

The best material for homemade face masks may be a combination of two fabrics

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In the wake of the COVID-19 pandemic, the U.S. Centers for Disease Control and Prevention recommends that people wear masks in public. Because N95 and surgical masks are scarce and should be reserved for

health care workers, many people are making their own coverings. Now, researchers report in *ACS Nano* that a combination of cotton with natural silk or chiffon can effectively filter out aerosol particles—if the fit is good.

SARS-CoV-2, the new coronavirus that causes COVID-19, is thought to spread mainly through [respiratory droplets](#) when an infected person coughs, sneezes, speaks or breathes. These droplets form in a wide range of sizes, but the tiniest ones, called aerosols, can easily slip through the openings between certain cloth fibers, leading some people to question whether cloth [masks](#) can actually help prevent disease. Therefore, Supratik Guha at the University of Chicago and colleagues wanted to study the ability of common fabrics, alone or in combination, to filter out aerosols similar in size to respiratory droplets.

The researchers used an aerosol mixing chamber to produce particles ranging from 10 nm to 6 μm in diameter. A fan blew the aerosol across various cloth samples at an airflow rate corresponding to a person's respiration at rest, and the team measured the number and size of particles in air before and after passing through the fabric. One layer of a tightly woven cotton sheet combined with two layers of polyester-spandex chiffon—a sheer fabric often used in evening gowns—filtered out the most [aerosol particles](#) (80-99%, depending on [particle size](#)), with performance close to that of an N95 mask material. Substituting the chiffon with [natural silk](#) or flannel, or simply using a cotton quilt with cotton-polyester batting, produced similar results. The researchers point out that tightly woven fabrics, such as cotton, can act as a mechanical barrier to particles, whereas fabrics that hold a static charge, like certain types of chiffon and natural silk, serve as an electrostatic barrier. However, a 1% gap reduced the filtering efficiency of all masks by half or more, emphasizing the importance of a properly fitted mask.

More information: "Aerosol Filtration Efficiency of Common Fabrics

Used in Respiratory Cloth Masks" *ACS Nano* (2020).
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