

EMERGING MOLECULAR BIOLOGY-BASED APPLICATIONS AT DEPARTMENT OF BIOTECHNOLOGY, UOT, WHICH MAY PROFIT FROM THE DEVELOPMENT OF NANOBIOSENSORS

Ariola Bacu

Department of Biotechnology, Faculty of Natural Sciences, University of Tirana, Albania

Department of Biotechnology of UOT is researching mainly in agricultural, environmental and aquaculture biotechnologies, which provide economically important products for the country. The methodologies used to explore natural or cultivated capacities of plant species, aquaculture related issues, and environmentally friendly biotechnologies are conventional and advanced ones, however, results prove the need for improvements. Here are presented examples of the emerging molecular-based applications of agrobiotechnology, which may profit from the development of nano-biosensors.

The choice of MAS with specific essential oils content is directly related to the TPS regulation, thus isolation and characterization of genes coding for these enzymes from local populations is done through homology-based PCR followed by sequencing. However, a number of disadvantages appear to damage the results: High similarity among genes coding for different monoterpenoids; Difficulties to determine which category of synthases does exactly the gene fragment codes for; High probability that some of the synthases are produced via post-transcriptional modifications; The development of immunosensors, which could detect respective terpene synthases from homogenates of medicinal aromatic plant species of economic importance and allow to measure the quantity per unit of volume of homogenate, would reduce disadvantages.

Secondly, the understanding of the regulation of the expression of genes involved in local wheat resistance toward environmental stresses is a research direction strongly related to the emergencies on crop production because of climate changes. Glutathione-S-Transferases (GST) are responsible for degradation of ROS accumulated during stresses. However, the procedure for screening the GST gene expression level is expensive and time-consuming; Stresses (drought, salinity, HT) might induce synthesis of regulatory proteins, which repress the transcription of GST, thus, the detection and measurement of Rubisco activase via immunosensors could be of importance.

Third, the early detection of viral pathogens at *in vivo* and *in vitro* fruit-trees is important for the agriculture in Albania. The use of Multiplex-RT-PCR in many cases suffers from the primer pair competition, while single pair RT-PCR is expensive.

The development of genosensors for the detection of mixed viral infections at plant material homogenate, based on the hybridization with known viral gene sequences, could serve the issue.

Keywords: UOT-University of Tirana, MAS-medicinal aromatic species, TPS-terpenoid synthases, PCR-polymerase chain reaction, GST-glutathione S transferase, HT-high temperature.