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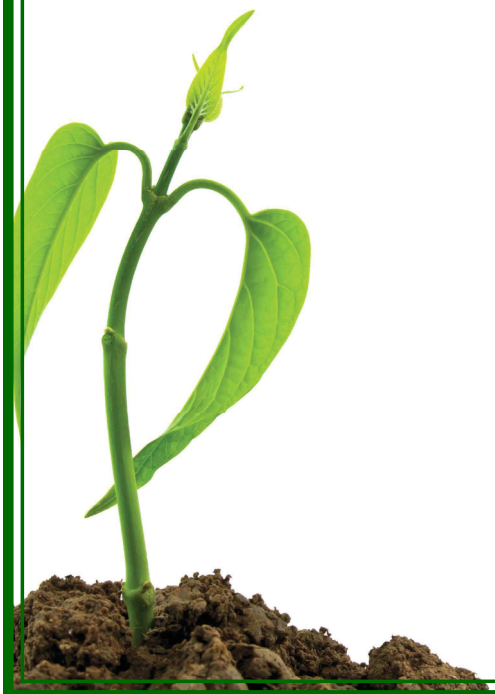

Venue

DoubleTree by Hilton Baltimore - BWI Airport
890 Elkridge Landing Rd
Linthicum Heights
MD 21090, USA

The Germplasm Resources and Utilization Status of Crataegus Plants in China

Dong Wenxuan
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Transcription Factor SmWRKY1 Positively Promotes the Biosynthesis of Tanshinones in Salvia miltiorrhiza

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Abstract

Tanshinones, one group of bioactive diterpenes, were widely used in the treatment of cardiovascular diseases. WRKYs play important roles in plant metabolism, but their regulation mechanism in *Salvia miltiorrhiza* remains elusive. In this study, one *WRKY* transcription factor *SmWRKY1* was isolated and functionally characterized from *S. miltiorrhiza*. Multiple sequence alignment and phylogenetic tree analysis showed SmWRKY1 shared high homology with other plant WRKYs such as CrWRKY1. *SmWRKY1* was found predominantly expressed in leaves and stems, and was responsive to salicylic acid (SA), methyl jasmonate (MeJA), and nitric oxide (NO) treatment. Subcellular localization analysis found that SmWRKY1 was localized in the nucleus. Over-expression of *SmWRKY1* significantly elevated the transcripts of genes coding for enzymes in the MEP pathway especially 1-deoxy-D-xylulose-5-phosphate synthase (*SmDXS*) and 1-deoxy-D-xylulose-5-phosphate reductoisomerase (*SmDXR*), resulted in over fivefold increase in tanshinones production in transgenic lines (up to 13.7 mg/g DW) compared with the control lines. A dual-luciferase (Dual-LUC) assay showed that SmWRKY1 can positively regulate *SmDXR* expression by binding to its promoter. Our work revealed that SmWRKY1 participated in the regulation of tanshinones biosynthesis and acted as a positive regulator through activating *SmDXR* in the MEP pathway, thus provided a new insight to further explore the regulation mechanism of tanshinones biosynthesis.

Biography

Guoyin Kai, Male, Philosophy Doctor (Ph.D.), now is a professor of plant biotechnology, head of Lab of Medicinal Plant Biotechnology in Zhejiang Chinese Medical University. He got his B Sc in biology education M Sc in crop breeding, Specialist in biochemistry and molecular biology, Philosophy Doctor's degree (Ph.D.) at Shanghai Jiaotong University, China. From 2012-2013, he worked in USA as a visiting scientist. Currently Dr. Guoyin Kai' researches focus on the plant metabolic engineering and TCM resource biotechnology. Studies on the mechanisms of biosynthesis and regulation of active compounds in medicinal plants. Now he has published more than 100 papers and applied more than 30 Chinese patents.

Effect of Flavonoids on Mycorrhizal Synthesis between Arbutus unedo L. In Vitro Plants and Tuber borchii or Lactarius deliciosus

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Abstract

Arbutus unedo L. is a Mediterranean species drought tolerant and fire resistant due to its low-level of combustibility and regeneration ability following fire occurrence. Fruits can be processed or consumed as fresh fruit. Adult plants were selected and micropropagated. New orchards were established considering the higher production of clones compared to seedlings. Mycorrhizal fungi as *Tuber borchii* or *Lactarius deliciosus* can produce edible mushrooms increasing the landowners's yield. Quercetin, among flavonoids, is known by stimulate the mycorrhization.

The objective of this study was to evaluate the effect of quercetin addition on mycorrhization. Two clones were tested during the *ex vitro* rooting. As mycorrhizal fungi a vegetative inoculum of *Lactarius deliciosus* and spores of *Tuber borchii* were used. Five quercetin levels (0.5 – 10μM) were tested after the addition to different media for inoculation (Knop medium compared to water distilled and sterilized). Perlite was used as substrate for inoculation. Six months after inoculation, plants were transferred to field containers and roots were analyzed.

When quercetin was added, a higher level of mycorrhizae establishment was observed compared to control. The mycorrhization level for both fungi was dependent of genotype, quercetin level and media culture (P<5%). Clones showed different response to quercetin level and inoculation media. However, similar genotype response was observed for both fungi tested. The highest level of quercetin showed a toxic effect. Roots were examined before field trial establishment, which intends to confirm long term persistence of mycorrhizae and to evaluate the fungal colonization level required to guarantee mushroom production.

Biography

Filomena Gomes is a lecturer at the Coimbra, Graduate in Forestry with Master and PhD in Plant Biology. Professional career began as a teacher of Soils and Fertility (1982-85). From 1985 to 1995 worked in tree breeding and plant propagation at Portucel Florestal. Since 1995, at ESAC as a teacher in the Forestry Department. Since 2005 has been working on plant breeding of Arbutus and Chestnut. Since 2012 has been collaborating in R&D European projects (ProDeR, FCT, PDR2020), with several partners, to improve vegetal material and cultural practices, collaborating with Research & Development Entities, Associations and Forest Producers.

21st Century Challenges to Food Security: An Attempt to Increase Crop Production through Transgenic and Genome Edited Approaches

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Abstract

The present status of global food security is alarming! The ever-increasing population coupled with various biotic and abiotic stresses brings toughest challenges and threatened for food production and sustainable agriculture. Recent development of molecular tools for precision gene manipulation for trait improvement is very much encouraging and has already been moved from laboratory curiosity to providing new varieties. Our strategies were to manipulate few key genes of interest to control notorious biotic stress weed as well as generate high yielding variety to meet the predicated food demand by 21st century. We have successfully introduced multiple distinct point mutations in the native copy of *OsALS* and *OsEPSPS* gene (major target for important herbicides) through homologous recombination using CRISPR/Cas9 platform. Alternate herbicide management is also important for minimum impact on the environment. Previously in our lab we separately generated over expressed mutated *OsEPSPS* dm and *PsPtXD Japonica* and *Indica* lines. Afterward, we have developed an *OsEPSPS* dm X *PsPtXD* japonica hybrid model for further evaluation of combined herbicidal effect of Glyphosate and Phosphite along with multi-utility effect of phosphite on crop management system.