

Motorcycle riders breathe easy with air-filtering helmet

August 26 2022



Helmets fitted with filters have been made available to protect motorcycle riders from harmful emissions. Credit: Biswarup Ganguly, [CC BY](#)

A motorcycle helmet that filters out harmful emissions from the air is protecting riders in New Delhi and other Indian cities that rank among the most polluted in the world.

Shellios Technolabs, the New Delhi-based startup that developed the

helmet, says filters used in it can remove PM 2.5 and other toxic, vehicular emissions which millions of two-wheeler riders are directly exposed to on Indian roads.

"Since the whole purifying system—including rechargeable batteries, blower and electronic circuit board—is located at the back of the fiberglass helmet it does not interfere with the bike rider's movements or vision but creates a clean, purified air space immediately behind the clear visor," Amit Pathak, one of the company founders, tells SciDev.Net.

Motorcycles, scooters and other two-wheelers are an important means of personal transport in India and in 2019 there were more than 221 million registered units in the country. During the 2021–2022 financial year, more than 13 million units were sold.

Shellios Technolabs received seed funding from India's Department of Science and Technology and support from the Science and Technology Entrepreneur Park (STEP), to develop the helmet which is now being sold commercially at US\$56.

It says the 1.5 kg head gear conforms to government safety and ergonomic standards and has shown, in controlled test environments, to reduce PM 2.5 particles and other outdoor pollutants by 80%.

"The anti-pollution helmet was one of the more promising products taken up for support by STEP considering that it had real benefits for the public that struggles to cope with extremely high levels of pollution in India's major cities," says Deepthi Shanmugam, the Bangalore-based chief executive of the Academy of Technical Education that works with STEP.

New Delhi and Kolkata were ranked as the world's two most polluted

cities by the Institute for Health Metrics and Evaluation, Massachusetts, US, in their Air Quality and Health in Cities in a report released on 17 August.

The report which ranked cities on the basis of two major air pollutants—[fine particulate matter](#) (PM2.5) and nitrogen dioxide (NO₂)—found the highest population-weighted annual average PM2.5 exposure in 2019 to be in Delhi at 110 micrograms per cubic meter, followed by Kolkata at 84 micrograms per cubic meter.

The WHO—which considers PM 2.5 to be the single biggest environmental threat to human health—recommends that annual average concentrations of PM2.5 should not exceed five micrograms per cubic meter.

"Our helmet has patented air purifying accessories including a silent blower fan that draws air through disposable, high-efficiency particulate air (HEPA) filter membrane and is powered by [rechargeable batteries](#)," Pathak said.

HEPA filters are already widely used in air purifiers found in homes, offices and restaurants in New Delhi. The India air purifier market, worth US\$74.8 million in 2020, is projected to reach US\$565.7 million by 2027, according to Blue Wave Consulting, which attributes the market growth to rapid urbanization and industrialization, resulting in [poor air quality](#) and widespread respiratory ailments.

Pathak says that future versions of the helmet would incorporate air-conditioning and hands-free operation of mobile phones through a wireless link. The helmet already connects via Bluetooth to a mobile phone to warn the wearer when it is time to change the filter. "The focus, for now, is on ensuring breathable air for motorcycle riders in Indian and other heavily polluted South Asian cities like Kathmandu and

Dhaka," Pathak adds.

Bhupendra Das, air quality specialist and chair at Nepal Energy and Environment Development Services, says that of the 3.2 million vehicles registered in Nepal over the last two decades 80% were two-wheelers. "Given the sharp rise in PM 2.5 air pollution caused by congested [traffic conditions](#) in Kathmandu, an air-purifying helmet would be a boon to two-wheeler riders," he said.

Das says the HEPA filter in the helmet could reduce exposure to pollutants associated with respiratory, cardio-vascular, allergic hypersensitivity ailments which are on the rise in Nepal. "Governments in South Asia should consider the introduction of such innovative devices as part of policy instruments being implemented to deal with high pollution levels, along with other measures," he said.

In July, India's national capital region, which includes New Delhi, introduced a series of measures to "prevent, control and abate air pollution" through restrictions on industries, vehicular transportation, construction, municipal solid waste burning, and crop-residue burning.

Smog towers with filters have been installed in known pollution hotspots and anti-smog guns capable of blasting and settling dust have been placed near construction sites. However, these have not shown tangible effects on the ever-rising levels of aerial pollution.

Provided by SciDev.Net

Citation: Motorcycle riders breathe easy with air-filtering helmet (2022, August 26) retrieved 19 April 2024 from <https://techxplore.com/news/2022-08-motorcycle-riders-easy-air-filtering-helmet.html>

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