



Effects of Salinity and Plant Growth Regulators on Ions Accumulation (Na ,K) in Olive (*Olea europaea* cv. Roughani)

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Abstract

Salinity is a limiting factor for plant growth and crop production. A study was conducted to determine the salt tolerance of olive (*Olea europaea* cv. Roughani) and its effects as combined with application of kinetin and cycocel plant growth regulators on Na and K distribution. The experiment was carried out in a completely randomized design with factorial arrangements with four replications. Accumulation of Na and K in aerial parts and roots of plants were determined. The results indicated that increasing salinity level caused a increase in Na content but a decrease in K/Na ratio. Sodium concentration was higher in roots. At 200 mM salinity leaf and shoot Na and increased significantly at 5% level. Also at 100 and 200 mM salinity, Leaf K decreased significantly at 5% level. K/Na ratio at 50,100 and 200 mM salinity level decreased. Application of 250 mg/l kinetin at the 200 mM salinity increased leaf Na that was significantly different at 5% level ,DNMRT. Application of 500 and 1000 mg/l cycocel, decreased shoot K (at the 100 mM salinity) and leaf K (at the 0 and 50 mM salinity). The decrease was statistically significant ($p < 0.05$).

Keywords: Salinity, Plant growth regulators, Olive, Ions

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Effect of Different Chemical Treatments on The Vase Life of Cut Gladiolus Flowers (*Gladiolus grandiflorum* L.) cv. 'Rose Supreme'

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Abstract

Gladiolus is one of the flowers that used on cut flower and garden plants. An experiment was conducted to study the effects of chemical treatments on the vase life of gladiolus cut flower cv. 'Rose supreme' with ten chemical treatment using complete randomize design with 3 replications. Gladiolus cut flower was harvested when the 2-3 lowest bud had start showing color then cut flower were treated by different preservative solution as: sucrose (4%), 8-hydroxy quinoline citrate (100, 200, 300 mg L⁻¹), citric acid (150 mg L⁻¹), gibberellic acid (50, 100, 150 mg L⁻¹), aluminum sulfate (100, 200, 300 mg L⁻¹) and distilled water (control) for 24 h then transferred in distilled water and kept in the temperature of 22 °C. Effect of applied treatment was evaluated by different characteristic like vase life, water uptake, chlorophyll content, floret diameter, total soluble solid of petal, floret opening, and fresh weight of flower. Results showed that treatment of sucrose + citric acid + 8-hydroxy quinoline citrate extend the vase life (2.79 day than control), water uptake, flower diameter, total soluble solid of petal, floret opening, fresh weight and and treatment of sucrose + citric acid + gibberellic acid maintain chlorophyll content of leaf and improve vase life of gladiolus.

Keywords: Aluminum sulfate, Gibberellic acid, Gladiolus cut flower, 8-hydroxy quinoline citrate, Vase life

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The Effect of Salicylic acid and Gibberelic acid on Fruit Ripening, Anthocyanin and Ethylene Production in Sweet Cherry cv. Mashhad

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Abstract

The use of compounds inhibiting ethylene production is very important in post-harvest technology of fruits. Sweet cherry is a non-climacteric fruit with capability of ethylene production during storage period. Factors that decrease ethylene production would increase fruits storage life. In this research sweet cherry fruits of Mashhad cv. were sprayed with different concentrations of Salicylic Acid (0.5, 1, 2, and 3 mmol/l) and Gibberelic Acid (0, 10, 20 and 30 mg/l). Fruits were sprayed about three weeks before harvest, when their color started to change from green to yellow. The experiment was performed in a completely randomized design with three replicates. The results showed that GA had less effect on decreasing ethylene production compared to SA, but did better on anthocyanin accumulation, fruit size, soluble solids content and fruit weight. GA treatment delayed fruit ripening and ethylene production but had little or no effect on the fruit color as an important ripening index. During storage period also the total amount of anthocyanin in fruits increased due to hormone treatments whereas the ethylene production decreased compared to control fruits.

