



## Evaluation of Proline, Proteins and Sugar during Phonological Processes of Flower Buds of Commercial Pistachio Cultivars

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### Abstract

The present research was done to evaluate proline, proteins and sugars of flower buds of pistachio trees during phonological stages. This study was conducted using a split-plot design with three replications considered time as main factor (5 Stages) and cultivars (Ahmad-aghaee, Ouhadi, Kaleh-ghochi and Akbari) as secondary factor. The experiment was conducted at Ferdowsi University of Mashhad and Institute of Pistachio Research of Iran (PRI). The Studied Variables included proline, soluble sugars and total protein which were assessed during rest (winter), flowering (beginning of spring) and after spring frost. The highest (27.36 mili mol/gram weight of fresh flower bud) and lowest (7.86 mili mol/gram weight of fresh flower bud) rates of proline were found in Ahmad-aghaee after chilling injury and bud swelling, respectively. The highest rate of total protein was shown by Akbari (70.79%) and Ouhadi (71.25%) at flower burst, and the lowest amount was obtained at bud swelling of Ouhadi (25.39%). Results indicated that sugars accumulated during winter and reduced by beginning of spring. Amount of proline increased during flowering and after spring frost. overall proteins were fixed and low after falling leaves (autumn) to bud dormancy (winter), but its amounts increased after bud dormancy till after flowering and spring frost

**Keywords:** Cold resistance, Spring frost, Late autumn frost

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## Interaction of Cut Flowers on Post Harvest Characteristics of each other in Vase Solution

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### Abstract

Reduction of post harvest losses in cut flowers and increasing their vase life, with consideration to high expenses of production is very necessary. One of the effective factors is presence of flowers near each other. This study was performed to investigate the interaction of some important cut flowers on their post harvest characteristics in vase solution (in combination or alone) in 2007- 2008 at post harvest physiology lab of horticulture department of Ferdowsi University of Mashhad. In the first experiment the effects of gerbera and tuberose and in the second one the effects of daffodil, carnation and gillyflower on their post-harvest characteristics were investigated. Results of the first experiment showed that the presence of tuberose and gerbera in a vase solution caused significant reduction of gerbera vase life, but the effect of this factor is not significant on other gerbera characteristics. In addition the effect of gerbera on tuberose was caused significant reduction on tuberose fresh weight. Results of the second experiment showed that presence of gillyflowers near daffodils was caused significant reduction of daffodils vase life but the other flowers have not any effect on their vase lives. In the first day, the diameter of carnations flower was also reduced significantly when they were near daffodils in one vase solution. Treatments had not significant effects on fresh weight train. Vase solution turbidity was higher for those vases for two flowers than one flower. But this difference was significant only about the vase solution of daffodil + carnation. The highest solution pH was observed in the solution of daffodil and carnation alone and they had significant difference with the others.

**Keywords:** Post-harvest, Cut flower, Gerbera, Tuberose, Daffodil, Carnation, Gillyflower, Vase solution

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## Effects of Potassium Permanganate and Storage Time on Quality of Mango Fruits (*Mangifera indica* L.)

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### Abstract

The effect of different levels of potassium permanganate ( $\text{KMnO}_4$ ) on quality of mango fruits were studied over a period of 21 days. A factorial trial in the form of complete randomized design as three levels of  $\text{KMnO}_4$  (0, 5 or 10 g.  $\text{kg}^{-1}$  fruit) and three time period (7, 14 or 21 days) was used. Means were compared using Duncan's test ( $P \leq 0.05$ ). Compositional parameters (pH, acidity, total soluble solids, density, ascorbic acid and phenolics in pulp and skin) were measured during storage time. Results showed that after application of the highest level of  $\text{KMnO}_4$  (10 g.  $\text{kg}^{-1}$  fruit), treated fruits had significantly higher acidity after 7 days. Fruits that treated with 10 g of  $\text{KMnO}_4$  had significantly higher phenolics in pulp after 7 days, but phenolics decreased significantly over control after 21 days. Phenolic compounds in fruit skin significantly ( $P < 0.05$ ) remained in high level in fruits treated with the highest level of  $\text{KMnO}_4$  (10 g.  $\text{kg}^{-1}$  fruit) after 7 and 14 days. There were no significant differences in decay of mango fruits between all treatments in comparison with control after 14 days, but application of  $\text{KMnO}_4$  (10 g.  $\text{kg}^{-1}$  fruit) significantly increased fruit decay after 21 days. Application of  $\text{KMnO}_4$  had no significant effects on ascorbic acid or gravity.

