

Nano-biosensor for detecting 'lycopene'

November 7, 2022

In news- A team of researchers from the Institute of Nano Science and Technology (INST), Mohali, has developed a nano-biosensor for detecting 'lycopene', a phytochemical with high commercial value.

About nano-biosensor-

- The **sensor uses a portable smartphone**-based upconverting reusable fluorescent paper strip.
- This transparent Upconversion Nanoparticles (UCNP) strip has been found to be **sensitive to lycopene**.
- **A simple smartphone camera can be used for detection**.
- **Upconversion is a process where light can be emitted with photon energies higher than the light** generating the excitation.
- The research team has found the newly developed **transparent strip offering minimal scattering with maximum sensitivity** despite not using any metal quenchers, in comparison to previous paper strips.
- An increase in strip hydrophobicity during the fabrication process complements the strip to selectively permeate and present an extraction-free substitute analysis for chromatography.
- Hydrophobicity endows the strip with the capability to reuse the strip with approximately 100 per cent luminescence recovery.

What is Lycopene ?

- **Lycopene is a carotenoid found in tomatoes, grapefruit, watermelons and papaya**.
- It is also **synthesised by plants and microorganisms but cannot be synthesised by the human body** and can only be obtained via diet.

- It is a potent antioxidant that helps prevent cancer and heart diseases.
- Several epidemiologic studies have suggested a strong association between a high intake of lycopene-rich foods and a reduced risk of several cancers, notably prostate cancer.
- However, there are not many well-designed clinical trials conducted and the data remain inconclusive.
- As **lycopene has potent antioxidant effects, it may interfere with chemotherapy and radiation therapy.**
- The undesirable degradation of lycopene affects the health benefit of tomato and other tomato-based foods for the human body.
- The quality of the produce is rated on the basis of the lycopene present in it and is priced accordingly.