

Natural indigo dye

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In news- Scientists have found that the natural indigo dye extracted from leaves of a plant of the bean family is capable of protecting human eyes from harmful laser radiation.

About the dye-

- The blue dye is **extracted from Indigofera Tinctoria or the famed Indigo plants** that has been used over the years to colour clothes and clothing materials.
- Researchers from the **Raman Research Institute (RRI), Bengaluru, and Kensri School and College, Bengaluru**, studied the optical properties of the natural Indigo dye and found that it can act as a device to protect human eyes from harmful laser radiation.
- The study is funded by the Department of Science and Technology, Government of India and was published in the journal 'Optical Materials'.
- The researchers extracted the dye and stored it in a refrigerator below 4° Celsius to preserve its natural properties.
- Their study on how much it absorbed light at different wavelengths of the electromagnetic spectrum showed that the **absorption is maximum in the ultraviolet region of the spectrum.**
- The absorption is comparatively **high for the green light** as well.
- The absorption's variation with wavelength indicated that **chlorophyll**, an organic compound that takes part in photosynthesis, is **present in the dye.**
- The team found that **when the intensity of the laser pulse is increased, the dye absorbs more light.**
- Thus it is **more opaque to higher intensity light** and is referred to as an '**optical limiter**'.

- Optical limiters are useful in weakening the potentially harmful radiation emitted by powerful lasers and protecting both eyes and sensitive optical instruments.

Indigofera tinctoria-

- It is also called **true indigo**, is a species of plant from the **bean family** that was one of the original sources of indigo dye.
- It is a **shrub** one to two meters high and may be an annual, biennial, or perennial, depending on the climate in which it is grown.
- It has been **naturalized to tropical and temperate Asia, as well as parts of Africa**, but its native habitat is unknown.
- The natural **dye** from *I. tinctoria* is **known as tarum in Indonesia and nila in Malaysia**.
- In Iran and areas of the former Soviet Union it is known as **basma**.
- It has light green pinnate leaves and sheafs of pink or violet flowers.
- The **plant is a legume**, so it is rotated into fields to improve the soil.
- The plant's leaves are soaked in water and fermented in order to **convert the glycoside indican naturally present in the plant to the blue dye indigotin**.
- The precipitate from the fermented leaf solution is mixed with a strong base such as lye.
- **Marco Polo (13th century)** was the first European to report on the preparation of indigo in India.
- Indigo was quite often used in European easel painting, beginning in the Middle Ages.