Cumhuriyet Üniversitesi Fen Fakültesi
Fen Bilimleri Dergisi (CFD), Cilt:36, No: 3 Özel Sayı (2015)
ISSN: 1300-1949

Cumhuriyet University Faculty of Science
Science Journal (CSJ), Vol. 36, No: 3 Special Issue (2015)
ISSN: 1300-1949

Effect of pollen source on hormones ABA and IBA, and Peroxidase and catalase Enzymes in seeds from Sh-12 cultivar (♀) Eskandar and Tuono ( )

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Received: 01.02.2015; Accepted: 05.05.2015

Abstract. This study was carried out during 2011 and 2012 in Horticultural Research Station of Seed and Plant Improvement Institute(SPII), Karaj, as factorial design base on randomized complete bloke design (RCBD) in triplicate with the aim to assess the effect of Effect of pollen source on hormones ABA and IBA, and Peroxidase and catalase Enzymes in seeds from Sh-12 cultivar (♀)Eskandar and Tuono ( ) in Steps before and after germination. The overall results of this study showed that the effect of pollen of Eskandar and Tuono on on hormons ABA and IBA, and Peroxidase and catalase Enzymes in seeds of Sh-12 cultivar was significant. Seed from the hybridizing of two Tuono and Sh-12 significantly has a higher amount of hormones ABA and IBA. The amount of the hormones ABA and IBA in seeds derived from this hybridizion is the average was5.66 and 2.14 micromol/gr while the amount of this hormone at levels seed from the hybridizing of Tuono and h-12on average 0.9 and 0.83 micromol/gr. The amount of enzyme activity of catalase significantly resulting in seed from the hybridizing of two Tuono and h-12 was higher in seed from the hybridizing of two Eskandar and Sh-12, but the mount of activity of this hormone had no significant differences with each other according to Peroxidase.

Keywords: germination, almond, enzyme, hormones

1. INTRODUCTION

And changes some internal substances such as hormones ABA seed Sh- 12 and IBA, peroxidase enzymes super auxin Dsymvtaz before and after germination were studied. Qualitative and quantitative study of seasonal changes of enzymes, especially enzymes sensitive to environmental stresses is important to find ecotypes resistant to stress. These changes can be in different parts of plants such as leaves, seeds, leaves, etc. checked. Research results showed that peroxidase was sensitive to various environmental stresses and capable of H2O2 in plants often increases in times of stress and damage to the plant, the analysis (Sagysaka, 1985). Peroxisome catalase and flower plants typically found oxy zoom and H2O2-induced degradation of its operation at the plant. The difference is that when the plant is operating with peroxides which are o2 environment is high, but peroxidase runs at the low H2O2 (Bernal et al., 2000).

In fact, peroxidase and catalase phenols with water and oxygen to produce water and plant tissues from the toxic hydrogen peroxide passes away. Managing water as a coolant and increased tissue oxygen also increases the rate of plant physiology (Bernal et al., 2000). On the other enzymes involved in resistance to a variety of stresses including salinity, drought and cold named. Several reports suggest that if the germination stage a successful genotypes under stress,

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Special Issue: The Second National Conference on Applied Research in Science and Technology

in the later stages of growth, seedling vigor of a better and stronger root system will produce. Reduced germination in saline environments due to blockage of the oxidative pathway, activation of inactive hormone and enzyme systems and membrane permeability is altered (Bagheri et al., 1367). Salinity, water potential and distribution of homeostasis at the cellular level and at the level of plant interactions and cause drought stress. The lack of water causes reactive oxygen species (ROS) such as superoxide, hydrogen, hydroxyl radical and oxygen. The activated oxygen cytosolic, impaired metabolism through oxidative damage to lipids, proteins and nucleic acids and antioxidant activity like catalase, ascorbate and glutamine Rdaktaz under tension increases (Sorkheh and colleagues., 2011) Drought, like other environmental stresses, causing oxidative damage fitted. Organisms including plants using oxidizing agents such as Katalaz Hay purifier, peroxidase, glutathione peroxidase and superoxide dismutase levels of reactive oxygen species by antioxidant system, be kept low during prolonged drought, mono- and di Hydrvaskvrbat reductase activity of ascorbate peroxidase. The *species P. communis, P. orientalis, P. gluca and P. scoparia,* dihydroergotamine ascorbate reductase activity in the *species P. communis, P. orientalis and P. Lycioides* and glutathione levels *in P. lycioides* and P. arabica species increases (Sorkheh et al., 2011).