**Keywords:** Fruit, Mango (*Mangifera indica* L.), Quality, Potassium Permanganate ( $\text{KMnO}_4$ ), Storage

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## Effects of Growth Regulators on in vitro Micropropagation of two Commercial Varieties of *Anthurium andraeanum*

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### Abstract

This experiment was conducted for optimizing a suitable medium for callus induction, regeneration and rooting of *Anthurium*. leaf and petiol explants of Antadra and Casino varieties were used for callus production. MS medium was supplied with growth regulators (NAA, BA, Kin and IBA). A complete randomized design with 3 replication was used in this experiment. Result indicates that varieties and growth regulators were significantly affected on callus production. The highest amount of callus was produced in C5 medium (3 mg/lit BA and 0.5 mg/lit NAA) in dark condition. The highest number of shoots were obtained from callus in Re2 medium (Ms BA 1 mg/l and NAA 0.01 mg/l) in light condition. After 8 weeks of inoculation, about 22.83 plantlets per cm<sup>2</sup> of callus were obtained. The best rooting medium (Ro2) was contained 1 mg/l IBA and 0.2 mg/l Kin which produced 11.5 roots per plantlet. Antadra cultivar was better than Casino for callus and shoot production, but casino cultivar showed better rooting than the.

**Keywords:** *Anthurium andraeanum*, Callus, Regeneration, Rooting, Tissue culture

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## The Changes of Antioxidant Capacity and Post Harvest Quality of Thompson navel and Blood Orange Fruits during Storage

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### Abstract

Antioxidant capacity and quality of fruits usually changed during storage. In the current study, the changes of antioxidant capacity and postharvest quality of two blood (pigmented) orange cultivars ('Tarocco' and 'Morro') and 'Thompson navel' orange, after 60 days storage at 7°C and 90 RH% was investigated. During fruit storage weight loss, TSS, TA, TSS/TA, vitamin C, total phenol, anthocyanins and also juice antioxidant capacity by DPPH scavenging activity test were determined. Fruit weight loss in blood oranges was more than 'Thompson navel' orange and increased gradually during cold storage. Fruit TSS declined in blood orange significantly but was constant in 'Thompson navel' orange. In contrast, TA decreased the most in 'Thompson navel' orange. Vitamin C slightly increased during storage time but total phenolics increased only in 'Tarocco'. The results showed that antioxidant capacity in oranges fruits decreased with storage time and 'Morro' fruits with the anthocyanin synthesis and accumulation during postharvest time had shown the highest antioxidant capacity. Finally, the results showed that quality of oranges decrease during long term storage except to blood orange that increase antocyanin and phenolic contents.

**Keywords:** Blood oranges; Anthocyanins; Total phenolics, Antioxidant capacity

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## Use of Somaclonal Variation on Improvement of drought Resistant Lines of Carrot (*Daucus carota* L.)

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### Abstract

In order to study the effect of using somaclonal variation on production of resistant lines to water deficit conditions on carrot (*Daucus carota* L.), an experiment was carried out in department of biotechnology of All Russian Research Institute of Vegetable Crops (RAAS) in 2008-2009. Coated seeds of four carrot cultivars which are cultivated in Iran including, Monarch, Nantes Improved, Tam Tam and Vilmorn were collected and germinated to produce hypocotyl segments. Sterilization of hypocotyles were carried out using ethanol 70% for 30 seconds and hypochlorite solution 1% for 10 minutes. Explants were placed on medium containing 2,4-D in concentration of 0.2 mg/l for callus production. For cell selection on resistance to drought, Polyethylene glycol (in concentrations of 0, 5, 10, 15, 20, 25 percent) were used. Nitrosoethylurea as a supermutagen was used to increase the rate of somaclonal variation in concentrations of 0, 0.5, 2 and 8 mM. Results showed that callus growth and regeneration ability were considerably decreased as the concentration of selective agents increased. In the level of 20% and 25% of PEG no seedling was regenerated and in concentration of 8 mM of mutagen, almost all of the calli died. Results of peroxidase activity analysis and water retention content showed that the lines regenerated from media supplemented with high concentrations of polyethylene glycol that were expected to be resistant lines, had significantly higher amounts of peroxidase activity and water retention capability than the lines regenerated from lower levels.

