

**OPEN
ACCESS**

Seed Priming for Improving Seed Germination and Growth of Peach cv. Sharbati

Gurjeet Kaur, Veerpartap Singh, Maninderjit Singh and Manraj Kaur

P.G. Department of Agriculture, Khalsa College Amritsar, 143002, India

Correspondence and requests should be addressed to MS (email: veerpartapsingh@khalsacollege.edu.in)

Received:

02-12-2022

Accepted:

16-12-2022

Published:

24-12-2022

Abstract

The experiment entitled "Seed priming for improving seed germination and growth of peach cv. Sharbati" was carried out in Horticultural Experimental Area, Nursery, P.G. Department of Agriculture, Khalsa College, Amritsar during the year 2021-22. In this study, peach seeds were treated with different pre-sowing treatments and planted in polythene bags having size 7×7 inches. The experiment was performed in Randomized Block Design with three replications and was assessed to know the effect of different treatments on seed germination and growth. Ten treatments comprised soaking of peach seeds in H₂SO₄ for 5 and 10 minutes, KNO₃ (1% and 2%) for 24 hours, kinetin (0.50 ppm) and kinetin (0.75 ppm) for 24 hours, GA₃ @ 500, 1000 and 1500 ppm for 24 hours and control (untreated seeds). The result obtained in the present studies showed that among different treatments, seeds treated with GA₃ @ 1500 ppm for 24 hours recorded the minimum days (22.00 days) required for initiation of germination, 50 per cent germination (28.66 days), complete germination (35.66 days) and maximum germination (46.66 % and 66.66 %) which was at par with the application of GA₃ @ 1000 ppm for 24 hours while the maximum days (39.66 days) taken for germination were recorded with control (without soaking). Application of GA₃ @ 1500 ppm also proved to be superior in the production of maximum plant height, number of leaves, leaf area, stem diameter at 30, 60, 90, 120 and 150 DAS.

Keywords: Peach; Seed Germination; Seed priming; Dormancy; Vigour index; Seedling survival**Introduction**

Peach (*Prunus persica* L. Batsch) belongs to the family Rosaceae and sub-family Prunoideae. It is an important stone fruit, their flesh surrounds one large middle seed, and has been extensively consumed worldwide due to its delicious taste, unique flavor and high nutritional value (Ali and Hama, 2014). The peach is largely self-fertile (Chaurasiya and Mishra, 2017). There are at least 77 wild species of *Prunus* and most of them are found in central Asia, while polyploidy is common in the genus *Prunus*, the cultivated peach is diploid and has a chromosome number of $2n = 2x = 16$ (Hancock et al., 2008). Peaches have a good position among stone fruits and are rated as the third most important temperate fruit next to apple and pear (Wang, 1998). Peach is a quite hardy fruit preferring cold winter and sunny dry spring and its chilling requirement is below 7 °C temperature for 650-1100 hrs. The sub-tropical peaches have come out as a promising fruit crop in North Western plains due to the availability of required chilling hours (Gangwar et al., 2005). Peach thrives well on light sandy soils (Kant et al., 2018). Fruits are rich source of minerals, vitamins and contain a good amount of sugars. This fruit is also a potential source of bioactive compounds, carrying medicinal benefits like a potential protection against various chronic diseases (Kim, 2014). Seeds of stone fruits do not germinate immediately and they show dormancy when the peaches are freshly harvested and need two to three months of stratification for better seed germination and seedling growth.



The germination inhibitors exist at different concentrations in different parts of the seed such as seed coat, pericarp, cotyledons and embryo (Martinez and Dicenta, 2001). Various methods have been tried to overcome the dormancy of stone fruits. Priming is a method that can improve seed performance under the stress conditions such as drought or freshly harvested or aged seeds that might fail to germinate (Binang et al., 2012). Seed priming has been commonly used to reduce the time between seed sowing to seedling emergence (Parera and Cantliffe, 1994).

