



## Carbohydrate Variations of Leaf and Fruit of Nectarine cv. Red Gold During Growth Season at Gorgan Climate

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### Abstract

Carbohydrate flow between vegetative and reproductive parts of trees is one of the determining factors of yield and fruit quality. Therefore, it varies during different times of growth season. The aim of this study was to investigate the carbohydrate content variation during growth season between leaf and fruit of nectarine. So, eight nectarine trees cv. Red Gold selected randomly in the orchard and after labeling two of them combined and four replications achieved for laboratory tests. Results indicated that the highest fresh (9.3 g) and dry (3.3 g) weight of the leaves recorded at the last harvesting stage. Fresh to dry weight ratio showed a descending trend than can be indicated this fact that leaf biomass is low at primary harvesting stages and increased gradually. Chlorophyll a, b and ab reached to the highest content at the last harvesting stage. Total sugar content showed an ascending trend at second and third harvesting stages and decreased at final harvesting stage. Fruit chlorophyll content also decreased by maturation and fruit ripening; while, anthocyanin content showed an ascending trend. Fruit total sugar content decreased by third stage, two weeks after pit hardening, but increased at the final harvesting stage. Sucrose content variations show a higher value at primary stages of fruit growth in comparison with next stages and decreased by final stages. Total sugar increased at the fourth stage to third harvesting stage.

**Keywords:** Nectarine, Carbohydrate, Total sugar, Chlorophyll, Sucrose

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## The Study on Physical, Chemical and Biochemical Characteristics of Pistachio (*Pistacia vera* L. cv. Daneshmandi) and Its Comparison to Some Commercial Cultivars From Iran

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### Abstract

In this research, we studied physical, chemical and biochemical characteristics of pistachio entitled *Pistacia vera* cv. Daneshmandi and was compared to three pistachio including of Badami Sefid, Kalle Ghoochi and Akbari. The examined characteristics were fresh and dry weight of seed, green shell and also kernel, weight of hard shell, seedless and early opening nut, comparing the seed and kernel dimensions, percentage of oil, saturated and unsaturated fatty acids, acid value, peroxide value, total tocopherols, and total phenolics. The results indicated that *Pistacia vera* cv. Daneshmandi in some characteristics holds a distinction amongst the other types and particularly in some qualities such as kernel weight, percentage early opening nut and kernel/seed proportion. This cultivar was high-oil (51.28%) and also the highest in the ratio of poly unsaturated to saturated fatty acids (2.82). The second place of pistachio Daneshmandi was the amount of antioxidant material. In front, was lowest peroxide value in the Daneshmandi cultivar (2.702 mil equivgr.kg<sup>-1</sup> oil). Also 27% decreased the amount of acid value in the Daneshmandi cultivar (0.49 mg.g<sup>-1</sup> oil) of compared of the Kalleghoochi cultivar (0.627 mg.g<sup>-1</sup> oil). In total, *Pistacia vera* Cv. Daneshmandi can be considered to be a good cultivar for commercial production and to have a top position among the national product exported.

**Keywords:** Acid value, Antioxidant, Peroxide Value, *Pistacia vera* Cv. Daneshmandi, Saturated and Unsaturated Fatty Acids

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## Assessing the Pomegranate Marketing Channels in Lorestan Province

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### Abstract

In this paper different channels of pomegranate marketing in Lorestan province are identified and the economic evaluation of these path ways is discussed. For this purpose, the different marketing margins, the share of marketing agents of final price of product, marketing cost coefficient and marketing efficiency in each channel was calculated. The necessary cross-sectional data and information was collected through in terview and 100 questionnaires by simple random sampling at 2010. According to the results, the producers, processors and consumer route has the highest marketing cost coefficient (99.81) and marketing margin (139740 Rials). Moreover, the producer share is the lowest in this route (1.85). The results indicated that the export route is the best marketing route with highest total efficiency (0.68) and price efficiency (0.69) in Lorestan province.