2. ENZYME CHANGES DURING SEED GERMINATION

Maintain vigor may depend on the activity of this enzyme level is sufficient to protect against oxidative stress (Symvntachy et al., 1993).

Oxygen free radical oxidation of mitochondrial metabolism during seed germination aimed derived.The seed is constant concentration of this metabolite in the act of superoxide dismutase, catalase and peroxide are moved from the use of electron donors and activity increases during germination (Gydrvl et al.,1994).

In a study on seed cotton was determined under accelerated aging conditions, the germination decreased. Correlated with the concentration of peroxide reduction in germination and decreased antioxidant enzyme activities of peroxidase, catalase and superoxide dismutase (OR Gvyl et al., 2003).

In a survey of seed corn was reported that peroxidase and catalase activity in embryonic axes of seeds of decline were low. The decrease in the concentration of H2O2 may be more likely to germinate Hydrvkysl damage through the formation of radicals. H2O2 accumulation in root growth was also harmful. (Bernal et al., 2000).

Increase the activity of antioxidant enzymes during germination of some plants such as wheat (Rvgzyn et al., 2001) and safflower (Bailey et al., 2002) and pea (Vjytyla et al., 2006) have been reported. In a study of the antioxidant enzyme activities, including Super oxidase, superoxide dismutase and catalase and peroxidase in various stages of Jatropha curcas seed germination and reported within ten days The superoxide dismutase activity during the first two days after germination increased and then gradually decreased. So of peroxidase activity in the endosperm gradually until 8 days after germination increased. Catalase activity is gradually increased until 8 days after germination.

In fact, we can say that the activity of these enzymes during the germination of seeds in the process of growth and development of plant tissues is dependent (Feng et al., 2011). In a study of two chickpea (Picea omorika (Panč.) Purkyně) in terms of germination and enzyme activity of catalase, peroxidase and superoxide dismutase during germination were compared. A line that has more power seed germination of seeds of line C, respectively, also had higher antioxidant activity. The dried seeds of peroxidase enzyme activity but lacks the dewatering and after 7 days of sowing the seeds of its activity 10 U / G and 28 U / G lines A and C, respectively, on receipt (full, Danvych et al., 2007).

In a study of the changes in enzyme activity of superoxide dismutase, peroxidase, catalase, ascorbic oxidase in the early stages of germination of seeds of corn were studied. The results of this study showed that the enzyme activity of peroxidase, catalase, ascorbic oxidase during germination increases the activity of superoxide dismutase decreased (John Howe et al., 2011). Hmalana and Prsad (2003) Changes in proteins and enzymes related to them during the 8 days of germination of seeds of sesame (Sesamum indicum l.) Review and report The thiol proteinase on the third day after germination reached its maximum, while at the same time the total seed protein content decreased by 50%.

In a study of changes in activity of phytase enzyme α-amylase and protease in the seeds of legumes (Vigna catjang, aureus Phascolus, Lens culinaris and Cicer arietinum seeds during germination were studied. The results of this study showed that the activity of all enzymes with significantly increased germination component of phytase in Grasspea. The enzyme activity was measured in all legume increased with time and reached its maximum at 72 hours after the onset of germination. It is generally suggested that germination in all legumes enzyme activity serves as an additive process (Davoodi and gavedell, 2011). In study of the changes in enzyme activity of superoxide dismutase, peroxidase, catalase, glutathione oxidase and ascorbate oxidase in the early stages of seed germination (Cibea pentandra) were studied. The results of this study showed that the enzyme activity of superoxide dismutase, peroxidase, catalase, glutathione oxidase and ascorbate oxidase during germination increases (Ravi Kiran et al., 2012).

3. HORMONES AND THEIR ROLE

Organic materials are a class of plant hormones At low concentrations Physiological processes such as plant growth and other processes Related processes such as stomatal movement under the influence of hormones play a major role in the response to stress (Davis, 1995). ABA acid regulation of seed maturation and embryo survival major role And adverse environmental conditions such as salinity involved in plant adaptation And acts as a growth regulator (Davis, 1995). At different stages of growth and development, ABA acid concentration is varied (Walker, 1987)

It is believed that ABA regulates the aging process and remobilization of assimilates to the grain (Yang et al., 2003). Stress, ABA accumulation during seed development in increases and its maximum value was coordinated with the maximum grain filling rate. some Key enzymes activities involved in the conversion of sucrose to starch was significantly increased during drought which has a positive and significant activities are consistent with ABA content (Young et al., 2004).

IAA is involved in the regulation of plant development and in response to salt concentrations are altered (Slylnd, 1987). IAA changes in the number and size of leaves, plant water balance sets Obviously, short-term and long-term effects of growth distension of cell walls and this generally decreases with aging cells (Slylnd, 1987).

