## ABSTRACT

The COVID-19 pandemic confined the global population to their homes, creating a demand for new hobbies to stay entertained. Among the most popular hobbies that emerged was running. However, as COVID-19 is an airborne disease, runners were required to wear masks. A common option, the surgical mask, posed challenges for runners due to its thick material, which inhibited breathing by making it difficult to inhale oxygen and exhale carbon dioxide. On the other hand, masks with thinner materials allowed harmful pollutants, such as Particulate Matter 2.5 (PM 2.5), to enter the lungs, potentially causing respiratory diseases. This study aimed to design a mask that effectively filters PM 2.5 while providing maximum comfort for runners. The Urban Air 2.0 Airinum mask filter was integrated into the mask design. This filter's electrospun properties effectively prevented the smallest particles from entering the lungs while maintaining normal oxygen intake and carbon dioxide expulsion. The mask featured a two-valve system to ensure efficient oxygen and carbon dioxide exchange. A light-transmittance test was conducted on the mask, and a particulate matter detection test was performed under controlled conditions with an airflow of PM 2.5 passing through the filter. The filtration efficiency was calculated at 96.15%, surpassing the filtration rates of surgical and KN95 masks, which are both 95%. This research and engineering project revolutionized how runners can perform in densely polluted environments.



**Keywords:** PM 2.5, Electrospinning, Minute Ventilation, Exhalation Valves