**Keywords:** Marketing, Marketing channels, Pomegranate, Lorestan

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## The Effect of Ascorbic Acid in Delaying Biochemical Changes During Senescence and Extension Flowers Vase Life in Rose

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### Abstract

In this study, effect of different concentration of ascorbic acid (AsA, 0, 2, 4 and 6 mM) on delaying senescence in cut rose flowers cv. Royall Class was investigated based on factorial design. The results showed that the greatest delay in senescence was obtained with 4 mM AsA as compared to control (distilled water). Therefore, fresh weight and diameter of flowers treated with 4 mM AsA was more than others treatments. Biochemical attributes such as protein, proline, anthocyanin content and lipid per oxidation levels were determined only in DW and 4 mM AsA. Application of 4 mM AsA treatments was shown to retard degradation of protein over 8 days vase life. Proline content in AsA treated flowers was slightly lower than DW flowers but no significant differences were found in treated flowers with AsA. Anthocyanin content declined gradually with onset of senescence, while AsA treatments suppressed decreasing its content. Therefore, treatment with 4 mM AsA suppressed malondialdehyde accumulation and delayed flowers senescence.

**Keywords:** Ascorbic acid, Lipid peroxidation, Protein, Proline, Flower senescence

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## The Effect of the Composted Peanut Shells as a Growth Medium on the Growth of *Dracaena marginata*

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### Abstract

Peanut shells as a waste of cultivated peanuts are produced in a considerable amount in Guilan province, Iran, that its compost can be used as an available resource in replacement of peat as growth medium of ornamental plants. This experiment was carried out to determine the possibility using of peanut shells compost as an appropriate medium of *Dracaena*. The control treatment was a medium of peat: perlite at 2:1 ratio that in a completely randomized design, the peat was replaced by composted peanut shells by 15, 30, 45, 60, and 100% V/V. The experiment had three replications. This study was carried out in Ornamental Plant Research Station of Lahijan, Guilan province, Iran. Chemical properties of media including EC, pH, total nitrogen, carbon, C/N ratio; and available concentrations of phosphorus, potassium, calcium, sodium and magnesium were measured. The growth factors including plant height, leaf number, dry weight of stem and leaf were evaluated. The concentrations of nitrogen, phosphorus, potassium, calcium, magnesium, iron and manganese in leaf were also measured. Results showed the peanut shell compost because of decreasing C/N ratio and availability of nutrients in media, caused to increase plant height, leaf number and dry weight of shoot compared to control. The greatest rate of growth was achieved in 15% and 45% compost treatments and its lowest obtained in 100% V/V treatment and control. In conclusion Peanut shell compost can be used as alternative substitution of expensive peat in the growth media of ornamental plants.

**Keywords:** *Dracaena*, Growth media, Peanut shells compost, Peat.

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## The Effects of Organic and Biological Fertilizers on Phosphorus and Potassium Uptake by Black Seed (*Nigella sativa* L.)

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### Abstract

In high-pH soils, phosphorus deficiency or low phosphorus use efficiency by crops is the main problems in dry and semi dry area. In order to investigate the effects of organic and biological fertilizers, on phosphorus and potassium use efficiency of black seed (*Nigella sativa* L.) in high pH soil, an experiment was conducted at Agricultural Research Station of Ferdowsi University of Mashhad, Iran, in year 2011. A completely randomized block design with three replications and 15 treatments was used. The experimental treatments included all combinations of 3 organic fertilizers (compost, vermicompost and no fertilizer as control) and 5 biological fertilizers (*Azotobacter* sp. + *Azospirillum* sp., mycorrhizae (*Glomus mosseae*), *Azotobacter* + *Azospirillum* + mycorrhizae, *Thiobacillus* + sulfur and no fertilizer as control). Results indicated that effects of organic fertilizers on increasing phosphorus and potassium use efficiency in black seed were significant. However, results showed that except *Thiobacillus* + sulfur, other bio fertilizers had no significant effects on increasing mentioned traits. The *Thiobacillus* + sulfur treatment significantly increased phosphorus and potassium use efficiency of black seed up to 34.7 and 14.6 %, in comparison with control treatment. In addition, interaction of vermicompost with *Thiobacillus* + sulfur treatment significantly increased phosphorus seed content compared with *Thiobacillus* + sulfur (more than two times) and vermicompost treatments. Based on our results, it seems that in high pH soils with low available phosphorus, the applying *Thiobacillus* plus sulfur can be effective on increasing phosphorus uptake and use efficiency.

**Keywords:** *Azospirillum*, *Azotobacter*, Compost, Medicine plant, Mycorrhizae, Sulfur oxidative bacteria, Vermicompost.

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## Impact of Antimony Stress on Biochemical and Physiological Criteria of Watermelon Plant (*Citrullus lanatus* Thunb.)