Capacity expansion of the aging of cells and reduced cell wall However, it has increased auxin power (Dvnlap and Banzan, 1996). Auxin by increasing the acidity of the cell wall and activation of signal transduction pathways related to cell expansion, expanding the capacity of the wall raises (Lytn et al., 1999). Saytvknyn high levels, increased levels of IAA and ABA is reduced That is why it is believed that the ability of an effect on the other hormones in the regulation of growth hormone And stress response may be very significant (Athens, et al., 1978). As of IAA from tryptophan in home-grown leaves and young leaves and the seeds are made And is transmitted from one cell to another. Transfer to the root xylem may involve. In general, it is believed that plant hormones such as 3-acetic acid Ayndvl-, gibberellin, Zeatin Rybvzyd and seed development are closely ABA acid Through the mediation of the endosperm cell division and enlargement or control the entry and exit assimilate to grain Set the size of the tank (Hansen and Grossman, 2000). There are some reports that auxin, GA and ABA acid are involved in the regulation of seed development (Hansen and Grossman, 2000).

4. HORMONAL CHANGES DURING SEED GERMINATION

Germination is a complex process plant by plant growth regulators and a set of genes regulated (barand and Peter, 1995). Morphologically, germination is completed when rooted out how to get enough of the fetus and surrounding structures do not break it (belli, 1997). Although the germination of plants with one another, but different growth regulators play an important role (Chen et al., 2004). ABA at different stages of germination control plays an important role. At the beginning of embryogenesis, ABA produced by the native tissue and inhibits the activity of germination(Chen et al., 2002). During seed maturation, hormone ABA is produced by fetal tissue and fat synthesis and storage proteins gives permission (Gutierrez et al., 2007). So in many plant species of the hormone to induce and maintain sleep mode and delayed germination is involved. (Kosrae, et al., 2005). Reduction in ABA is usually observed at the start of germination. ABA as antagonism with hormone GA as a growth hormone is also known to induce germination. (Krmvd, 2005). It is reported that with the growth of the seed and they go on stage, changes in the composition stored in them done So that they accumulate in the food supply, Their water content is reduced and increased ABA levels and relatively drought tolerant seeds increases and the seeds are beginning to enter sleep (Finkelstein et al., 2002).

The number of plants within the ABA is involved in stimulating and maintaining seed dormancy (Belli, 1997). Frnandh et al (2011) Changes in the levels of ABA and IAA seeds of *Araucaria angustifolia* (Gymnospermae) and Ocotea odorifera (Angiosperms) review and report During germination indoleacetic acid and polyamine levels in both of embryo increased While the ABA in Ocotea odorifera decreased but increased embryo Araucaria angustifolia. Increase in the amount of IAA before germination can be the result of variation in the amount of polyamine. Also amount of the ABA in seed embryos can be downloaded *Rykal Sytrant* and *orthodox* seeds *Rykal Sytrant* are more resistant to the ABA.

5. MATERIALS AND METHODS

This study during the years 1390 and 1391 Seed and Plant Improvement Institute of Horticultural Research Station was conducted and compared the impact of two types of Alexander and Tuno pollen (male parents) The rate of change of the inner seed germination and pollen receiver Sh-12 (male parents) Hormones such as ABA and IBA, peroxidase and catalase enzymes before and after germination in a factorial randomized complete block design was studied. To conduct this research, practice, hybridization was out in Spring 1389. In order to perform hybridization flowers sh-12 in the balloon stage were emasculation. The pollen of the Eskandar and Tuono were collected pollen transfer was done at the right time. Arriving hybrid fruit, seeds are collected and used to study sleep and study their properties, Beginning with a 2% solution of tetra-methyl fungicide Tyvram disulfide were sterilized for 2 minutes.

The seeds of any combination of two of the 90 specimens (with skin and without skin), respectively. Seed samples were placed for 24-48 hours under running water. After this step, the hormone ABA and IAA, enzymes, peroxidase and catalase were measured. The method for measuring the kinetic activity Hemeda et al (1990) was used. Derived ABA and GA by Yokota et al (1994) was And measure hormone detector using UV / VIS wavelength at 257 nm was determined. Calorimetric method of measuring the kinetic activity of amylase Bergmayer and colleagues (1983) conducted And then the absorption spectrophotometer at a wavelength of 546 nm was read. Data obtained from different measurements using SAS software and were analyzed in a completely randomized design Also, Duncan's test was used to compare treatment means.

