

**DEVELOPMENT OF GENETIC VECTORS BASED ON ARTEMISININ BIOSYNTHESIS RELATED GENES
AND THEIR TRANSFORMATION INTO PLANTS USING AGROBACTERIUM**

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Artemisinin (chemical formula $C_{15}H_{22}O_5$) is the sesquiterpene alkaloid, and it is produced in glandular trichomes that are present on leaves, floral buds, and flowers of the artemisia crops, but it is in very low amount leading to problem to fulfill medicinal needs.

According to global studies, demand for artemisinin is growing fast, especially to use it in medicine to cure the patients with malaria, various forms of cancer, and viral diseases COVID-19. Therefore, in recent years there have been reports in scientific publications that attempts have been made to develop more productive plants and microorganisms to obtain products with high yielding artemisinin using synthetic biology, genetic engineering and biotechnologies. Thus, using transcriptomics, metabolomics and genetic engineering data analysis and publications, in our study we developed genetic vector constructions based on the genes that participate in artemisinin biosynthesis.

To develop vector construction, we used the SnapGene software system, which is easy to use and rich in qualitative functionalities, as well as its visualisation helps to build vectors very effectively. Ready to transformation vectors into variety plants were confirmed for their accuracy by colony PCR, restriction enzymes and sequencing analysis. Explants of several plants such as leaves, cotyledons, and stems were subjected to our study to transform into new generated genetic vectors. Genetic transformation of vectors was realized with the help of *Agrobacterium tumefaciens* strains in aseptic conditions. Now after co-cultivation procedures steps of somatic embryogenesis such as callusogenesis, their differentiation, shoot and root formation under research in in vitro laboratory.

As the next steps of our research, we will obtain transgenic plantlets where integrated new genes can be expressing artemisinin or its related metabolites. The results of this study will be reported next after deep studies.