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### Abstract

Antimony is a toxic heavy metal for plants, animals and human being. Considering its effects on plants growth, different concentrations on watermelon growth and development were studied. The experiment was established on a factorial experiment based on a completely randomized design with 3 replications. The seedlings were grown hydroponically in nutrient solution containing Sb-EDTA (0, 0.25, 0.5, 0.75, 1, 1.5, 2, 3, 4, 6 and 8 mg/L). Samples were harvested after four weeks to determine biochemical and morphological parameters. With increasing Sb concentration in culture medium, resulted in significantly decreased chlorophyll content and some other growth parameters in treated plants ( $p < 0/05$ ). Also increasing antimony concentration resulted in proline accumulation in roots and shoots of treated plants. With enhancing Sb<sup>+3</sup> concentration in medium, antimony content of roots and shoots increased significantly ( $p < 0/05$ ). Antimony accumulation in the roots was much higher than the shoots.

**Keywords:** Antimony, Growth parameters, Proline, Chlorophyll, *Citrullus lanatus*

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## Studying the Effects of Different Rates of Pelleted Animal Manure and Urea Levels and Some Micronutrients on Yield and Yield Components of Medicinal Pumpkin (*Cucurbita pepo* var. *styriaca*)

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### Abstract

Progressive usage of medicinal plants has necessitated their mass production using the minimum amounts of chemical inputs. To find out the effects of urea and pelleted animal manure and some micronutrients on yield and its components in pumpkin, a split plot experiment based on RCBD with three replicates was conducted at the Research Farm of Abouraihan Campus, University of Tehran in 2011. The pelleted animal manure and urea with four levels (150 kg urea, 50 kg urea+3.5 tone animal manure, 100 kg urea+1.5 tone animal manure and 150 kg urea+1.5 tone animal manure) were considered as the main plot and micronutrients with three levels (1000, 2000 and 3000 (mg kg<sup>-1</sup>); including iron, zinc, manganese from a chelate source and boron from boric acid source) were considered as sub plots. Analysis of variance and comparison of means showed that usage of pelleted manure with urea was superior to using urea alone. The maximum fruit and seed yield, number of seeds per fruit and 1000 seed weight were observed where 1.5 tone pelleted animal manure+150 kg urea with 2000 (mg kg<sup>-1</sup>) of micronutrients was applied. Micronutrients did not show any significant effect on fruit number per square meter, seed dried weight per fruit, and single fruit weight. Moreover, the interaction effect of pelleted animal manure plus urea and micronutrients on immature seeds percent was significant at 1% level. Where 150 kg urea+1.5 tone animal manure in combination with 3000 (mg kg<sup>-1</sup>) of micronutrients was applied, the lowest percentage of immature seeds (22.6%) was achieved. Overall, applying 150 kg urea+1.5 tone animal manure in combination with 2000 (mg kg<sup>-1</sup>) of micronutrients could be suggested as the best option for achievement of the maximum yield characteristics of pumpkin medicinal plant.

**Keywords:** Pumpkin, Pelleted animal manure, Micronutrients, Yield, Yield component

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## Effect of Different Harvest Stage on Physical and Bio-chemical Characteristics of Pomegranate (*Punica granatum* L.) Fruit in Climatic Condition of 'Baghmalek' (Khuzestan Province)

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### Abstract

Pomegranate (*Punica granatum*) is an important fruit crop cultivated for fruit and processing in the Iran. Delaying fruit harvest of pomegranate may increase fruit losses due to fruit cracking; however, early harvest may influence physical and biochemical indices of fruit. An experiment was carried out in 2011 at 'Baghmalek' (North West of Ahwaz, Khuzestan province, Iran) to determine the effects of three stages of fruit harvest (fruit maturity) on quality of fruit in three local cultivars of pomegranate. Fruit weight, density, percentage of juice, peel and seed, vitamin C, total soluble solid (TSS), acidity (TA), anthocyanin and maturity index (TSS/TA) were used for fruit quality assessment. A close relationship was observed between fruit quality and time of fruit harvest (fruit maturity). The fruit quality in respect of TSS, maturity index (TSS/TA), fruit juice color intensity and quality, anthocyanin was superior in fruit harvested from fruits harvested at the 2th and 3th harvest time. Results revealed that the aril weight, TSS, fruit juice color quality was high in 'Poost Sabz'. Also, lowest fruit L/D, fruit juice, anthocyanin/browning substances ratio and fruit juice color intensity was recorded by 'Poost Sabz'. Percentage of fruit juice, fruit L/D and vitamin C was high for the fruits of 'Poost Zard'. Overall, pomegranate fruits harvested at the end of summer had significantly lower quality than fruits harvested at the later stages.