Keywords: Salicylic acid, Gibberelic acid, Sweet cherry, Ethylene, Anthocyanin

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Investigation The Effects of Thidiazouron and Humic acid on Postharvest Life of Cut *Alstroemeria aurantifolia* cv. " Konyambe "

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Abstract

Two separated experiments were conducted to evaluate the effects of different concentrations of thidiazouron (10, 20, 30, 40 and 50 μ M) and humic acid (1, 10, 100, 1000 and 10000 ppm) on vase life of cut *Alstroemeria* flowers. Experiments were carried out based on completely randomized design with 8 replications in postharvest laboratory of Horticultural Department, Mohaghegh Ardabili University in 2009. The results showed that lower concentrations of humic acid had positive effects on flower vase life, water content of tissue and solution uptake, while didn't affect relative fresh mass and leaf chlorophyll content. In both experiments results also indicated that humic acid in higher concentrations affected all traits, negatively. However, this compound at 10000 ppm decreased flower vase life, water content, relative fresh mass, solution uptake and chlorophyll content. By increasing the humic acid concentration up to 100 ppm the vase life of cut flowers improved. Compared with control and other treatments, 1000 ppm of humic acid decreased flower vase life, considerably. The highest vase life of flowers devoted to 10 μ M of TDZ, however higher concentrations of this compound reduced flowers vase life. Moreover, the highest solution uptake and leaf chlorophyll content obtained by 30 μ M TDZ, while the highest relative fresh mass devoted to 40 μ M of this compound.

Keywords: *Alstroemeria*, Thidiazouron, Humic acid, Postharvest life

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Effect of Exogenous Application of Hydrogen Peroxide on some Salt Tolerance Indices in Oregano (*Origanum majorana* L.)

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Abstract

Salinity is one of the environmental stresses that have limited influence on the crop growth. Oxidative process is a secondary stress due to salinity. Oregano is enumerated as one of the most important of medicinal plant that its production and development is possible in Iran. In order to study the effect of exogenous application of hydrogen peroxide on salt tolerance in oregano (*Origanum majorana* L.) an experiment was conducted in greenhouse conditions. This study was designed as factorial based on completely randomized design with 3 replications. Different concentration of hydrogen peroxide (0, 2.5 and 5 mM) and four levels of NaCl (0, 50, 10 and 150 mM) were treated in this study. Results showed that foliar application of hydrogen peroxide can improve shoot and root dry weight and alleviate adverse effects of salinity. In the other hand, high concentration of hydrogen peroxide (5mM) increased total chlorophyll and caroteoid content about 46.6 and 100.6 percent comparing to control plant, respectively. Salt stress had no significant effect on cellular hydrogen peroxide, but it increased free proline and reduced K:Na ratio. While hydrogen peroxide content, free proline and K:Na ratio were increased 104.6, 320.7 and 77.8 percent by high level of hydrogen peroxide, respectively. The final result showed that foliar application of hydrogen peroxide decreased salt stress.

Keywords: Chlorophyll, Reactive oxygen, Stress, Spray, Proline

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Effects of Substrate and Substrate Enrichment on Physical and Chemical Properties of Medicinal Shiitake Mushroom

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Abstract

In order to evaluate the effect of substrate and enrichment material on biological efficiency (BE) and other physical and chemical properties of medicinal mushroom shiitake (*Lentinula edodes*) an investigation was performed as factorial experiment in completely randomized design with four replications in Khorramabad city of Lorestan province Iran. Experimental factors were substrate in three levels, 1- chickpea straw 2- sawdust 3- wheat straw, and enrichment material in four levels, 1- sugarcane bagasse 2- sugarbeet molasses 3- rice bran and 4- control (without enrichment). Result indicated that BE of mushroom for substrate was 72% and 48% higher than chickpea and wheat straw respectively. Rice bran enrichment had the significant effects on BE and was increased BE by 56% in comparison to control treatment. Enrichment treatment of sugarcane bagasse and sugarbeet molasses had no significant effect on mushroom BE. Among the substrates sawdust with 57.7% had the highest carbohydrate levels in shiitake mushroom. The highest level of carbohydrate (63.3%) was belonged to rice bran enrichment that had significant differences with control and two other enrichments. Substrate had no significant effect on mushroom lipid. The highest level of mushroom lipid (3.3%) was attributed to rice bran enrichment. Rice bran enrichment was increased mushroom lipid by 65, 57 and 50% in comparison to control, sugarbeet molasses and sugarcane bagasse respectively.

