Antiviral Nano-coatings

Why in News

Recently, the **Department of Science and Technology** (DST) has approved the use of antiviral nano-coatings on **anti-Covid-19** masks.

> These coatings have been approved for **Triple Layer Medical masks** and **N-95 respirator,** as a part of the **Mission on Nano Science and Technology (MNST or commonly known as Nano Mission).**

Key Points

- The antiviral nano-coating has been developed using **N9 blue silver** which will be modified to form **nanocomplexes with Zinc (Zn, atomic number-30) compounds** to achieve a synergistic effect. Subsequently, it will be **applied as coatings on facemasks** and other **Personal Protection Equipment (PPEs).**
    - Nano-coatings have **99.99% effectiveness** and these can **work on multiple levels** at the same time like **antiviral, bacterial and fungal and self-cleaning**.
    - These can be **applied to various surfaces** such as **glass, metal, stone, textiles and plastics** by **spraying or dipping.**
    - N9 blue nanosilver is a **highly potent antimicrobial agent** and has been developed at **SMITA Research Lab, Indian Institute of Technology (IIT) Delhi.**
    - **Silver (Ag, atomic number-47)** is known to have strong antimicrobial activity against bacteria, viruses and fungus.
        > In experiments, **strains of bacteria and viruses** have **shown either resistance or sensitivity** when **exposed to silver** which confirms **silver resistance and toxicity** in them.
- After the **evaluation of shelf life of the coatings and their efficacy** under different conditions such as **temperature, humidity and time,** the masks and PPEs will be **prepared and provided to the medical workers for field trials.**

- The use of highly effective antimicrobial nanoparticles on masks, PPEs, etc is a useful application providing an **extra layer of protection for the high risk settings,** such as for the medical workers.

Mission on Nano Science and Technology

- It was launched by the **Government of India** in **May 2007** as an **"umbrella capacity-building programme"** to build upon the promotional activities in the highly promising and competitive area of Nano Science and Technology.
- The **DST is the nodal agency** for its implementation.
- **Objectives:**
    - Basic research promotion.
    - Infrastructure development.
    - Nano applications and technology development.
    - Human Resource development.
    - International collaborations.
- Due to its efforts, India is **amongst the top five nations in the world** in terms of scientific publications in nano science and technology.
- In **2014,** recognizing its success, the Union Cabinet accorded **approval for continuation** of the Nano Mission in its **Phase-II during the 12th Plan period (2012-17)** with an allocation of ₹650 crore.
- The Nano Mission has **resulted in useful products** like nano hydrogel based eye drops, pesticide removal technology for drinking water, water filters for arsenic and fluoride removal, nanosilver based antimicrobial textile coating, etc.
- It has orchestrated national dialogues to promote R&D in development of standards for nanotechnology and for laying down a **National Regulatory Framework Road-Map for Nanotechnology (NRFR-Nanotech).**

Source: PIB