

Microbes from medicinal plants yield anticancer hope: IISc team reports interesting findings

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A team of scientists from the Indian Institute of Science, Bengaluru has found an alternative source of a blockbuster anticancer drug – an endophytic fungus of a *Taxus* species, the original natural producer. This is hailed as a potential solution to the supply crisis of this compound called Taxol, for the long run.



The team from biochemistry lab led by Prof. C. Jayabaskaran, has been, for over a decade working on identification and extraction of natural compounds of pharmaceutical value found in well-known medicinal plants and their endophytic fungi. While working on mass cultivation of an evergreen shrub, Chinese yew (*Taxus celebica*) of the Yew family, Jayabaskaran came across a fungus growing from the aseptic cuttings of this shrub. It was later identified as *Fusarium solani*, a Taxol-producing endophytic fungus.

“We isolated the fungus from plant tissues and cultured it in the lab. Taxol purified from this fungus was confirmed at the chemical level as well as its biological activity. As this is among the first-line and most effective anticancer drugs worldwide, we would like to partner with any interested industry to study enhanced or large scale manufacturing potential” he said

In the early 1960s, National Cancer Institute, United States, funded researchers to find a natural compound to treat cancer. After screening through thousands of trees, scientists finally found a remarkable chemical compound from the bark of a Pacific Yew tree (*Taxus brevifolia*). They named this biomolecule with anti-cancer properties as Paclitaxel (marketed as Taxol).

While the unique structural properties of paclitaxel captivated scientists, its extraction posed a major challenge. Just to harvest a gram of this compound from the bark, an entire yew tree had to be cut down. Because of the rare existence and its slow growing nature, loss or possible extinction of this tree started becoming a major concern.

“A well known or any novel drug, even a single one, getting closer to market potential would be great” says Jayabaskaran whose laboratory works on an extensive variety of endophytic fungi in search for an assortment of pharmaceuticals including anticancer compounds.

Research in endophytic fungi opens a scope for the future generations of students and teachers to explore options beyond mainstream areas.

What are endophytes: Any microorganism (fungi, bacteria or viruses) which resides internally in the plant tissues for complete or part of its life cycle without producing ill effects is known as an endophyte. An analogy is the various microbes in human gut. Fungi are the most well-known example of this group of microorganisms from plants. They have been known to produce a plethora of chemical compounds with medical, agricultural and industrial applications. Thousands of such compounds have been isolated from various endophytic fungi by groups across the world. Some of these have found clinical application for different diseases.