Keywords: Shiitake mushroom, Biological efficiency, Substrate, Enrichment material

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Evaluation of Fruit Physicochemical Properties and Qualitative Characteristics of Some European Pear (*Pyrus communis* L.) Genotypes

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Abstract

Considering to importance and high genetic diversity of Pear (*Pyrus communis* L.) in Iran, a study was conducted on the effect of genotype on fruit physicochemical properties and qualitative characteristics of six mature European Pear genotypes in Teheran, Iran environmental conditions. In this study some physicochemical fruit properties and qualitative characteristics such as: fruit length, width, length to width ratio, fruit pedicel length, fruit color, fruit fresh and dry weight, fruit volume, fruit firmness, total soluble solids (TSS), titratable acidity (TA), pH and sensory evaluate were monitored based on the descriptors of International Plant Genetic Resources Institute (IPGRI). Results showed significant differences within the studied genotypes in the most fruit characters ($P \leq 0.05$). In addition, it was a diversity within the measured characters in fruit length (ranged from 6.99 to 9.82 cm), fruit width (4.69 to 7.17 cm), fruit length to width ratio (1.23 to 1.59), fruit pedicel length (2.2 to 3.73 cm), fruit color (yellow to yellowish green and green to red with L^* value 60.47 to 74.08 and H^* value 80.06 to 86.95 and C^* value 46.16 to 53.43), fruit fresh weight (80.5 to 308.9 g), fruit dry weight (4.52 to 5.36 g), fruit volume (86.33 to 270.7 cm³), fruit firmness (1 to 2.37 Kg/cm²), TSS (14.9 to 17.63 °Brix), TA (0.18 to 0.41 % malic acid), TSS/TA (40.49 to 92.66) and pH (3.95 to 5.33). Results revealed that genotype A₉₅ had better quality and physicochemical properties and qualitative characteristics than other genotypes which can be considered as promising genotype for further evaluations.

Keywords: European Pear (*Pyrus communis* L.), Genotype, Genetic diversity, Fruit physicochemical properties and qualitative characteristics

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Effect of Carbon dioxide Enrichment on Morphophysiological Characteristics of *Amaranthus* (*Amaranthus tricolor* L.) under Salinity Stress

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Abstract

To evaluate the effects of various concentration of carbon dioxide and salinity stress on morphophysiological characteristics of *Amaranthus tricolor* L. an experiment was conducted in greenhouse conditions in Faculty of Agriculture Ferdowsi University of Mashhad. the experiment was split plot based on completely randomized design with three levels of CO₂ (380, 700, 1050 μ l/L) and three concentrations of sodium chloride (0,150, 300 mM) with 3 replications. The results showed that in control carbone dioxide (380 μ l/L), application of salinity to 300 mM, reduced shoot dry weight, plant height and leaf area from 9.34, 53.83 and 1001 to 3.71, 35.3 and 158 respectively. Interaction effects of salinity and carbon dioxide showed that in control salinity and 1050 μ l/L carbon dioxide, shoot dry weight and plant height increased 46 and 38% respectively. in level of 150 mM sodium chloride, with increasing concentrations of carbon dioxide from 380 to 700 μ l/L, leaf area increased from 134 to 358 cm². at this salinity level, in concentration of 1050 μ l/L carbon dioxide, leaf area was 287 cm². The final results showed that increasing concentrations of carbon dioxide improves adverse effects of salinity. in characteristics such as leaf area and electrolyte leakage, carbon dioxide in 700 μ l/L and in characteristics such as root dry weight, shoot dry weight and plant height concentrations of 1050 μ l/L carbon dioxide showed a better reaction to salinity.

Keywords: Amaranthus, Carbon dioxide, Salinity stress

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Evaluation of Genetic Variation of Different Potato Varieties Using Electrophoretic Tuber Storage Proteins

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Abstract

Potato (*Solanum tuberosum* L.) ranks the fourth most important food crops in the world. Determination of genetic diversity using different markers have a key role in plant breeding programs. In this research, SDS-PAGE technique was used as a tool for assessing genetic diversity relationships among 23 potato cultivars (*Solanum tuberosum* L.). Potato tubers proteins were extracted using Laemmli method (1970). UPGMA method and NTsys softwar were applied to calculate polymorphism and to draw dendrogram. Genetic distance of samples was calculated by SPSS softwar. 39 protein bands were observed in populations under study. The results revealed maximum number of bands (23 bands) in Markiz cultivar. Cluster analysis differentiated 23 cultivars in two large groups. Dendrogram constructed shows that Granola is closest to Impala (73.7%). Also, Fontaneh and Savalan cultivars were the most dissimilar ones (9.1%). Two major group of storage proteins appeared at 22 and 40 kDa positions could be probably the isomers of the Sporamin and Patatin, respectively. The results indicate presence of high level of genetic diversity in potato cultivars.

