

In conjunction with an increasing public awareness of infectious diseases, the textile industry and scientists are developing hygienic fabrics by the addition of various antimicrobial and antiviral compounds. Necessity is the mother of invention and that usually is very true. However due to the current situation the need arose very quickly on us. Textiles are excellent substrates for a bacterial growth and microbial proliferation under appropriate moisture, nutrients, and temperature conditions. In order to gain antimicrobial proper-ties, various chemical additives have been applied to textile products such as inorganic salts, organometallics, phenols and thiophenols. The corona virus pandemic has only quicken the process of all sorts of disinfectants be it in the form of floor cleaners or sanitizers. However that is not enough in the long run and hence we much seek new ways to protect ourselves now only from this corona virus but other dangerous diseases caused by a general lack in our ability to stay disinfected.

This however can be tacked by introduction clothing that is itself disinfectant and hence as it covers the major part of our body it gives us the ability to stay safe in the current situation.

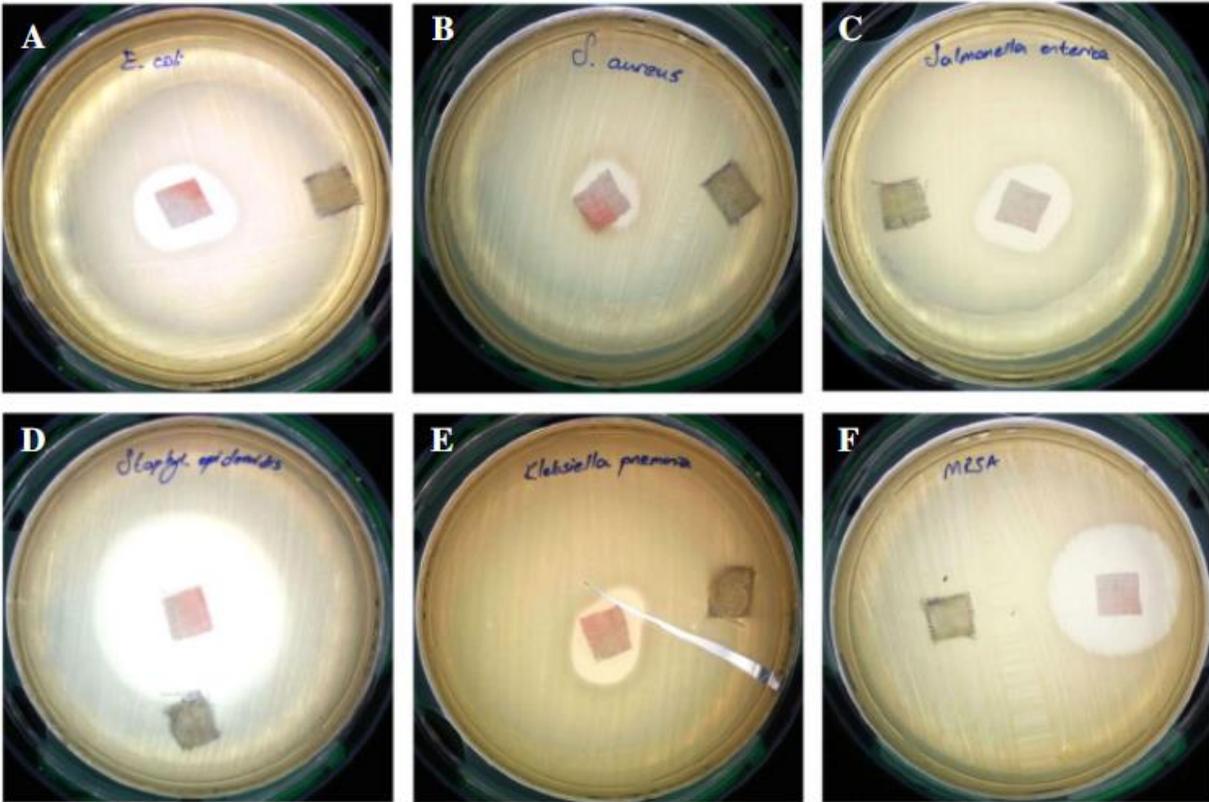
Chitin is the second most plentiful natural polysaccharide found in the various marine, terrestrial, and microorganism sources. Chitosan is prepared by partial deacetylation of chitin. Both of them are widely used in different industries such as pharmacy, water purification, biomedical applications, biotechnology, and production of fibers and finishing process.



