Inexpensive Nano-Respiratory Filters

Sonam Choudhary

Pollution levels have been breaching the permissible limits of air quality standards repeatedly in the past, making breathing a tough task for the residents of the National Capital. While some choose to stay indoors and reduce their exposure, stepping outdoors is inevitable for others. For protection against the hazardous smog and smoke, a variety of anti-pollution masks are available in the market in a range of specifications and prices but the efficacy of even the costliest of them is not ensured.

Inspired by similar grim circumstances, Prateek Sharma, Founder & CEO, Nanoclean Global Pvt. Ltd., thought of building an accessible, effective and easy-to-use pollutant filter.
to help her mother, an asthma patient, when the best masks available in the market failed to be fully efficient, mostly being uncomfortable to wear.

A team of researchers from the Indian Institute of Technology (IIT)-Delhi and Nanoclean Global including Prateek Sharma, IIT-Delhi professors Manjeet Jassal and Ashwini K. Agrawal, the institute’s alumni Sanjeev Jain and Tushar Vyas, and a student, Jatin Kewlani joined hands together to shape this thought into reality and developed the nano-respiratory filter that is so tiny that it can fit in the nostrils. Named as ‘Nasofilters’, the product is developed using advanced nanotechnology.

Nasofilters contain a highly porous substrate that uses surface filtration instead of depth filtration and autocleans itself as one breathes out. The nanofibers used to make the filter media of the device are 100 times smaller than a thread of a normal fabric and pore density is also increased by millions of time on a unit area. The product is highly efficient to filter out even the finest PM 10 particles by 100 percent and PM 2.5 particles by 95 percent giving minimal pressure drop without causing any resistance in breathing.

These filters stick to the user’s nasal orifice and restrict the foreign particulate matter including the smallest of bacteria and viruses and pollen allergens from entering the body. This use-and-throw biodegradable device can be used for up to 8-10 hours. The device not only reduces the risk of respiratory diseases but is also the cheapest respiratory filter available with a price as low as just Rs. 10 for each, making it affordable for the masses. Also, it is very inconspicuous as the edges that stick to the bottom of the nose are transparent.

The team was awarded the “Startup National Award” for their innovation in 2017 by Former President Shri Pranab Mukherjee for creating promising new technology for protection against air pollution. The South Korean Government also recognised the company as one of the “Top 50 Technical start-ups in the world” from over 118 countries. The product is now available to be sold at the company’s website and will soon be out in Indian and global markets.

*Contributed by Sonam Choudhary, Science Reporter, CSIR-National Institute of Science Communication And Information Resources*