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THE USE OF PLANT TISSUE CULTURE TECHNOLOGY FOR PRODUCTION AND CONSERVATION OF SPECIES

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The *in vitro* culture has a unique role in sustainable and competitive agriculture and forestry and has been successfully applied in plant breeding for rapid introduction of improved plants. Plant tissue culture has become an integral part of plant physiology and breeding. As an emerging technology, the plant tissue culture has a great impact on both agriculture and industry, through providing plants needed to meet the ever increasing world demand. Significant contributions to the agricultural sciences advancement in recent times and today have been achieved. Interventions of biotechnological approaches for in vitro regeneration, mass micropropagation techniques and gene transfer studies in tree species have been encouraging. *In vitro* cell and organ culture offers an alternative source for the conservation of endangered genotypes. Germplasm conservation worldwide is increasingly becoming an essential activity due to the high rate of plant species disappearance and the increased need for safeguarding the floristic patrimony of the countries. Tissue culture protocols can be used for preservation of vegetative tissues when the targets for conservation are clones instead of seeds, to keep the genetic background of a crop and to avoid the loss of the conserved patrimony due to natural disasters, whether biotic or abiotic stress. The plant species which do not produce seeds - sterile plants or recalcitrant seeds that cannot be stored for long period of time can successfully be preserved via in vitro techniques for the genetic resources maintenance. Cryopreservation plays a vital role in the long-term *in vitro* conservation of essential biological material and genetic resources. It involves the storage of *in vitro* cells or tissues in liquid nitrogen that results incryo-injury on the exposure of tissues to physical and chemical stresses. Successful cryopreservation is often ascertained by cell and tissue survival and the ability to re-grow or regenerate into complete plants or form new colonies. It is desirable to assess the genetic integrity of recovered germplasm to determine whether it is 'true-to-type' following cryopreservation. The fidelity of recovered plants can be assessed at phenotypic, histological, cytological, biochemical and molecular levels, although, there are advantages and limitations of the various approaches used to assess genetic stability. Cryobionomics is a new approach to study genetic stability in the cryopreserved plant materials. The embryonic tissues can be cryopreserved for future use or for germplasm conservation.

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MICROPROPAGATION OF DIFFERENT MEDICINAL PLANTS

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Medical plants are important source of material for the pharmaceutical industry because some of their valuable secondary metabolites cannot be produced artificially. Tissue cultures and micropropagation techniques are plant biotechnological tools that offer many advantages for production of medicinal plants over the conventional methods.

In this study, medicinal plants lavender (*Lavandula vera* L.), lemon balm (*Melissa officinalis* L.), chamomile (*Matricaria chamomilla* L.), St John's worth (*Hypericum perforatum* L.) and sage (*Salvia officinalis* L.) were subjected to micropropagation using different media supplied with different combination of growth regulators. Commercially available seeds were used as starting material for the species lavender and sage, while seeds collected from the local populations were used as starting material for chamomile and St John's worth. Lemon balm was micropropagated through leaves. The starting materials of the studied medicinal species were micropropagated either on MS media or on the modified MS media with the growth regulators application. Specific results in proliferation, callus and shoots formation were obtained in dependence on type of initial explants and growth regulators combinations.

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