131_IMPACT_OF_MOSQUITO_REPELLENT_FINISHING_ON_COTTONPOLYESTER_BLENDED_FABRIC_USING_EXTRACT_OF_SENNA_AURICULATA_FLOWERS)
- [https://www.researchgate.net/publication/293821250\\_Mosquito\\_protective\\_Textile\\_A\\_Review](https://www.researchgate.net/publication/293821250_Mosquito_protective_Textile_A_Review)
- [https://www.researchgate.net/publication/312146864\\_Mosquito\\_Repellent\\_Finish\\_of\\_Cotton\\_Fabric\\_by\\_Extracting\\_Castor\\_Oil](https://www.researchgate.net/publication/312146864_Mosquito_Repellent_Finish_of_Cotton_Fabric_by_Extracting_Castor_Oil)