

# Mask reuse: Is microwave steaming safe from Covid-19 virus?

Facing the COVID-19 pandemic that is threatening the world, the situation of masks becoming so scarce, is it safe to reuse? The answer was recently shared on the Corona Virus Shield page by BS. Tran Van Phuc (Green Po Hospital, Hanoi) launched.

Facing the situation that face masks are becoming increasingly scarce due to the complicated situation of the Covid-19 epidemic, many people question whether we can recycle and reuse used masks. how to reuse and is it safe to do? To answer this question, Corona Virus Shield page recently shared the opinion of BS. Tran Van Phuc (Green Po Hospital, Hanoi) on this issue.

## 3 principles to follow to prevent SARS-CoV-2 infection

Dealing with an infectious disease, any strategy must be based on the tools available at the time of the epidemic. The Covid-19 pandemic is very complicated in 197 countries and territories, most of which are at the starting point, while we do not yet have specific vaccines and antiviral drugs.

Therefore, the strategy for each individual to prevent SARS-CoV-2 infection is very important, with 3 principles each must follow; include:



### *1. Keep social safety distance*

The minimum safe distance is 2m with the person nearby. Give up the habit of shaking hands, hugging and kissing when meeting. Minimize social interaction, that is, do not gather in large numbers, do not go to public places, do not take the train, do not go to the hospital if that is not the case.

## ***2. Establish physical barriers***

Wearing a mask properly and practicing hand washing with regular soap or antiseptic solution are extremely important to prevent SARS-CoV-2 infection.

## ***3. Do not contact with agents likely to cause illness***

Specifically, no contact with identified patients, people suspected of infection, people at risk of infection; If contact is required, protective measures such as protective masks or medical masks and protective clothing must be used.

## **Is reuse masks safe?**

N95 respirator masks and medical masks are designed to be used only once and thrown away; But in the face of the global threat of the Covid-19 pandemic, masks are becoming too scarce, is it safe to reuse?

The mask wants to reuse must ensure 3 elements:

- Eliminate viruses and pathogens.
- Harmless to users
- Maintain the integrity of disease prevention function.

Boil, put into an autoclave, spray alcohol, irradiate with ultraviolet rays, and most recently some experts instruct to spray a little water on the mask surface and put in the microwave for 1 minute .; Facemasks cannot be recycled in these ways!

At first glance, these methods are fully suitable with corona virus's weaknesses which are sensitive to temperature, ultraviolet rays, alcohol; and it will be completely destroyed by those agents.

N95 respirators or medical masks, in order to meet the "anti-virus" standard, manufacturers must design a "filter layer" to adsorb and block ultrafine particles (aerosols), so that this filter layer must be fabricated with ultra-fine fibers from polypropylene materials.

Structurally, the polypropylene material is microfiber shaped, ten times thinner than the hair, about 2 $\mu$ m. These fibers do not tolerate high temperatures. At conditions of more than 80 ° C, the polypropylene fibers will shrink and deform, creating holes and reducing or losing the ability to stop superfine particles.

According to technical requirements, it is necessary to ensure a comfortable ventilation while still blocking the ultra-fine particles containing viruses, so that the anti-suction ability of medical masks with pressure cannot exceed 343 Pascals. In order to increase the efficiency of adsorption of ultra-fine particles containing viruses, the filtering material needs to be "electrically processed" to generate a small amount of charge.

Thus, even if the mask is put into a pot of water to boil, put into an autoclave at high temperature, in principle, the SARS-CoV-2 virus will be completely destroyed, but the mask membrane is denatured. polypropylene fibers and lose the ability to charge, so masks reduce or even lose the ability to prevent viruses from entering.

Some researchers hope to use a microwave to kill the virus, by spraying a little water on the mask and putting it in the microwave for about a minute, but this technique is not effective. The reason is that droplets absorb energy

from microwaves that raise temperatures very high, which will lead to denaturation of the polypropylene fiber, but the nanometer-sized virus may not be in the water droplet, so it will not receive enough energy from the microwaves. wave to be affected, meaning the virus is less destroyed.

- Corona virus will be killed in 75% alcohol.

But, the outside of the N95 mask and the medical mask have a "waterproof" layer. This layer makes water, blood, pus, fluids, saliva, drops . very difficult to penetrate. 75% alcohol has a different surface tension than water, so when rubbing alcohol on a mask to disinfect, the "waterproof" layer is destroyed, the ability to stop will no longer.

- Corona virus is very sensitive to ultraviolet rays.

But Polypropylene material is thermoplastic, ultra-thin filaments have poor aging resistance and are very sensitive to ultraviolet rays. After being irradiated by ultraviolet light, the fiber structure will be destroyed or oxidized quickly, which will greatly reduce filtration performance.

Research of the manufacturer shows that N95 masks and medical masks are boiled in water, steamed, dried, alcoholic insects, ultraviolet irradiated, or turned into microwave ovens; then the ability to prevent viruses from 95% to 60% is equivalent to a cloth mask only.

## **Is there a disinfectant way to reuse a mask?**

*The answer is yes!*

When making masks, there is the sterilization stage with ethylene oxide gas, unfortunately, it can only be done at the mask production facilities, which people cannot do. In addition, the mask continuously absorbs the steam that the human body exhales during use, the steam will lose the electrical charge of the filter layer, thus reducing the absorption capacity, so that the manufacturer does not Old masks are allowed to disinfect by this method and then reused.

In the current scarcity of masks, experts believe that if masks are not used in sick people, in hospitals, or at high-risk places such as public places, on trains; healthy people can still reuse their own masks a few times, but the total time to wear the mask should not exceed 6 hours, the distance between two uses should be at least 3 days apart to ensure The virus has been killed because it does not exist in the environment.

Instead of reusing masks, use a cloth mask.

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