The Impact of Different Fabrics and the Resistance to Mosquitoes: Which Types of Fabrics Let Mosquitoes Go Through?

Purpose

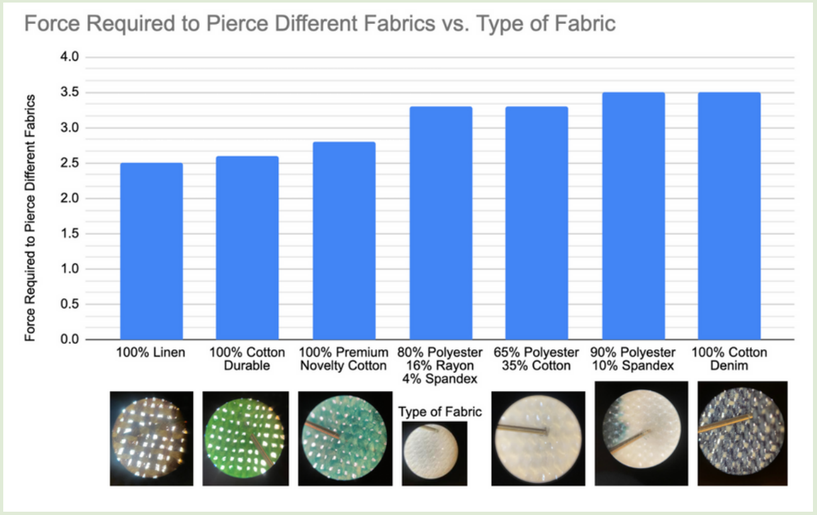
The purpose of this project is to see what types of fabrics will help prevent mosquito bites. Through finding out the best fabric, I will connect this project to mosquito-related diseases so people can know which fabrics prevent mosquitoes from biting people.

Procedure

Gather clean samples of 100% Premium Novelty Cotton, 90% Polyester and 10% Spandex blend, Wide Solid 100% Cotton, 100% Linen, 80% Polyester 16% Rayon 4% Spandex blend, and 65% Polyester 35% Cotton. Place two boxes or other heavy objects at least 6 inches away from each other and place your first fabric of choice on those two boxes. Place two more heavy objects on the fabric, and straighten the fabric. Take a 290 micrometer wide needle, which mimics a mosquito's proboscis, and attach that needle to a spring scale with a piece of tape. To easily measure newtons needed to poke the fabric, set up a camera for filming a video to review footage later. Hang the spring scale in a position where it will stay the same for each attempt, such as on a peg or screw. Ensure the tip of the needle has some space between itself and the fabric, and poke the needle through the fabric. Release the needle and stop the video footage. To see the newtons necessary for the needle to go through the fabric, look at the video footage to see how much force was used when the needle poked through the fabric. Repeat with each fabric, and change or clean the needle if necessary. Use the amount of newtons needed to measure how well the needle could go through, and for further study, look at the fabric under a microscope, with or without the needle inserted.

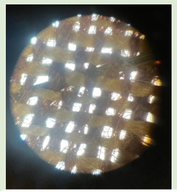
Results

A picture of each fabric with a needle inserted is shown under the microscope. Each fabric is under its corresponding name. Each microscope picture is in 40x magnification.

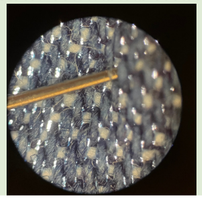


Analysis

The fabric that required the least amount of force to go through was the linen. Under the microscope, you could see linen had more holes in its weave, and the holes are larger, especially compared to the 90% polyester and 10% spandex blend. 90% polyester and 10% spandex had minimal holes, and the holes were very small in size. Similarly, the denim was tightly knit and had smaller gaps in it. Both of these fabrics needed more force for the needle to go through due to the stronger fabric structure of both of these fabrics. In other words, the fabrics with more openings that were less tightly knit needed less force for a needle to go through, while the fabrics with smaller openings that were tightly knit needed more force for a needle to go through.



Linen with a needle in it



Denim with a needle in it