6. RESULTS AND DISCUSSION

Results showed that the effect of the hormone abscisic acid Tuono Eskandar pollen and seed varieties acid sh-12 was significant at 1% level (Table 1). As can be seen from Table 1, the result of crossing two varieties of seeds Eskandar and sh-12 significantly with higher levels of the hormone ABA acid and IAA acid.The hormone ABA acid in seeds from this cross was an average of 5.66 micromol/ gr, while the amount of the hormone at the confluence of two varieties of seeds anymore Tuono and sh-12 micromol/ gr was on average 0.9. Levels of IAA in seeds derived from a cross between the Alexander and average 2.14 micromoles per gram was Sh-12 While much of the hormone at the confluence of two varieties of seeds **Tuono** and sh- 12 micromol/ gr was an average of 0.83.

As mentioned, germination is a complex process plant by plant growth regulators and a set of genes regulated (barn and Peter, 1995). Morphologically, germination is complete when the embryo radicle enough to tear it off and surrounding structure (Belli, 1997). Although the germination of plants with one another, but different growth regulators play an important role (Chen et al., 2004). ABA at different stages of germination control plays an important role.

At the beginning of embryogenesis, ABA produced by the native tissue and inhibits the activity of fetal growth (Chen et al., 2002). At the beginning of embryogenesis, ABA produced by the native tissue and inhibits the activity of fetal growth (Guteirs et al., 2002). So in many plant species of the hormone to induce and maintain sleep mode and delayed germination is involved. (Kosrae, et al., 2005). It is said that ABA regulation of seed maturation and embryo survival and plays a major role in plant adaptation to adverse environmental conditions such as salinity intrusion and acts as a growth regulator (Davis, 1995). At different stages of growth and development ABA concentration is varied (Walker, 1987). Saytvknyn also high levels, increased levels of IAA and ABA is reduced That is why it is believed that the ability of an effect on the other hormones in the regulation of growth hormone may be very significant (Ltam et al., 1978).

As mentioned in the previous section for an average period of germination of seeds from crosses of Eskandar and medium term sh 12 of the confluence of seed germination was lower Tuono and sh-12. However, the hormone IAA acid in seeds from this cross were significantly more seeds resulting from crosses Tuno and sh 12. In light of the above, we can say that is probably one of the reasons for the decrease Germination of seeds resulting from the cross anymore Alexander, sh-12, a high level of hormone IAA in the seeds of this intersection is The reduction of the hormone ABA causes the seeds will germinate faster.

Table 1. The effect of pollen on the Tuono and ESkandar hormonal changes in the enzyme at sh 12 before germination.

s.v	df	IAA	ABA	Catalase	Peroxidase
Effects of pollen sourse	1	**2.74	**33.98	*422.35	ns117.48
R	2	ns0.0027	*0.13	ns24.50	ns 63.50
error	2	0.0091	0.022	9.50	21.50
Coefficient of Variation	-	6.41	4.53	1.67	1.49

The * and ** indicate correlation significance at the P = 0.05 and P = 0.01 levels of probability, respectively. ns: without significant difference. (*and**:significant at 1% level)

Table 2. The effects of pollen figure of Eskandar and tuono the hormonal changes of the enzyme at 12 before germination

Treatment	IAA	ABA	Catalase	Peroxidase
Pollen Eskandar	2.14 a	5.66 a	180.73 b	316.48 a
Pollen tuono	0.83 b	0.90 b	197.51 a	307.63 a

Means in each column and factor with the same word, indicate correlation insignificance at the P = 0.05 and P = 0.01 probability based on Duncan's test, respectively.

7. FIGURES AND DRAWINGS

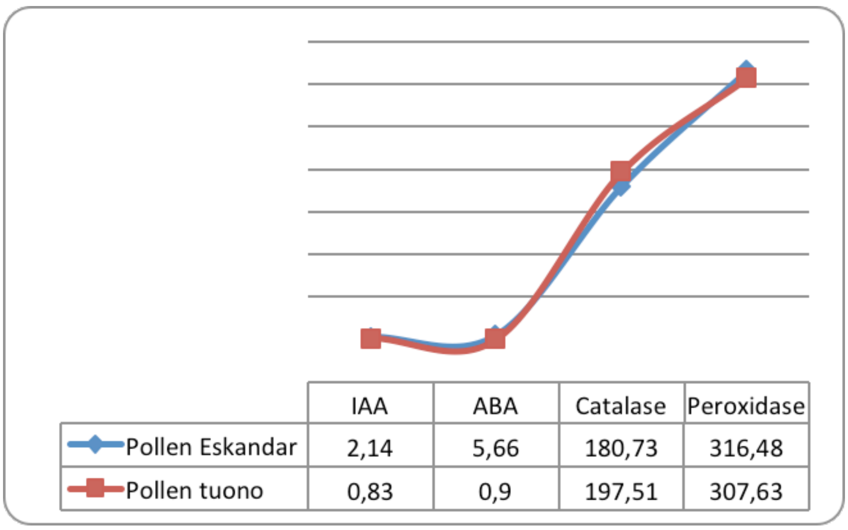

Figure 1.

