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Quantitation of Total Oil Contents, Proteins and Fatty Acids Composition in Fruits of *Pistacia* Species and Their Hybrids Growing in Turkey. V. SÜZERER1, A. Onay2, V. Kızılmaz2, N. Çalar2, A. A. Uncuoglu2, A. Boukelou2, F. Işıkçı2, E. Tılık2, Y. O. Çiftçi2, O. F. Akdemir2, F. M. Kulaç2, and Y. Ersah2. Department of Medical Services and Techniques, the University of Bingöl, 12000 Bingöl, TURKEY; 2Department of Biology, Faculty of Science, the University of Dicle, 21280, Diyarbakır, TURKEY; 3Department of Biology, Faculty of Science, the University of Istanbul, TURKEY; 4Department of Bioengineering, Faculty of Engineering, the University of Marmara, 34722, Istanbul, TURKEY; 5Pistachio Research Institute, Sahnibey 27001, Gaziantep, TURKEY; 6Department of Biology, Faculty of Science and Literature, the University of Batman, Batman, TURKEY; and 7Department of Molecular Biology and Genetics, Faculty of Science, the Geybe Institute of Technology, 41400 Geybe, Kocaeli, TURKEY. Email: beyso1985@gmail.com

Several studies have been reported on the chemical compositions of the different pistachio species, but so far there is no report on the chemical composition of the hybrid *Pistacia* genotypes. This study focuses on assessment of protein yields, oil yields and fatty acid compositions in the mature fruits of 4 *Pistacia* species (*P. vera* L., *P. terebinthus* L., *P. atlantica* Desf. and *P. kibinjak* Stocks) and their 8 hybrid genotypes grown in Pistachio Research Station in Gaziantep, Turkey. Fruit oils were extracted by using chloroform/methanol (2:1). FAMEs of the fruit oils were analyzed by GC and protein content was determined by Kjeldal method. The oil content of the hybrids varied in a relatively high range between 15.93% and 30.23%. Thirteen fatty acid components representing about 99% of the total oils were characterized. Oleic acid, which accounted for 46.66 to 68.75% of the total fatty acids, was the sole fatty acid component in all genotypes studied. Oleic acid (C18:1), linoleic acid (C18:2) and palmitic acid (C16:0) were the main fatty acid components in both *Pistacia* species and their hybrid genotypes. Regarding of the total oil and protein contents of the fruits from *Pistacia* species and their hybrids, there have been significant differences between cultivars. The total content of protein compound in the fruits ranged between 35.21% and 19.62%. Other fatty acids such as myristic, pentadecanoic, palmitoleic and stearic acid were present only in trace proportions. This research is a part of our investigations on exploiting fatty acids and bioactive other natural products with the prospects for the utilization of them in industrial applications.

*Pistacia lentiscus* L. is an evergreen tree which belongs to the Anacardiaceae family. The different part of the lentisk such as fruits, galls, resin and leaves are utilized as folk medicine since the ancient Greeks. Based on this ethno pharmacological knowledge, in the 20th century several studies were published on the utilization of primary and secondary products of lentisk i.e. in the perfumery, food and especially pharmaceutical industries. The aim of this study was to show the production of anticancer phenolic compounds in the extracts of the leaf samples grown in vitro, and compare them with the results reported from in vivo grown samples. In vitro stock cultures initiated from the seeds of one genotype containing highest phenolic content grown in vivo were proliferated in the MS media containing different cytokinins (BA, Kn, TDZ, MeJA, each at 1 mg/l) and 1.0 mg/l BA + 0.2 mg/l MeJA and 1.0 mg/l BA + 10 mg/l the seed oil extracted from *P. lentiscus* seeds. The phenolic and flavonoid compositions of the ethanol extracts were determined by liquid chromatography triple quadrupole mass spectrometry (LC-MS / MS). Although phenolic compounds obtained from the leaves of male and female genotypes grown in their natural environment vary quantitatively, there was no significant difference in main components. Among the 27 compounds studied, quinic, malic, gallic and
tannic acids, hesperidin, rutin, hyperoside and kaempferol were found to be the most abundant compounds in both in vivo and in vitro grown leaves of lentisk. The high content of flavonoids and phenolic acids determined in the MS medium supplemented with 1 mg/l BA + 10 ml gum arabic oil shows that the in vivo production of the anticancer compounds were positively influenced by the applied treatment.