**Keywords:** Carrot, Polyethylene glycol, Somaclonal variation

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## Evaluation the Effects of Cycle Irrigation and Super Absorbent on Qualitative Characteristics of Lawn

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### Abstract

Water deficit and consecutive droughts have lead to drought stress in most parts of the world recently. We need prepare a good program to use better available water. Different material can be used to increase water use efficiency. Super absorbent is one of the materials used around the world. These materials absorb water in the soil so that reserved water is usable by plant in the time of drought stress and they can reduce stress and lead to prevent yield loss. So that an experiment was conducted to evaluate effects of different super absorbent and irrigation cycles on lawn. A split plot experiment based on randomized block design with three replication was used so that irrigation cycles and super absorbent amounts used as main plots and subplots respectively. 4 irrigation periods (1, 2, 4 and 6 days) and 4 super absorbent amounts (0, 20, 25 and 30 g/m<sup>2</sup>) were used as experimental treatments. One day irrigation interval and zero super absorbent amounts were used as control. Lawn water requirement calculate by evaporation from a pan class A. Results shown that super absorbent amount had significant effect at 1% and 5% level on shoot height, total chlorophyll and plant density but had significant effect on root fresh and dry weight, shoot fresh and dry weight, root developing. Rigidity, Elasticity and performance quality was higher for 30 g/m<sup>2</sup> of super absorbent amount at one and two day's irrigation cycle interval in compare to other treatments. Experiment results showed that lawn performance was higher in 30 g/m<sup>2</sup> of super absorbent amount at two days irrigation cycle than the others and had 50% water saving in compare to one day irrigation interval.

**Keywords:** Irrigation cycle, Lawn, Qualitative characteristics, Super absorbents

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## Effect of Different K:Ca Ratios on Yield and Quality of Galia (*Cucumis melo* var. *reticulatus* L. Naud. cv. Galia) Grown in Hydroponics

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### Abstract

Supplement of optimum concentration nutrients such as K and Ca in soil less culture seems to have a remarkable effect on the yield and quality of fruity crops. An experiment was conducted to find out the effect of different K:Ca ratios on the growth, yield and quality in Galia (*Cucumis melo* var. *reticulatus* L. Naud. cv. Galia) grown in hydroponics. The experiment was arranged in the completely randomized design with three replicates. The seeds of melon were sown in the media containing perlite and vermiculate (3:1 V:V) with different K:Ca ratios (1.5, 2, 2.5, 3, 3.5, 4). The fruits were harvested in the physiological ripened stage and their quality and quantity attributes were measured. The fresh weight of fruits were determined and brushed in a hot water rinse at 59 °C for 15 s and then they were stored at 5-6 °C for 14 days and an additional 5 days at 20 °C then quality characteristic were measured. The results showed that the yield of melon was significantly affected by various K:Ca ratios, so that the highest and lowest yield was observed in K:Ca ratio 3 and 4, respectively. The firmness was significantly affected by various K:Ca ratios, so that with increasing K:Ca ratios the firmness of fruit was decreased. Calcium concentration in fruits and leaves were significantly reduced with increasing K:Ca ratios. It can be concluded that K:Ca 3 improved the yield and quality of galia, therefore adjustment of K:Ca=3 in the nutrient solution seems to be crucial to obtain the highest yield and quality

**Keywords:** Potassium, Galia melon, Yield, Calcium, Quality

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## Effects of drought Stress Induced by Polyethylene Glycol on Germination and Morphophysiological Characteristics of Dill (*Anethum graveolens* L.)