Keywords: Polymorphism, Genetic Variation, Potato, Tuber Storage Proteins, SDS-PAGE

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Effect of Pre harvest Sprays of Ethephon on Fruit Quality Attributes of Ghizil Uzum Grape (*Vitis vinifera* L.)

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Abstract

Application of ethephon is an effective way in increase of grape fruits quality. In this study the effect of preharvest application of ethephon solution at four levels (0, 150, 250 and 300 mg/l) and application time at two levels (10-20% and 50-70% of berry coloring), were evaluated on quality indices of Ghizil Uzum grape cultivar at harvest time. Evaluated indices were soluble solids content, titratable acidity, palatability, total phenolics, tissue firmness and fruit color. Different concentrations of ethephon were effective on all quality attributes of berries. But ethephon spray times were effective only on titratable acidity, palatability, total phenolics and fruit firmness. Results showed that 250 ppm of ethephon and treatment time of 50 – 70 % of berry coloring had the highest effect on berry quality. Based on obtained results application of ethephon with the optimum concentration in the proper time can be an effective strategy in pre harvest technology of grapes from the point of color and optimum quality of berries.

Keywords: Grape, Ethephon, Quality attributes, Total phenolics, Fruit color

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Development of Biodegradable Nanoparticles Derived from Plant Mucilage and Its Application as an Edible Coating

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Abstract

Plants gums, hydrophilic colloids, hydrocolloids, mucilages and hydrophilic polymers are compounds that can produce gel. Coating materials which applied on food products increased shelf life of food by affecting water loss, gas exchange, oxidation process and decreasing the food spoilage and affect shelf life of food products. Coating material could carry antioxidant, antibacterial and/or other compounds responsible of food color and flavors. Some advantages of edible coating are antibacterial activity, improvement of nutritional values, flavors and also decreasing the environment pollutions. In order to develop biodegradable nanoparticles from plant polymers and study of the effect of nanoparticle application as edible coating on shelf life of cucumber fruits, the experiment was conducted at the research laboratories of Ferdowsi University of Mashhad (FUM) and industrial laboratory of School of Pharmacy, Mashhad University of Medical Science. At the first, some plant mucilage including tragacanth (*Astragalus gummifera*), marshmallow flower (*Malva silvestris*) and seeds of plantain (*Plantago lanceolata*), basil (*Ocimum basilicum*), psyllium (*Plantago psyllium*) and lallemantia (*Lallemantia royleana*) were extracted by water as natural polymers at room temperature. Ethyl-celluloseTM also used as semi-artificial polymer. Then acetone fraction of the extracts prepared and dispersed in water solution which had different Hydrophile–Lipophile Balance (HLB) values (5-15) during different stirring level (500, 750 and 1000 rpm) by phase dispersion method for production of nanoparticles. Nanoparticle properties and morphological characteristic determined by Particle Size Analyzer and electronic scanning microscopy (SEM) respectively. The solution contained nanoparticles sprayed on fresh cucumber fruits (as a model) as edible coating and the shelf life evaluated. Results showed that mucilage of tragacanth (*Astragalus gummifera*), marshmallow flower (*Malva silvestris*), Lallemantia (*Lallemantia royleana*) and ethyl-celluloseTM(as a control) produced particles at nanometer scale (100-200 nm) but plantain (*Plantago lanceolata*), basil (*Ocimum basilicum*) and psyllium (*Plantago psyllium*) had no significant acetone fraction. The best solution's HLB for production of suitable nanoparticles (app. 100 nm in size) in the mentioned natural polymers were 7 at 1000 rpm. The results of the second set of experiment showed that application of the solutions containing nanoparticle as edible coating decreased cucumber spoilage caused by mold and improved shelf life of the commodity in the package. The results of the present study showed that medicinal plants mucilage are valuable source of natural polymeric compounds and could be used as edible coating using nanotechnology.

