

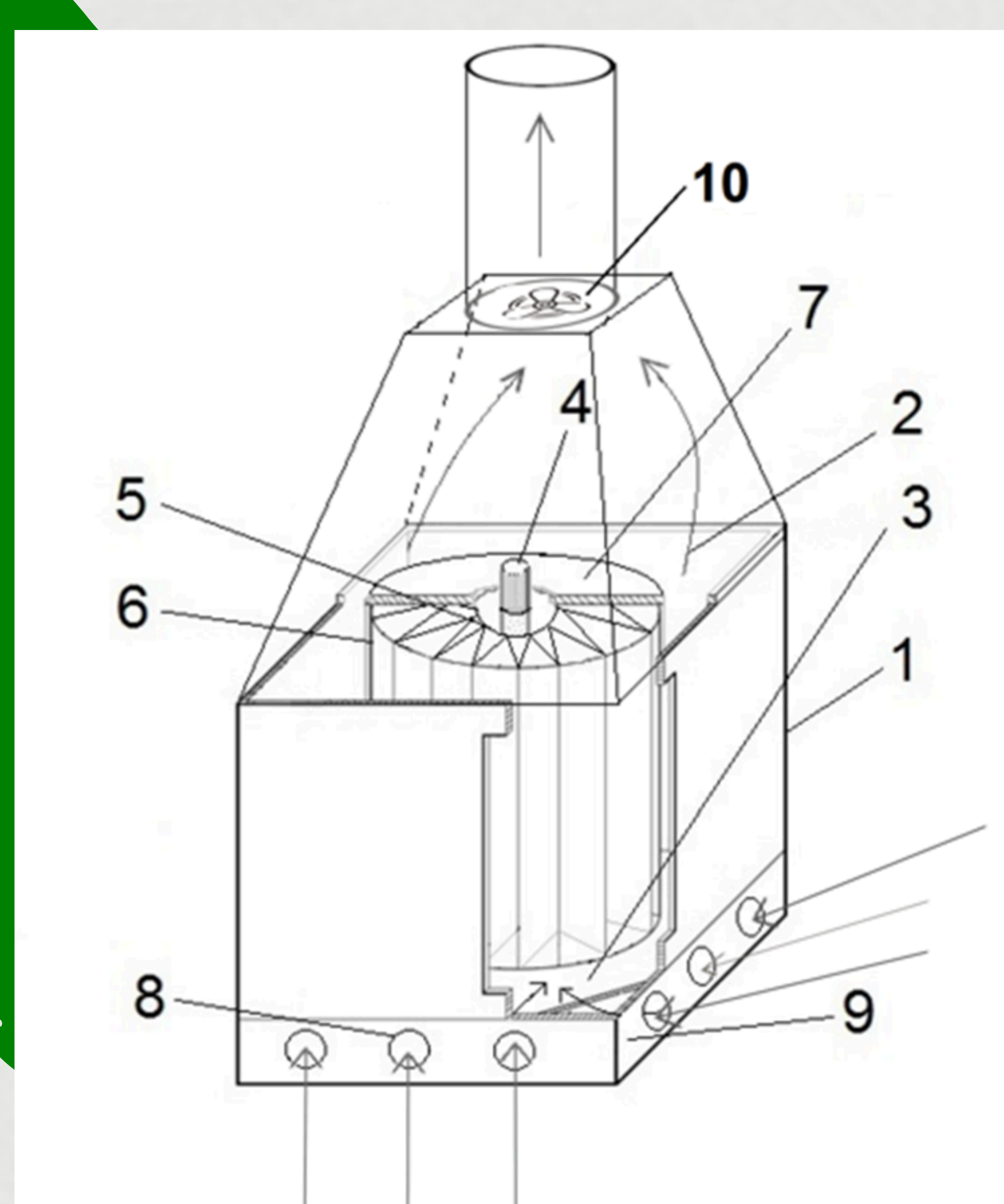
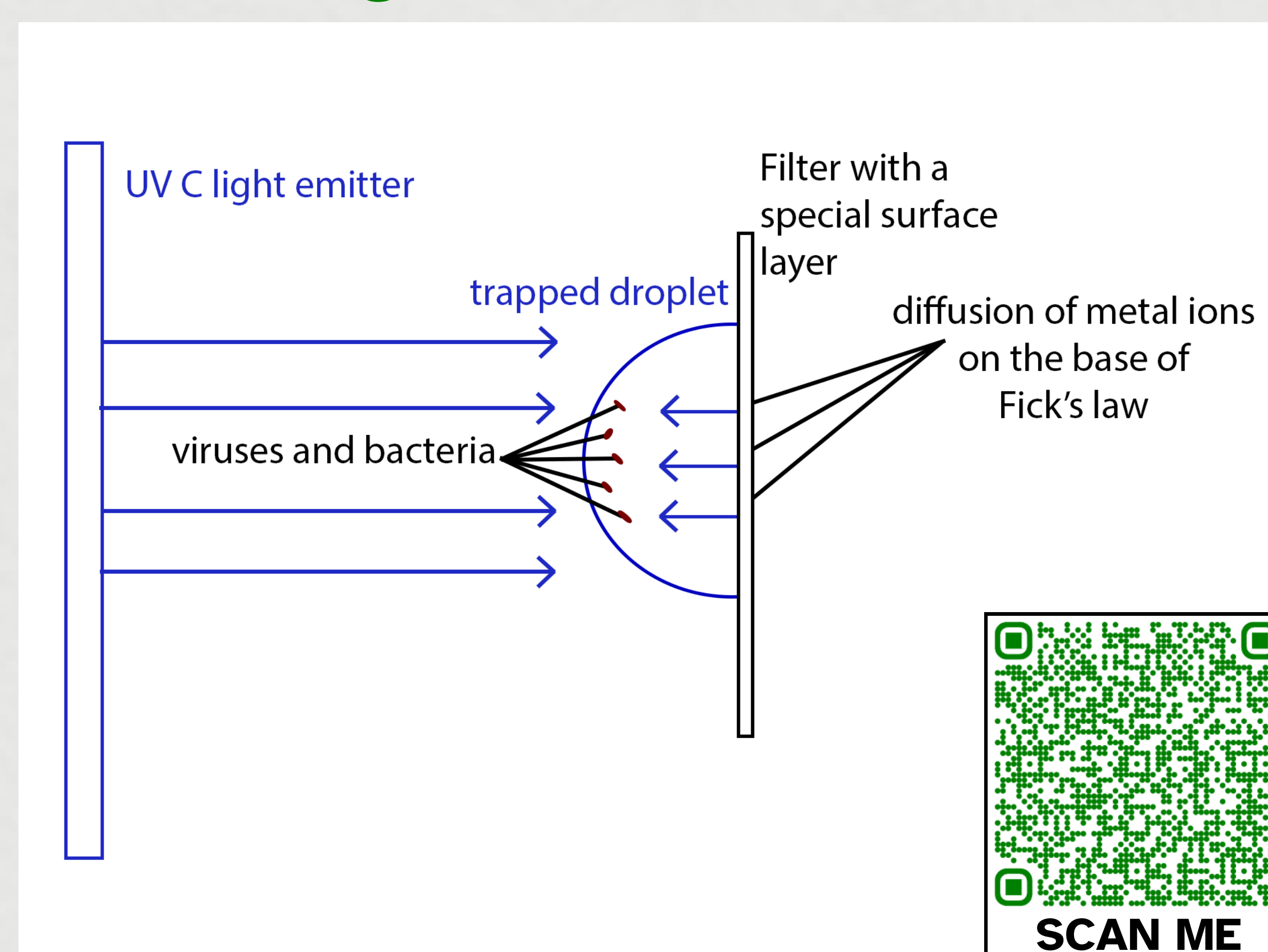
VÝSKUMNÝ ÚSTAV PAPIERA A CELULÓZY A.S. PULP AND PAPER RESEARCH INSTITUTE - ESTABLISHED IN 1947