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### Abstract

In order to study the effect of different water potential on *Anethum graveolens* two experiments were conducted for germination and vegetative stages. This study was carried out as a factorial experiment based on completely randomized design with three replications. In the first experiment, response of dill seeds germination to levels of drought stress including to drought potentials zero(control), -1.5, -2, -2.5 and -3 bar that were obtained by polyethylene glycol 6000 were investigated. In the second experiment, similar to first, influence of drought stress on dill morphophysiological parameters were investigated. The results showed that effect of drought stress on germination characteristics including to germination percentage, germination rate, radicle and plumule length, radicle and plumule dry weight, plumule to radicle dry weight ratio was significant ( $p \leq 0.01$ ). Mean comparison of treatments showed that with increasing drought stress, all parameters decreased. Effect of drought stress on amount of proline and soluble carbohydrates in shoot and root was significant ( $p \leq 0.01$ ). Mean comparison of treatments showed that with increasing stress, amount of proline and soluble carbohydrates in shoot and root, shoot to root proline and soluble carbohydrates ratio increased. Shoot to root proline and soluble carbohydrates ratio were not influenced by drought stress ( $p \leq 0.05$ ).

**Keywords:** PEG, Morphological parameters, Proline, Soluble carbohydrate

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## Effect of Plant Density and Shoot Pruning on Fruit Quality Characteristics of two Cultivars of Sweet Pepper

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### Abstract

To study the effect of plant density (2.5, 3, 3.5 plant. m<sup>-2</sup>) and shoot pruning (no pruning, plant with 3 main stems) on fruit quality characteristics of two sweet pepper cultivars "Tomson" and "Maratos", a factorial experiment was done in randomized complete block design with 3 replication in greenhouse. The results showed that pruning had significant effect on fruit weight, fruit length, fruit diameter, fruit pericarp thickness and vitamin C. Plant density also had a significant effect on fruit weight. The fruit weight decreased as the plant density increased and was highest in 2.5 plants per m<sup>-2</sup> density. In this experiment pruning increased fruit weight, fruit length, fruit diameter, fruit pericarp thickness, and vitamin C and fruit quality was higher in pruning treatment than in no pruning treatment. pH and total soluble solids were not affected by shoot pruning and plant density. Harvest date had a significant effect on vitamin C, total soluble solid, pH. Vitamin C and total soluble solid were the highest in the third harvest.

**Keywords:** Capsicum annum, Pruning, Density, Fruit quality, Vitamin C

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## Study the Effects of Irrigation Regimes on Physiological Traits, Yield and Water Use Efficiency of Potato (*Solanum tuberosum* L.) in Mashhad Weather Condition

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### Abstract

In order to Study the effects of irrigation regimes on physiological traits, yield and water use efficiency of potato (*Solanum tuberosum* L.) in Mashhad weather condition, an experiment was conducted in 2009 at research field of the College of Agriculture, Ferdowsi University of Mashhad, using factorial experiment based on randomized complete blocks design with 3 replications. Experimental factors were 3 irrigation regimes including: I<sub>1</sub>: provided with 100% of water requirement of potato, I<sub>2</sub>: provided with 70% of water requirement of potato applied before tuber initiation and I<sub>3</sub>: provided with 70% of water requirement applied at all growth period of potato as first factors and 3 potato cultivars (Agria, Almera and Sinora) as second factors. The results indicated that about physiological traits when provided with 100% water requirement of potato the highest of relative water content, quantum efficiency of photosystem II, leaf area index and canopy height related to this irrigation regime. Even though with reduce in irrigation volume because of decreasing in LAI, the SPAD index in some cases was higher. Also in all irrigation regimes total tuber yield of Agria cultivar was better than to others. Considering to the calculation of water use efficiency with 30% decreasing in irrigation volume before tuber initiation, Agria had the highest WUE in provided with 70% water requirement. Finally, it seems that with decreasing in irrigation volume at Mashhad weather condition, Agria had the best growth and more acceptable yield compared to other genotypes.

**Keywords:** Potato, Irrigation regimes, Cultivar, Water Use Efficiency

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## Evaluation of Physicochemical Properties and Antioxidant Activity of the Peel of Different Commercial Citrus Species