P.3011
Micropropagation of Mature Khinjuk Pistachio, Pistacia khinjuk Stocks. Y. Ersah1, V. SUZERER1, E. Tilkici2, A. Onay2, A. A. Uçagızlı1, Y. O. Çifçi2, F. M. Kılıç2 and H.C. Ozen1. 1Department of Medical Services and Techniques, the University of Bingöl, 12000 Bingöl, TURKEY; 2Department of Biology, Faculty of Science and Literature, the University of Batman, Batman, TURKEY; 3Department of Biology, Faculty of Science, the University of Dicle, 21280 Diyarbakır, TURKEY; 4Department of Bioengineering, Faculty of Engineering, the University of Marmara, 34722, Istanbul, TURKEY; and 5Department of Molecular Biology and Genetics, Faculty of Science, Gazi University of Technology, 41400 Kocaeli, TURKEY. Email: beyso1985@gmail.com

A protocol was described for the micropropagation of khinjuk pistachio (Pistacia khinjuk Stocks) apical tips and lateral buds explanted from mature trees. Decontamination was best achieved when the apical buds were surface-sterilized by immersion in an aqueous solution of 10% sodium hypochlorite for 10 minutes. The influences of different cytokinins such as kin, ZP, BA, TDZ and growth medium such as MS, SH and WPM for in vitro culture initiation and shoot proliferation were investigated. To optimize further the proliferation stage, 2 mg/l BA was used in combination with three auxins such as IAA, IBA and NAA at different concentrations (0.1, 0.3 and mg/l). The best response for shoot proliferation was obtained from the explants cultured in the MS medium supplemented with 2 mg/l BA and 0.1 mg/l IBA with a shoot number of 2.55 per explant. For the rooting, different auxins such as IBA, NAA, IAA and 2,4-D each at 1 mg/l were investigated. The rooting experiments have revealed that the auxin NAA has superior rooting rate (94%) than the other auxins tested. The in vitro regenerated plants of mature khinjuk pistachio were successfully acclimatized under in vitro conditions, with a 60% survival rate when they were treated with a gradually decreasing humidity. Among mother plantlets and their regenerants for two of the clones tested, a similarity ratio in the range of 0.838-0.749 indicated the presence of polymorphism within the clones studied.

CELL BIOLOGY
P.3012
Development of a Simple High-throughput Bioassay Method for Allelopathy: Protoplast Co-culture with Image Analysis. H. SASAMOTO1, T. Murashige2, E. Tanaka3, T. Sato3, A. Hasegawa3, N. Wasano4, and Y. Fujii1. 1Kanagawa University, Research Institute for Integrated Science, Hiratsuka, Kanagawa 259-1293, JAPAN; 2Yokohama National University, Faculty of Environment and Information Sciences, Yokohama 240-8501, JAPAN; and 3Tokyo University of Agriculture and Technology, Faculty of Agriculture, Tokyo 183-8509, JAPAN. Email: sasamoto@ynu.ac.jp

"Protoplasts Co-culture Method" was developed to study allelopathic activities of plants using tissues and their cultured cells. The response of cultured protoplasts could be expressed as numbers of enlarged, divided protoplasts, in a 50 μL of liquid medium in a well of a 96-well culture plate. The results were in agreement with those obtained by the conventional in vitro bioassay method and field tests. Our studies offer an in vitro assay method, which can be used to study allelopathy between various test plants and recipient plants and quantitative evaluations are possible under different culture conditions in order to simulate the possible future environmental risk. In this report, for example, inhibitory effects of protoplasts of a leguminous plant, Vicia villosa (hairy vetch), on the growth of recipient lettuce protoplasts were determined in a Murashige and Skoog's medium containing 2,4-dichlorophenoxyacetic acid and benzylationrine, sucrose and mannitol. Protoplasts densities varied from 6 × 10³ to 6 × 10⁵ / mL. Strong inhibitory activities were found in protoplasts from epicotyl and roots of etiolated V. villosa seedlings. We also found an accumulation of a yellow color after cell enlargement and divisions of lettuce protoplasts. After scanning of 96-well culture plates, the yellow color of each well was quantified by the ImageJ analysis. The results were consistent with those of