**Keywords:** Pomegranate, Quality, Maturity, Cultivar, Fruit

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## Effect of Regulated Deficit Irrigation and Partial Root Zone Drying on Quality and Quantity Performance of Orange

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### Abstract

Awareness of the effects of water deficit on quality and quantity yield of orange is essential for product managing at water shortage conditions. In this regard, present study was conducted in an orange garden of Babol area in 2011 in a completely randomized design with 5 treatments and 5 replications. Experiment Treatments included full irrigation (FI), regulated deficit irrigation (RDI) and partial root zone drying (PRD) in two levels 75% and 55% of FI treatments. The root zone moisture was measured by TDR sensors. The amount of irrigation water was determined from difference between initial soil moisture before irrigation and moisture at field capacity point. Measured qualitative and quantitative characteristics of fruits were included fruit fresh and dry weight, fruit moisture, fruit volume, dimensions, total dissolved solids (TDS) and treatable acidity (TA). Irrigation water depth at FI was 169.44 mm and water saving in deficit irrigation treatments at 75% and 55% levels were 17.44% and 31.39%, respectively. Comparison of means was conducted by Duncan test at 5% level. The results showed that differences between FI and PRD in attributes of fresh and dry weight, moisture and volume of fruit were not significant. DI and PRD compared with FI showed a significant increase in TDS and TA at harvest. The results showed that, DI and PRD compared with FI were caused significant increase in fruit quality. It is recommended to use PRD and DI at 75% level to save water and increase the product quality.

**Keywords:** Partial root zone drying, Orange, Regulated deficit irrigation, Total soluble solids

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## Effect of Different Types and Concentrations of Growth Regulators on Callus Induction in Different Strawberry (*Fragaria ananassa* Duch.) Cultivars

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### Abstract

The present investigation was conducted to study the effects of type and concentration of auxin and cytokinin on callus induction of three strawberry (Kurdistan, Parose and Camarosa) cultivars. For this purpose, leaf blade, nodal, petiole, receptacle, stamen and flower bud explants were cultured on Murashige and Skoog (MS) medium at three separate experiments included 2, 4 dichlorophenoxyacetic acid (2,4-D) at 2, 3, 4, 5 and 6 mg/L, naphthalene acetic acid (NAA) at 2, 3, 4, 5 and 6 mg/L and different concentrations (0, 0.5, 1.0, and 2.0 mg/L) of benzyl adenine (BA) combination with 4 mg/L NAA. The concentration and type of growth regulators, cultivar and explant type were found critical to the callus induction and callus physical appearance. All explants exception of receptacle incubated on medium formed callus. The leaf and nodal were the most responsive explant to produce callus. MS medium supplemented with combination of auxin and cytokinin were evidently higher than those in the single auxin treatments. 4.0 mg/L NAA + 1 mg/L BA yielded the highest percentage of callus in all types of explants. In this medium, the highest callus induction (98.50%) was recorded in nodal explants of Kurdistan cultivar.

**Keywords:** Strawberry, Callus induction, Explant, Growth regulators

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## Evaluation the Effect of Symbiosis with Mycorrhizal Fungus on Growing Characteristics and Minituber Yield of Potato Plantlets

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### Abstract

To evaluate the influence of arbuscular mycorrhizal inoculation on growth, yield and minituber production of potato plantlets, a pot experiment was conducted using a factorial based on completely randomized design with four replications. The factors were mycorrhizal inoculation (non-inoculated and inoculated with *Glomus mosseae*, *Glomus etunicatum* and mixed of them) and two potato cultivars (Agria and Sante). Some growing characteristics and physiological traits such as chlorophyll content, internode length stem diameter, stolon length, leaf area, fresh and dry stem weight, fresh and dry root weight and percentage of colonization were measured. After harvesting, minitubers were separated to different classes according their size and their percentage of dry matter was measured. The results showed that inoculation with mycorrhiza had significant effect on all parameters. In growth characters the interaction of cultivar and mycorrhiza was significant only in stolon diameter and root fresh and dry weigh. The interaction of cultivar and mycorrhiza had significant effect on production of all minituber classes. Highest number of minituber was achieved by inoculating with mixture of fungi. Correlation coefficients demonstrated that most of growth parameters and minituber yield had significant relation with colonization percentage.

