Nano Plastics Can Make E. Coli Infections Worse

Prelims: Science and technology | Current events of national and international importance

Why in news?

Recently, a new study from researchers at the University of Illinois, Urbana-Champaign, has revealed that nano plastics aren't just risky on their own

- **Nano plastics –** It is extremely **small plastic particles** typically ranging from 1 to 100 nanometres in size.
- They are found everywhere- in mountaintops, deep-sea trenches, human bloodstream, tissues, and even newborns.
- It is known for **toxic effects** including damage to cells and genetic material.
- **E. coli (Escherichia coli) –** It is a group of bacteria that usually lives in your gut without hurting you.
- It is a gram-negative bacillus foodborne pathogen and is a causative agent of many diarrheal illnesses.

Gram-negative bacteria appear pink or red under a microscope during lab test because they have a thin cell wall and an outer membrane that prevents the primary stain (crystal violet) from being retained.

Findings of the study

- **Impact of Nano plastics –** Researchers found that nano plastics make E. coli (*Gram-negative) can be* more virulent.
- The charged nano plastics increases stress on E. coli, prompting it to produce more **Shiga-like toxins** — proteins responsible for causing disease.
- The charged nano plastics initially **inhibited bacterial growth**.
- But over time, some E. coli cells **adapted**, resumed growth, and showed **genetic changes**.
- Both **positively and negatively charged** nano plastics led to these effects, although **positive charges** had more severe outcomes.
- **Significance –** Nano plastics can **exacerbate bacterial infections** by enhancing virulence
- It also poses indirect threat by making microbes more dangerous and resistant to antibiotics.

Reference

[The Hindu| Nanoplastics can make E. coli infections worse]