8. EFFECT ON THE ACTIVITY OF CATALASE AND PEROXIDASE POLLEN

As seen from Table 2, the catalase activity significantly in the seeds resulting from crosses between the Tuono and sh- 12 seeds resulting from crosses between varieties Eskandar and sh-12 was higher but the level of activity of the hormone peroxidase together not significantly different. Catalase activity in the confluence of two varieties of seeds Tuono and sh- 12 micromoles per gram was an average of 197.51 While the activity of this enzyme at the confluence of two varieties of seeds Eskandar and sh-12, was on average 180.73 micromol/ gr (Table 2). Peroxisome catalase and flower plants typically found oxy zoom and H2O2-induced degradation of its operation at the plant. The difference is that when the plant is operating with peroxides which are o2 environment is high But peroxidase amount at the low H2O2 (crores, 1378).

In fact, peroxidase and catalase phenols with water and oxygen to produce water and plant tissues from the toxic hydrogen peroxide passes away. Managing water as a coolant and increased tissue oxygen also increases the rate of plant physiology (crores, 1378). Oxygen free radical oxidation of mitochondrial metabolism during seed germination aimed derived. The seed is constant concentration of this metabolite in the act of superoxide dismutase, catalase and peroxide are moved from the use of electron donors And enzyme activity increases during germination (Gydrvl et al., 1994). Ability to grow seeds may depend on the activity of this enzyme level is sufficient to protect against oxidative stress (Symvntachy et al., 1993).

In a study on seed cotton was determined under accelerated aging conditions The germination decreased. Correlated with the concentration of peroxide reduction in germination and decreased antioxidant enzyme activities of peroxidase, catalase and superoxide dismutase (Gvyl et al., 2003).

In a survey of seed corn was reported that peroxidase and catalase activity in embryonic axes of seeds of decline were low. The decrease in the concentration of H2O2 may be more likely to germinate Hydrvkysl damage through the formation of radicals. H2O2 accumulation in root growth was also harmful. (Bernal et al., 2000). In this study, as mentioned, the seed from the cross Skander and sh- 12, IAA and ABA levels were significantly higher and catalase activity was significantly lower than the seeds from the cross and Tuono and sh-12. On the other hand, the average time of germination from the confluence Eskander and Sh-12, the average time of germination of seeds resulting from the cross Tuono and Sh-12 were lower no significant differences in this trait. Higher amounts of the hormone indoleacetic acid in seeds from crosses of Eskander and Sh-12 on the one hand anymore and lower amounts of catalase activity on the other hand, has The seeds of the confluence of germination and averege germination of seeds mean you do not have differences.

9. CONCLUSIONS

The results of this study showed that pollen grains on the seeds from the confluence of two cultivarTuono and Skandar of seeds Eskandar and sh-12 significantly with higher levels of the hormone ABA and IAA.

The hormone ABA in seeds from this cross was an average of 5.66 micromoles per gram

While much of the hormone at the confluence of two varieties of seeds Tuono and sh-12 micromoles per gram was an average of 0.9**.** While much of the hormone at the confluence of two varieties of seeds Tuono and Sh-12 micromoles per gram was an average of 0.83.

Catalase activity significantly at the confluence of two varieties of seeds Tuono and sh-12 seeds resulting from crosses between varieties Eskander, Sh- 12, was higher But in terms of hormone peroxidase activity were not significantly different from each other. As mentioned, in this study, the seed from the cross Eskander, Sh-12, IAA and abscisic acid levels were significantly higher And catalase activity was significantly lower than the seeds resulting from crosses Tuono and Sh- 12 anymore On the other hand, the average time of germination from the intersection of Eskander and Sh-12 The average time of germination of seeds resulting from the cross Tuono and sh-12 were lower That no significant differences in this trait. Higher amounts of the hormone IAA in the seeds of cross of Eskander and sh-12, on the one hand and lower amounts of the catalase enzyme Has led the seed of the confluence of the average germination percentage and germination of seeds, with no significant difference.

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