Keywords: Plant mucilage, Biodegradable nanoparticles, Edible coating, HLB

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The Effects of Drought Stress on Yield and Quality of Thompson Seedless Grape in Takestan

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Abstract

Partial rootzone drying (PRD) is a new irrigation technique which improves water use efficiency without significant yield reduction in grape. To study the effects of partial rootzone drying and green pruning on yield and yield quality of Thompson seedless grape a split plot experiment with randomized complete block design and three replications was conducted. The experiment was performed in Takestan. The experimental treatments were irrigation and pruning and each treatment had three levels. During growing season, half of the root system was maintained in a dry state, while the rest was irrigated (PRD). The irrigation levels were: full irrigation (irrigating both sides of root zone), drying left side of rootzone (irrigating from north direction) and drying right side of rootzone (irrigating from south direction). Pruning levels included light, medium and heavy green pruning. The analysis of variance (ANOVA) of data showed that the effects of irrigation were significant on pH and TSS of grape juice at 5% level but there were no significant differences between irrigation treatments with respect to grapevine yield indicating that water requirement of grapevine can be reduced to half without significant yield reduction. The effects of pruning were also significant on grapevine yield, berry weight and diameter, cluster weight and length and sultana production. The interactive effects of pruning and PRD were significant on weight and diameter of berry, weight and length of cluster and Sultana production. Full irrigation with medium pruning, irrigation from north with medium pruning and irrigation from south with light pruning had higher grape yield than the other treatments. PRD reduced shoot and lateral shoot growth about 8 and 30% respectively compared with full irrigation.

Keywords: Partial rootzone drying, Full irrigation, Green pruning.

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The Effects of Acidifying Irrigation Water on Quality and Quantity of two Variety of Pelargonium (Red Flower and White Flower)

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Abstract

In order to study the effects of reducivis irrigation water alkalinity and acidity on quality and quantify of geranium growth in pot with soil mixteur medium , the research work was carried out during 2007-2008 in a green house ,using a factorial assay and a randomized complete block design with three replication. The main plot assigned to cultivar (white and red colored flower geranium) and the subplot assigned to irrigation water acidity viz, pH1=4, pH2= 4/5, pH3=5, pH4=5/5, pH5=6 and pH6(well water)=7/8.Results showed that irrigation water acidification significantly increased number of total flowers and opened flowers per inflorescence ,chlorophil and magnesium content of leaves. But its effects on petiole length was not significant. Cultivar and water acidification interactions had highly significant impacts on stem length, leaf size, fresh and dry weight of plant foliages , number of inflorescence per plant and Iron content and significant impacts on inflorescence diameter and number of lateral branches at five percent of probability. Comparison of means and neutralizing alkalinity and acidifying of irrigation water to PH=5/5 con increase nutrients absorbsion and improve quantitative and qualitative traits of geranium.

Keywords: Irrigation water, Alkalinity, Acidity

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Determination of Suitable Harvesting Time and Its Effect on Postharvest Kiwifruit Quality

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Abstract

The harvest date more influenced on postharvest quality during storage. In present study, fruits were harvested at four date base on total soluble solids content (5.5, 6.5, 7.5, and 8.5%) and then stored at 0.5 °C and 80-90% RH, for 18 weeks. The samples were taken in 6th, 12th and 18th interval weeks and evaluated some parameters including weightless, losses, firmness, TSS, TA, TSS/TA, ascorbic acid, pH, EC, Skin and pulp lightness and sensory analysis. Results showed that different harvesting time had not significant effect on weightloss and pH parameters during storage. Also, we observed that fruits which were harvested at brix of 5.5 had high firmness specially during primary 6 weeks storage. The skin of fruits picked with 5.5 and 6.5 % brix was a little darker than other treatments. EC showed reverse relationship with storage period during storage. With TSS increasing, TA level decreased during storage. Although, ascorbic acid content was higher during 6 weeks of storage but it was lower in fruits which picked with 5.5 % brix than other times of harvest. Finally sensory analysis revealed that fruits which harvested at least 6.5 °Brix content, would have excellent quality after storage and handling.

Keywords: Hayward, Harvesting time, Storage, TSS

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