



Hot Springs & Origin of Life

Source: DST

Scientists in [Puga Valley hot springs](#), Ladakh, discovered **travertine (calcium carbonate)** deposits capable of **trapping organic molecules** like amino acids, fatty acids, and formamide.

- This supports theories that **life may have originated in geothermal environments**, similar to early Earth or Mars.
- The study used techniques like **GC-MS-MS, Raman Spectroscopy, X-ray Diffraction (XRD), Infrared Spectroscopy (IR), Stable Isotope Geochemistry and microscopy**.
- It challenges earlier **silica-based origin** theories by showing **calcium carbonate can preserve biosignatures**, acting as a **prebiotic reactor**.
- Findings may aid **ISRO's astrobiological missions** by guiding biosignature detection on **Mars-like terrains**.

Hot Springs & Geysers

- **Hot springs** are geothermal features where **heated groundwater surfaces in tectonically active areas**. Eg: Manikaran (Himachal Pradesh).
 - **Puga Valley**, in southeastern Ladakh, is known for geothermal activity, **sulphur springs**, and **energy potential**.
- **Geysers** are volcanic geothermal features that erupt **hot water and steam** when **groundwater is superheated by magma** in underground cavities. Eg: **Yellowstone National Park (USA)**.

Hot Springs	Geysers
▪ In a hot spring the heated water flows out continuously without any eruptive activity. ▪ Such hot springs are common in Yellowstone Park US; Badrinath and Manikaran in India. ▪ These hot springs are very healthy for bathing.	▪ In a geyser, hot water and steam are thrown out at intervals in the form of a fountain. ▪ There is an Old Faithful geyser which erupts out exactly in one hour intervals; these are about 100 geysers.

Read More: [Geothermal Power in Ladakh](#)