Nanofiltration device for deactivation of airborne pathogens on the surface-treated filter material

Principles of operation

Device for the inactivation of airborne pathogens transmitted by droplets, captured on filter paper with a surface treated with a special layer of nano fibrillated cellulose and nanocellulose containing antiseptic metal ions and adjuvants, in which the inactivation and disinfection effects of metal ions and radiation in the UV-C range of electromagnetic wavelengths are combined.



1. Nanofiltration device of cylindrical or prismatic shape for deactivation of airborne pathogens on the surface treated filter material with nanocellulose and nano fibrillated cellulose containing metal cations and adjuvants
2. Perforated base/pedestal
3. Interior space
4. In the middle is longitudinally (axially) a germicidal emitter in the form of a cylinder or a U tube
5. Accordion-shaped folded surface treated filter paper sheet fixed in cartridge
6. The filter cartridge
7. Impermeable barrier
8. Air inlet holes
9. Input of infected air with droplets
10. Fan



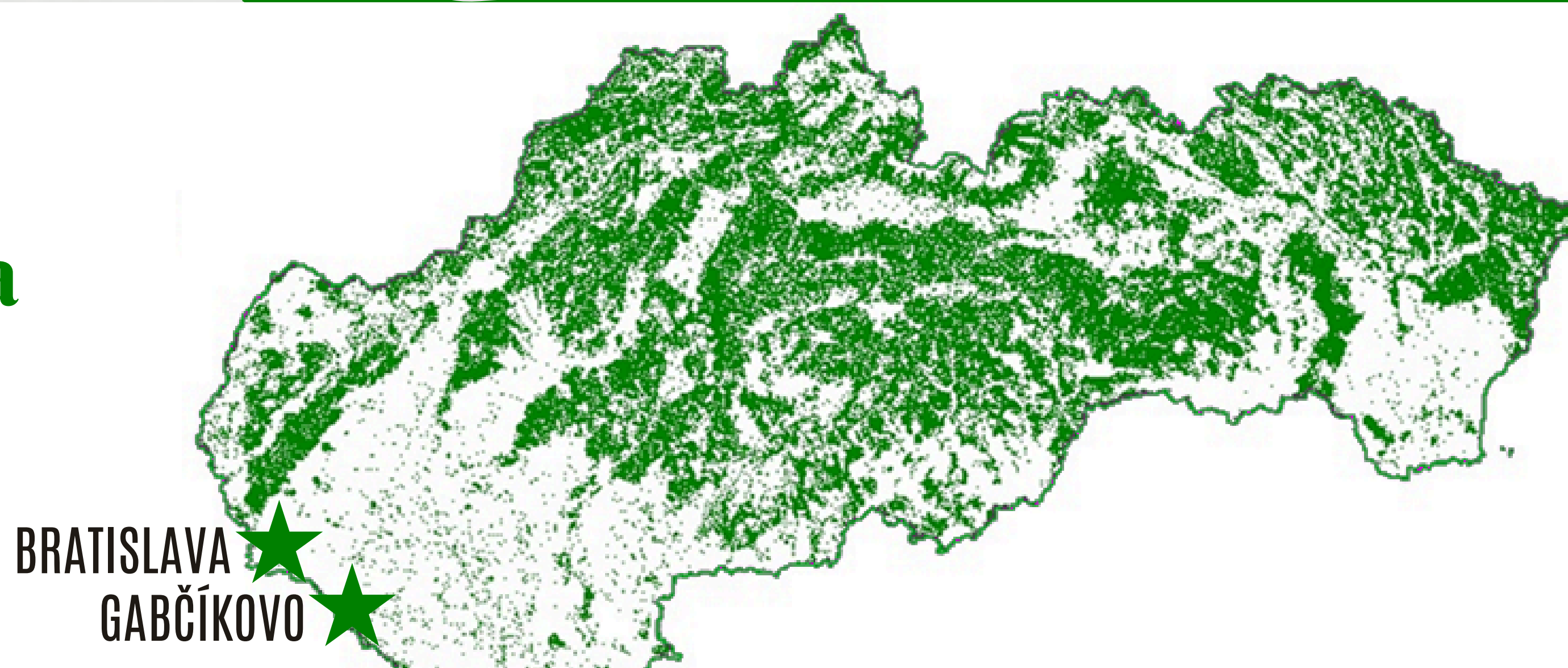
Special filtration papers developed for a device to deactivate airborne pathogens transmitted through airborne droplets contain a special layer of nano fibrillated cellulose and nanocellulose. This layer contains antiseptic metal ions and adjuvant substances. The deactivating and disinfecting effects of certain metal ions and UV-C radiation in a specific range of electromagnetic radiation wavelengths, where no ozone is produced, are combined. Droplets are captured during contaminated air filtration on the surface-treated paper. Air is drawn in through an opening of the nanofiltration device located at the bottom and passes into the centre of the filter cartridge, where a germicidal lamp emits UV-C radiation. Subsequently, it passes through the filtration paper hermetically inserted into the filter cartridge. The filter barrier is folded in an accordion shape to ensure its surface is maximally and fully exposed to UV-C radiation. Antiseptic ions diffuse into the captured contaminated droplets, which, together with the effect of UV-C radiation, deactivate viruses and disinfect bacteria. Due to the effect of UV-C radiation and airflow with relatively low humidity, droplets gradually dry out and deactivated viruses and disinfected bacteria are carried away by air. Microbes are coated with adjuvant substances on their surface. Thanks to this, deactivated viruses and disinfected bacteria are more easily introduced into the human immune system, where the adjuvants dissolve, exposing spike proteins and the entire protein surface of the deactivated virus or disinfected bacteria—unable to replicate. The immune system learns to fight against these exposed unknown substances, and upon entry of an active virus or live bacteria, the organism will already have increased immunity against the current mutation of the virus or bacteria. Thus, these devices contribute to increasing the overall immunity of the population.

Intellectual Property Rights to this unique device is protected by the International Application Published under the Patent Cooperation Treaty (PCT) No. WO 2023/128878 A1 by WIPO.



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