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The Blood orange and the Cara cara orange are special cultivars of navel orange that are distinguished by their color derived from the expression of anthocyanins and lycopene in the ripening fruit. They are superior to other navel orange varieties in flavor, taste, health benefits and are often in high demand when they are in season. Despite increasing consumer interest, production of these citrus varieties remains unreliable due largely to a dependency on cold for full color formation. We propose to generate Blood and cara cara cultivars via genetic engineering by targeting anthocyanin and lycopene metabolic pathways using fruit specific promoters from citrus and tomato. Constitutive promoters may be suitable for proof of concept experiments, but have potential disadvantages for use in crop breeding. Fruit specific promoters which enable precise manipulation of gene expression and metabolic pathways are fundamental for engineering fruit cultivars and improve fruit quality. We have identified 3 candidate citrus fruit-specific promoters using bioinformatics tools and citrus gene expression data. The candidate promoters should express in orange fruit, but should exhibit little or no expression in vegetative tissues. The promoters of the selected candidate genes have been identified using the available citrus genome sequences and a 1.5-kb upstream sequence has been PCR amplified and cloned. These candidate promoters have been fused to the GUSPlus reporter gene in a binary vector to test their activity in tomato and citrus fruits. The promoter strength and expression specificity is currently being tested in tomato fruit using a transient expression assay and stably in transformed Micro-Tom tomato plants. The required enzymes necessary for anthocyanin and lycopene production are well characterized. MybA transcriptional activation gene has been shown to up-regulate the expression of anthocyanin biosynthetic genes in many species, including citrus and lycopene production requires a minimal metabolic pathway of three genes for most plants. With the existing citrus candidate promoters and lycopene/anthocyanin genes in our hand, the proposed research will be useful for generating oranges that accumulate anthocyanin or lycopene or for modifying other citrus fruit quality traits.

P-1010

Genetic Instability of Long-term Micropropagated Mature Pistachio. H. AKDEMIR1, V. Suzer1, E. Tilkat2, A. Onay3, and Y. Ozden Çiftci1. 1Gebeze Institute of Technology Faculty of Science, Department of Molecular Biology and Genetics, Gebze Institute of Technology, Moleküler Biyoloji Ve Genetik Bölümü, Çayırova, Kocaeli 41400, TURKEY; 2Batman-Turkey; and 3Dicle University, Faculty of Science, Department of Biology, Diyarbakır 21280, TURKEY. Email: pinarakdemir@gmail.com

Determination of genetic stability of micropropagated plants provides information about the applicability of the developed technique for mass propagation of mature pistachio trees. A non-destructive assay for hydroxyl radicals, using DMSO as a radical trap, was used to determine hydroxyl radical formation during tissue culture. The result showed that shoot tips excised from mature pistachio buds were subjected to oxidative stress especially in the beginning of culture period. We investigated genetic stability of long-term (5-7 years) micropropagated plantlets, via apical bud proliferation followed by organogenesis using RAPD, ISSR and AFLP markers to obtain possible effects of the oxidative stress or other tissue culture induced stresses. Each molecular marker system showed genetic polymorphism between donor plant and its clones. 15 RAPD primers produced 141 scorable fragments and PIC value of the primers was 0.226. Average genetic similarity values was determined as 0.84. 7 ISSR primers produced 62 scorable fragments and PIC value of the primers was 0.220. Average of genetic similarity values was determined as 0.82. In case of AFLP marker, totally 789 scorable bands were produced by 10 AFLP primer pairs and PIC value of the primers was 0.241. Genetic similarity value of the donor plant and its clones varied from 0.57 and 0.90 and the average genetic similarity values was 0.75. Our results showed that applied marker systems are useful to reveal out specific genomic alterations associated with tissue culture variation. In conclusion, this is the first study on occurrence of genetic instability, which is slightly informative (PIC.

P-1011

Overexpression of a Soybean Salicylic Acid Methyltransferase Gene Confers Resistance to Soybean Cyst Nematode. J. LIN1, M. Mazarei1, N. Zhao2, M. Rudis1, V. Pantalone1, P. Arelli3, F. Chen1, and C. N. Stewart1. 1Department of Plant Sciences, University of Tennessee, Knoxville, TN 37996; 2Biosciences Division, Oak Ridge National Laboratory, Biosciences Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831; and 3USDA-ARS-MSA, 605 Airways Blvd., Jackson, TN. Email: jlin11@utk.edu

A salicylic acid methyl transferase gene (GmSAMT1) was identified from soybean as a candidate soybean cyst nematode (Heterodera glycines Ichinohe, SCN) defense-related gene in our previous analysis using GeneChip microarray experiments. Using in vitro enzyme assay, the Escherichia coli