

**PP 16. OBTAINING AND RESEARCHING OF PLANT BIOLOGICALLY
ACTIVE AGENTS BY USING OF ENDOPHYTIC FUNGI**

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Natural biologically active agents are even more often used in agriculture, medicine and food industry. Endophytic fungi are relatively novel source of natural bioactive compounds [1, 2]. Plant endophytic fungi spend the whole or part of their lifecycle colonizing inter- and/or intra-cellularly in the healthy tissues of the host plants, typically causing no apparent symptoms of disease. They are important components of plant micro-ecosystems [3, 4]. Endophytic fungi are found in many plants and more than one million species of endophytic fungi exist in the nature [5]. During the long period of co-evolution the useful relations have been formed between each endophytic fungi and its host plant. Some endophytic fungi have an ability to produce the same or similar biologically active agents as their host plant. After discovery of bioactive compound paclitaxel (taxol) in endophytic fungus *Taxomyces andreanae*, interests of scientists in research of endophytic fungi have been increased [6]. It is valuable bioactive compound, on its basis preparation of multifunctional, almost useful biologically active compounds with antimicrobial, insecticidal, cytotoxic and anticancer activities is possible. Compounds obtained from endophytic fungi could be classified as alkaloids, terpenoids, steroids, quinones, lignans, phenols and lactones [7].

Application of endophytic fungi of European yew (*Taxus baccata*) for obtaining antimicrobial compounds is possible in Georgia, this plant is widespread in Batsara nature reserve. Antimicrobial metabolites could be obtained from endophytic fungus *Pichia guilliermondii*, which grows in the plant *Paris polyphylla* var. *Yunnanensis*, as well as from endophytic fungi *Clusia* spp. (*Clusiaceae*). Many important compounds as paclitaxel and its analogues which represent tetracyclic diterpenoids, are received from the endophytic fungus. Podophyllotoxin is a well-known lignin, together with anticancer effect it has antibacterial, immunostimulating and antirheumatic properties.

Bioactive agents obtained from endophytic fungus are actually the same compounds as existing ones in host plant. Thus application of endophytic fungus for obtaining bioactive agents is perspective and promotes further development of their use. Podophyllotoxin (PDT) known aryltetralin lignin also should be noted. It has potent antibacterial, antineoplastic, antiviral, antioxidant, immunostimulation and anti-rheumatic properties. PDT has been used as a precursor for chemical synthesis of the anticancer preparations like etoposide, teniposide and others [8].

Camptothecin (CPT), a pentacyclic quinoline alkaloid, for the first time was isolated from the wood of *Camptotheca acuminata* in 1966 and is an effective means against cancer [9]. Vinblastine and vincristine, the terpenoid indole alkaloids derived from the coupling of vindoline and Catharanthine monomers, are two of the well-known antineoplastic agents [10].

After collecting of biomass, isolation of biologically active agents by means of the original method developed by us - stimulated natural extraction by use of plant precipitators will be carried out. Separation of some fractions and checking at the biological test-objects should be done. Selected narrow fractions will be investigated on GC/MS and by other chemical methods, their further modification for efficiency increase is possible.

Plant endophytic fungi, as an important micro biological source for producing bioactive compounds originally from their host plants, have attracted attention of many scientists. Their theoretical research as well as potential applications is studied, but there are still many issues that need to be defined and resolved.

References

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