

Endophytic Natural Products for Management of Cancer and HIV

M. Govindappa, T.S. Sadananda, R. Channabasava

Department of Biotechnology, Shridevi Institute of Engineering & Technology,
India

E-mail: dravidateja07@gmail.com

The endophytic fungi reside in living tissues of host plant with a variety of relationships. The endophytes may produce a plethora of substances (what the host plant usually has or/and produces) of potential use to modern medicine. These natural/endophytic drugs may be more effective natural productive candidates for treating cancer and HIV by various mechanisms. Endophytes anticancer drug, paclitaxel (*Taxomyces adrenae*, *Pestalotipsis microspora*, *Seimatoanterium tepuiense*, *Periconia* sp., *Seimatoantlerium nepalense*, *Tubercularia wallichiana*, *Sporomia minima*, *Trichothecium* sp., *Corylus avellana*, *Alternaria* sp., *Alternaria alternata*, *Alternaria fumigates*, *Aspergillus niger*, *Botrytis* sp., *Fusarium* sp., etc.), torreyanic acid (cytotoxic quinine dimer) (*Pestalotipsis microspora* etc.), many alkaloids (species of *Xylaria*, *Phoma*, *Hypoxylon* and *Chalara*), novel cytochalasins (*Rhinocladiella* sp.), podophyllotoxin (PDT) (*Alternaria*, *A. neesex*, *Fusarium oxysporum*, *Monilia*, *Penicillium* etc.), camptothecin (CPT) (*Entrophospora intrequens*, *Fusarium solani*, *Neurospora* sp.), vinblastin and vincristine (*Fusarium oxysporum*), lapachol (*Alternaria alternata*, *Aspergillus niger*), viscum album agglutinin (VAA) (*Aspergillus niger*, *A. flavus* and *Fusarium oxysporum*) and coumarins, pestalasin (*Pestalotipsis* sp.), 4-aryl coumarins (*Streptomyces aureofaciens*), isocoumarin (*Penicillium* sp.), dimethoxycoumarin (*Periconia atropurpurea*), coumarins (*Aspergillus flavus*, *A. niger* and *Fusarium oxysporum*) and many more. These endophytic natural products control cancer cells by precluding tubulin molecules from depolymerization during cell division, causing apoptosis and cellular toxicity, interfering with cancer cells growth, topoisomerase inhibitors, senescence of cancer cells, growth arrest, inhibition of oncogenes expressions and inhibition of protein synthesis and inhibiting allergen induced histamines, mitochondrial dysfunction, etc. Endophytic coumarins exhibit inhibition of reverse transcriptase activity, protease activity, glycohydrolase enzyme, etc. We can produce expected natural products within short period at higher concentration using fungal endophytes. Potential endophytic natural products and their role in cancer and HIV control will be discussed.