In recent years, the use of both chitin and chitosan has increased as a multifunctional materials for surface modification of textiles. It has many very amazing uses such as being antimicrobial,

antiodor, and blood coagulant, antistatic. These are already being used in the medical textile industry and have great potential in the consumer textile industry in today's day and age as it is already tried and tested. This also means that it saves time the corona era where time is lives saved. The chitosan molecule can be modified to give a fabric different properties. For example, water-resistant molecules can be added to chitosan to make textiles water-repellent. Additionally, coating fabrics with chitosan can give them antibacterial properties. chitin could provide a more sustainable alternative to compounds that are currently used in the textile industry, as insects are increasingly utilized as a source of protein in the animal feed industry so there is a long term access to this and is not only a niche.

Another use in a similar manner can of that of nanoparticles. The nanoparticles, even in very small amounts, can provide the final product with bacteriostatic properties due to the fact that Nano scaled materials have a high ratio of a surface area to volume. Silver in its metallic state is inert but it reacts with the moisture and gets to ionize. The ionized silver is highly reactive, as it binds to tissue proteins and brings structural changes in the bacterial cell wall and nuclear membrane leading to cell distortion and death. The solution in relation to its antibacterial and antifungal properties and its ability to functionalize the surface of textile during washing and ironing process is what makes it so remarkable in its implementation in textile for consumers in the corona era. Antimicrobial activities of the chemicals and chemical-treated textile goods were investigated. This showed stronger antibacterial activity than other natural materials largely due to the fact that Textile materials particularly made of natural fibers supply an outstanding medium for microbial growth due to their large surface area and ability to retain moisture. In the future, newly developed antimicrobial textiles are recommended for use in the military, health care, work/uniforms, home fashions and domestic products, and sports apparel. With these new technologies, the growing needs of the consumer in antimicrobial textile related to safety, human health, and environment are fulfilled.



Another company working in this industry is Heiq. Developer of textile technologies, is contributing to the pursuit of wellness with the antiviral and antimicrobial textile treatment that has proven effective against the coronavirus in face mask testing. It is a combination of vesicle and silver technologies designed to inhibit the growth and persistence of bacteria and viruses. The vesicle technology targets lipid-enveloped viruses, such as coronavirus, providing rapid virus deactivation, while the silver technology inhibits the replication of both bacteria and viruses. This can be applied to a wide spectrum of textile surfaces including face masks, air filters, medical gowns, curtains, drapes and more. It prevent textiles from becoming a host surface for propagating harmful viruses and bacteria, and contribute to reduce the risk and speed of contamination and transmission. In face mask testing, the treatment significantly enhanced the antiviral log reduction from 2.90 for untreated face masks to 4.48, more than a 99.99% reduction of virus infectivity.



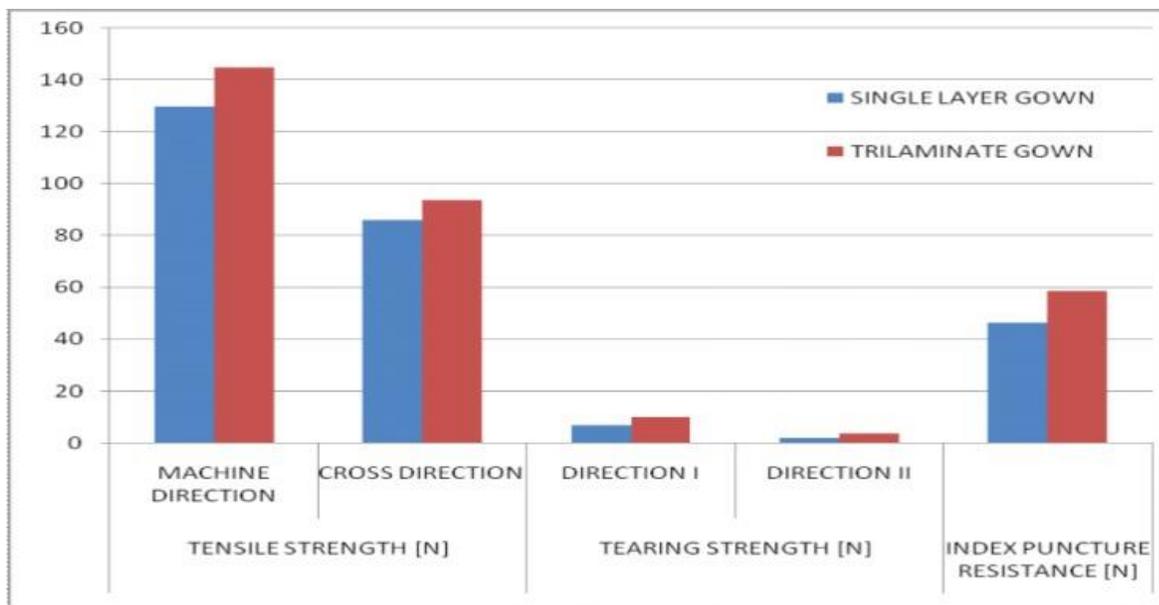
Textile finishing firm Polygiene says it has gone back to its roots with the development of a new antiviral treatment that has been proven to kill various forms of airborne virus with a success rate of 99 per cent.

