



Natural Protein Nanofiber Filters: A Sustainable And Economically Beneficial Solution For Efficient Smog Filtration

Muhammad Haris, Kashif Sattar, Hamza Arshad, Maryam Saleem, Nimra Usman, Ayesha Hafeez
Department of Bioinformatics & Biotechnology, GCUF

(May 15, 2024)

One-day Symposium on Nanotechnology for Sustainable Environmental Applications

Organized by: Green Youth Movement (Club) & Department of Environmental Sciences, GCUF

The idea

Use of natural protein nanoparticles in green solvent-based nanofiber filters can effectively remove smog particulates and toxic gases, separating them for commercial reuse.

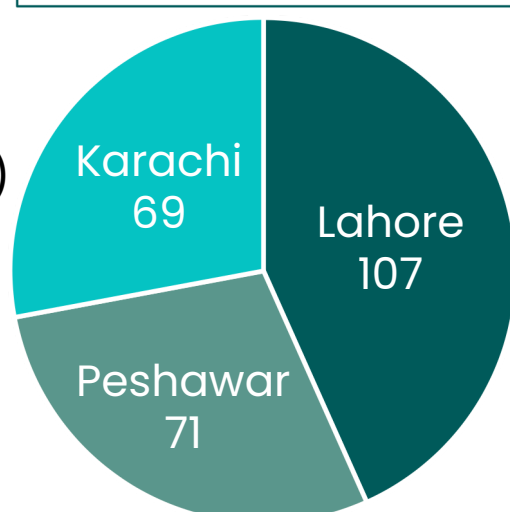
Problem

Smog, a blend of pollutants from human activities and industrial emissions, typically includes Nitrogen Oxides (NO_x), Volatile Organic Compounds (VOCs), Sulfur Dioxide

(SO₂), and Particulate Matter (PM) and some other toxic gases.

The Air Quality Index (AQI) in major cities like Lahore, Karachi, and Peshawar often exceeds safe limits, posing significant health risks to the population.

AQI of Different Cities



Solution

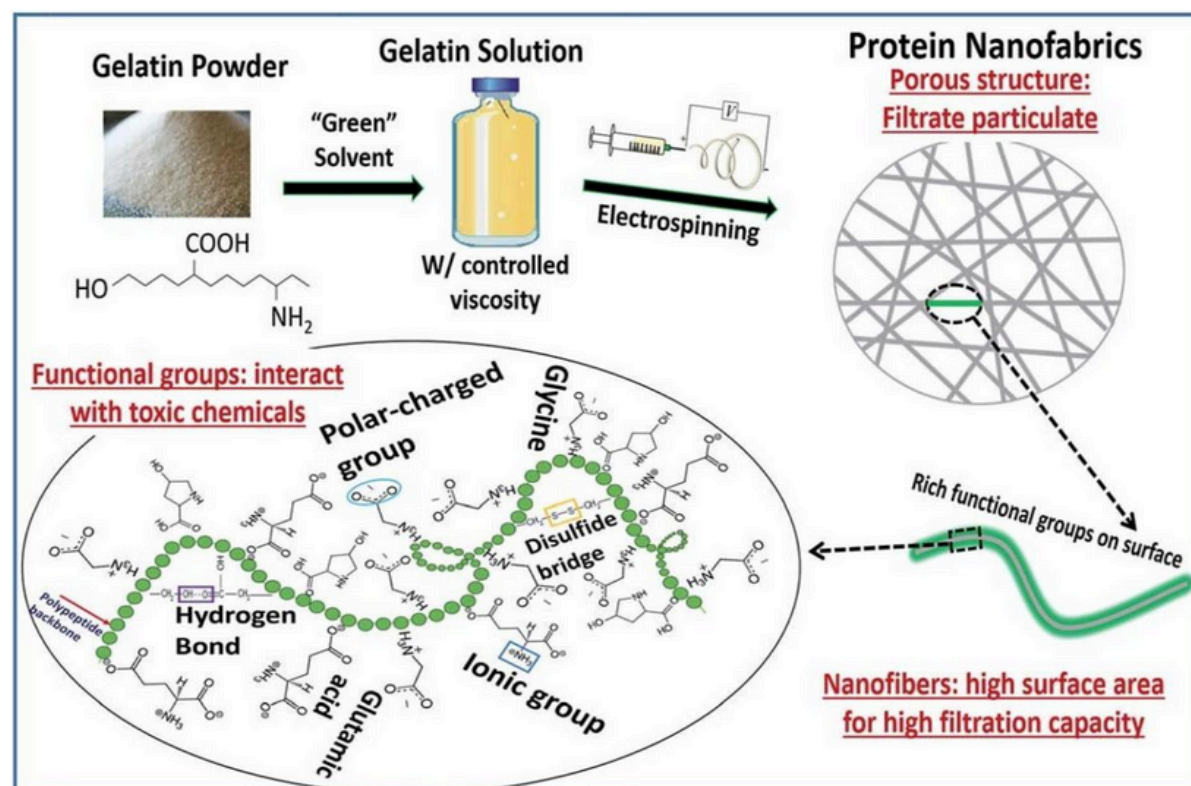
Gelatin nanofiber smog filters in Pakistan are promising for addressing smog pollution and improving air quality. These filters, with high **efficiency and biodegradability**, align with the global trend towards sustainable and eco-friendly air filtration solutions. The process involves creating nanofibers in a green solvent (**acetic acid : water**), and adding functional groups like **Carbon Nanotube (CNT)**, **β-Cyclodextrin**, and **Zeolite** to separate pollutants and gases. .

Conclusion

Gelatin nanofiber smog filters can potentially combat smog pollution and improve air quality sustainably. By utilizing green solvents and incorporating additional functional groups, these filters can efficiently separate pollutants while aligning with global eco-friendly trends.

Objectives

- Environment-friendly green nanofilters.
- Efficient filtration of hazardous smog particles.
- Separation of the pollutants for their reuse them for economic purposes.
- Cost-efficient nanofiltration process than conventional methods.



Quality factor comparison of Commercial air filters, transparent PAN, air filter18, and gelatin air filter.