**Keywords:** Potato, Plantlet, Mycorrhiza, Symbiosis and Minituber production

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## Influence of Salicylic Acid, Calcium Chloride and Hot Water Treatment on Quantitative, Qualitative Parameters and Storage Life of Pomegranate cv. Meykhosh

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### Abstract

The effect of hot water treatments [45 °C for five minutes, 55 °C for 25 seconds and non-treated(control)], salicylic acid in three levels (0, 1 and 2 mM) and calcium chloride in two levels (2% and 4%) on quantitative and qualitative parameters and storage life of pomegranate cv. Meykhosh were investigated. Experiment was conducted as a factorial based on completely randomized design with three replications. Fruits were stored for four months and sampling was performed at the end of storage. Results showed calcium chloride treatment prevents weight loss and fruit softening in comparison with control. Salicylic acid had a significant effect in preventing of TSS content increasing so that Salicylic acid with 2 mM concentration was more effective than 1 mM, also fruits treated with salicylic acid had less reduction in TA content. Fruits treated with hot water had weight loss percentage less than control fruits and hot water treatment at 45 °C was more effective than 55 °C. Also the use of hot water and salicylic acid treatment increased PAL activity in comparison with the control. Survey of triple treatments interaction showed that hot water treatment at 45 °C, 2 mM of Salicylic acid and 4% calcium chloride had the best result in pomegranate fruits storage life.

**Keywords:** Fruit firmness, Phenylalanine Ammonialyase Enzyme, Postharvest

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## Effects of Different Light Intensities and CO<sub>2</sub> Levels on the Rooting of Croton *Codiaeum variegatum* Cuttings

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### Abstract

CO<sub>2</sub> enrichment in greenhouse is a suitable way which reduces production time, better growth vigor and also higher plant quality. The main aim of this study was to find out the effects of artificial CO<sub>2</sub> enrichment under different light levels on rooting of the ornamental foliage *Codiaeum variegatum*. The experiment was planned as a split plot based on a completely randomized design. CO<sub>2</sub> was considered as the main plots (380 as control, 750 and 1050 ppm) and these light intensities as the sub plots (10000 as control, 12000 and 14000 Lux) were used. Results showed a significant increase on measured traits with elevating levels of CO<sub>2</sub> and light. Highest measured values of different traits were observed at 12000 Lux light intensity and 750 ppm CO<sub>2</sub> enrichment. Light intensity × CO<sub>2</sub> interaction had a significant effect on leaf length, leaf number, root quality, root volume, root length ( $P \leq 0.01$ ) and rooting percentage at ( $P \leq 0.05$ ). Spad chlorophyll unit was not noticeably significant. Rooting and plant growth generally raised along with both light intensity and CO<sub>2</sub> elevation.

**Keywords:** Rooting, Leaf length, Chlorophyll, Croton, CO<sub>2</sub>

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## The Effect of Superabsorbent Polymer and Different Withholding Irrigation Level on Some Qualitative and Quantitative Traits of Tomato (*Lycopersicum esculentum*)

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### Abstract

The superabsorbent polymer withholding water and disperse it gradually to roots increase soil water capacity. To study the effect of superabsorbent polymer on decreasing water stress effect as well as increasing irrigation efficiency a factorial experiment based on randomized block design with 4 replicates was design. Treatments were 0, 10 and 20 % V superabsorbent and irrigation levels 25, 50 and 100% field capacity in greenhouse of Shiraz University. The results were shown that drought stress decreased chlorophyll content, fresh and dry weight but did not effect on fruit parameters at 5%. Superabsorbent improved tomato growth in stress condition and in 50% FC, 10% superabsorbent increased relative water content to 14% and fresh weight of root to 60%. Chlorophyll content increased to 22% in 25%FC with 20% superabsorbent relative water content and root fresh weight increased 28 and 53% respectively. In 25%FC with 20% superabsorbent. Superabsorbent elevated hazardous effect of drought stress and with holding the water in root zoon cues normal plant growth.

**Keywords:** Drought Stress, Superabsorbent, Tomato

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