Their tech is a unique combination of our registered silver technology for antiviral and antibacterial effect and our vesicle technology as a booster. This hence makes the textile designed to inhibit the growth and persistence of bacteria and enveloped viruses, such as coronavirus, on textile surfaces. Their silver technology attracts the oppositely charged viruses and binds permanently to their sulfur groups, and the fatty spherical vesicle technology (Liposomes) helps to deplete the viral membrane of its cholesterol content in seconds, thereby destroying the virus. These are also highly-wash durable antimicrobial and odor-control textile technology that combines silver-based and bio-based materials. The technology is already scheduled to be in production from the start of April. This all in all prevents the textiles from becoming a host surface for propagating harmful viruses and bacteria, and contribute to reduce the risk and speed of contamination and transmission.



HeiQ Fast-Tracks Textile Tech Effective Against Coronavirus

There have also been attempts at developing antiviral nonwoven fabrics for the consumer sector. The purpose is to make clothing which can be used as barriers to eliminate the risk of infection. To develop antiviral consumer clothing it must be comprising of Polypropylene nonwoven as outer layer, Polytetrafluoroethylene (PTFE) film as middle layer and polyester nonwoven as inner layer. The titanium dioxide (TiO₂) nano dispersion was prepared with methylene blue and urea as a reacting medium. These nano particles have an average size of 9 nm which was revealed by High resolution transmission electron microscope. The nonwoven fabric pore size was characterised by using digital image analyzer. The polypropylene nonwoven fabrics were treated with nano dispersion by pad-dry-cure method and trilaminate fabric was formed using fusing machine. The presence of nano particle on the surface of the non-woven fabric was confirmed by Scanning Electron microscope.



Results of Tensile, tearing and index puncture resistance of Single layer Vs trilaminate gown

Lastly another very direct step tackling the corona virus and an amazing step technologically forward in textile was taken by a start-up company who has developed an anti-pathogen fabric that could be used in masks to stop the spread of coronavirus. The company's technology is based on a lab-scale sonochemical process. They developed an almost-permanent, ultrasonic, fabric-finishing technology for mechanical impregnation of zinc oxide nanoparticles into textiles. The technology is based upon a physical phenomenon called cavitation. Sound waves are used to physically infuse desired chemicals onto the structure area of materials, enhancing them with clinically proven antiviral and antibacterial properties. The Differentiation of its products from the many antimicrobial fabrics that have been developed and marketed is due to the the use of silver, which has proven effective. They use lower-cost, metal-oxide nanoparticles, including zinc oxide and copper oxide, to impart antibacterial protection. Ultrasonic irradiation causes the formation of antimicrobial metal-oxide nanoparticles and actively impregnates these nanoparticles into textile fibers. Moreover, those fabrics impregnated with the zinc and copper oxides were shown to retain significant antibacterial activity. They have demonstrated clear bactericidal activity against a broad spectrum of infections in laboratory tests. The process uses sound waves in water that break down the zinc into nanoparticles that are formed within bubbles of air. When the bubbles explode, they create tiny jet streams of liquid that force the nanoparticles of zinc into the surface of the fabric.

Due to all these factors and companies working towards this we can safely say we are on the right path , and this corona scare has only pushed these efforts not slowed it down