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### Abstract

In this study, the physicochemical quality and antioxidant activities of fruits peel from 6 citrus varieties which commonly consumed in the North of Iran were determined. Some parameters were measurement such fruit size, peel thickness, residue percentage, peel color indices, total phenolics, total flavonoid, total anthocyanins, total carotenoids, total chlorophyll, ascorbic acid content and antioxidant capacity by DPPH<sup>•</sup> assay and ABTS<sup>•+</sup> scavenging activity. Results showed that there were a positive relationship between fruit size, peel thickness and residue percentage. Thamson variety was largest among all varieties. Generally, all varieties had standard peel color at harvesting time. The total content of phenolic was superior in peel of 'Siavaraz' (0.49 mg/ml) and 'Page' (0.43 mg/g) varieties. The peel of 'Moro' with 7.68 mg/g and 13.29 mg/l had highest total flavonoid and anthocyanin respectively. The highest of total carotenoid and chlorophyll accumulation with 0.84 and 3.5 mg/ml were observed in 'Tarocco'. Perfectly, peel carotenoid concentration ranged from 0.12 to 0.84 and also from 0.87 to 3.5 mg/g to total chlorophyll. The quantity of ascorbic acid content ranged from 18.17 (Siavaraz) to 23.56 mg/100g FW (Thamson). Also, results showed 'Sanguinello' peel had the lowest IC<sub>50</sub> values (0.2 mg) of DPPH radical scavenging activities. Base of AE results, significant differences only observed between 'Sanguinello' and other varieties. According to the ABTS assay, the antioxidant activity was at least 68.58% in 'page' variety. Finally, this peel of citrus varieties possessed relatively high antioxidant activity and might be rich sources of natural antioxidants.

**Keywords:** Citrus, Peel, Color, Antioxidant activity, Carotenoid, Flavonoid, Ascorbic acid

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## Investigation of Vegetative and Reproductive Traits and Their Correlation in Progeny Obtained from Crossing between Cultivars Touno and Shahrood 12 of Almond

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### Abstract

Almond is an important nut tree which is cultivated in many Mediterranean countries. This study was carried out to study some vegetative and reproductive traits as well as qualitative and quantitative characteristics and their correlation in some self-compatible and self-incompatible genotypes obtained from crossing between Touno (male parent) and Shahrood 12 (female parent). Quantitative traits were analyzed in Completely Randomized Design (CRD), with 12 replication using SAS program. The mean was separated by Duncan Multiple Range test. The results showed that genotypes together were significant difference in all traits measured except Double kernels percentage. The results showed that genotypes No. 6 and 23 are very late blooming and self-compatible with had medium size and moderate quality fruits. However, genotypes No. 15 and 24 were classified as late to very late blooming and self-compatible. They produced large size and good quality fruit. The results correlation between traits showed that kernel weight had significant positive correlation with nut weight and fruit weight. In-shell/kernel ratio had also significant positive correlation with shell softness and suture opening of the shell. Kernel taste had significant correlation with kernel to shell ratio, percentage of empty seeds, color intensity of kernel and smoothness of kernel. Therefore, the smoother, clearer and low percentage of empty seeds resulted in sweet and good quality kernel.

**Keywords:** Almond, Vegetative and generative traits, Correlation

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## The Effects of Different Rates of N, Mn and Zn on Yield and Quality of Pomegranate Fruit in Mazandaran Province

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### Abstract

To study the effects of different levels of N, Mn and Zn on yield and quality of pomegranate fruit a factorial experiment based on complete randomized block design with 18 treatments and three replications was conducted in Behshahr city, Mazandaran province, in 2009. Investigated treatments were include: Nitrogen, Manganese, Zinc. Fertilizer source for nitrogen was urea and three rates (0, 544 and 1088 g/tree) of this fertilizer were used in this experiment. Mn and Zn microelements used as MnSO<sub>4</sub> and ZnSO<sub>4</sub> and the levels of these fertilizers were 0, 100 and 200 g/tree and 0 and 150 g/tree respectively. Fertilizers containing Mn and Zn micronutrients were applied to soil before bud break in winter but urea used in three split applications. The parameters measured in this experiment were fruit yield, acidity of fruit juice and ratio of flesh to fruit juice.

The results of analysis of variance (ANOVA) of data showed that the effects of nitrogen were significant on fruit yield, acidity of fruit juice and ratio of flesh to fruit juice. But the measured traits (except the ratio of flesh to fruit juice) were not affected by the soil application of MnSO<sub>4</sub>. The effects of Zn were also significant on fruit yield, and acidity of fruit juice. The highest fruit yield (53.93 kg/tree) was obtained from the application of 1088g urea/tree. The highest ratio of flesh to fruit juice (1.3) was measured when 200g MnSO<sub>4</sub> was used for each tree.

**Keywords:** *Punica granatum*, Urea, Manganese sulfate, Zinc sulfate, Yield and fruit quality

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