Material and methods

The experiment was conducted at the P.G. Department of Fruit Science of Agriculture, Khalsa College, Amritsar. The trial was conducted during the winter season. The experiment was laid out in Randomized Block Design with three replications having fifty seeds in each replication, seeds are planted in polythene bags having size 7x7 inches. The experiment was performed in ten treatments which include seeds treated with T₁ and T₂ (H₂SO₄ concentrated for 5 minutes and 10 minutes), T₃ and T₄ (KNO₃ 1% and 2% for 24 hours), T₅ and T₆ (Kinetin 0.50 ppm and 0.75 ppm), T₇, T₈ and T₉ (GA₃ 500 ppm, 1000 ppm and 1500 ppm) and T₁₀ (control).

The data were recorded on various germination parameters namely days taken to initiation of germination, days taken to 50 per cent and complete germination, germination percentage at 30 and 60 days after sowing and growth parameters which include plant height, stem diameter, number of leaves per seedling and leaf area at 30, 60, 90, 120 and 150 days after sowing. The mean data was separated using LSD test. Difference was considered significant at the level $p \leq 0.05$ using statistical analysis system software Statistix 10.

Result and Discussion

Days taken to initiation of germination

Minimum number of days taken (22 days) for initiation of germination was recorded in the seeds treated with GA₃ @ 1500 ppm for 24 hours which was statistically at par with seeds treated with GA₃ @ 1000 ppm for 24 hours followed by 0.75 ppm kinetin for 24 hours (25.33 days). The highest number of days (39.66 days) taken for initiation of germination was recorded in control. GA₃ upsurges the growth potential of the embryo and indorses germination, it is also required to overcome the mechanical restraint conferred by the seed covering layers by weakening the tissues surrounding the radical (Shah et al., 2013). The above result is in conformity with Barche et al. (2010), Anburani and Shakila (2010) and Dhinesh et al. (2010) and Babu et al. (2010) in papaya, who recorded the least number of days occupied to initiate germination in GA₃.

Days taken to 50 per cent and complete germination

Seed priming with GA₃ @ 1500 ppm for 24 hours registered to take minimum days (28.66 days) for 50 per cent germination which was at par with GA₃ @ 1000 ppm for 24 hours and 0.75 ppm kinetin for 24 hours followed by concentrated H₂SO₄ treatment for 10 minutes. The highest number of days (49.66 days) taken to reach 50 per cent germination were noted in control. The findings are supported by Ynoue et al. (1999) who reported that the GA₃ @ 1500 ppm reduced the average time of germination on kiwi fruit seeds, this might be due to the stimulating effect of imbibition on seed germination caused by improved water absorbing capacity (Cho and Lee, 2018). The minimum number of days (35.66 days) required for complete germination was observed in seeds treated with GA₃ @ 1500 ppm for 24 hours followed by GA₃ @ 1000 ppm for 24 hours i.e. (37.66 days). The maximum number of days (54.33 days) taken for complete germination was found in control. The present findings are in agreement with the findings of Bagal (2004), who observed better 50 per cent germination with GA₃ treatment in aonla. The present findings are also corroborating with the research findings of Vasantha et al. (2014) in tamarind.

Germination per cent at 30 and 60 days after sowing

Maximum seed germination (46.66 %) at 30 DAS was recorded in seeds treated with GA₃ @ 1500 ppm for 24 hours which was statistically at par with GA₃ @ 1000 ppm for 24 hours followed by seeds treated with concentrated H₂SO₄ for 10 minutes and 5 minutes (36.33 % and 33.33 %).

However, no seed germination initiated up to 30 DAS in control. At 60 DAS, the seeds treated with GA₃ @ 1500 ppm for 24 hours recorded the maximum germination (66.66 %) which was followed by GA₃ @ 1000 ppm for 24 hours (63.66 %). The minimum germination percentage at 60 days was in control (27.66 %). High per cent of germination was recorded when seed soaked in GA₃ might be due to the fact that GA₃ helps in the synthesis of α-amylase enzyme which changes the starch into simple sugars during the process of germination. Gibberellic acid also boosts cell elongation, so the radical can push through the endosperm and seed coat that limit its growth (Hartman and Kester 1979). The results are in conformity with the findings reported by Anburani and Shakila (2010) and Deb et al. (2010) in papaya.

Table 1. Effect of seed priming on germination attributes of peach cv. Sharbati

Treatments	Initiation of germination (days)	50 per cent germination (days)	Complete germination (days)	Germination % at 30 DAS	Germination % at 60 DAS
H ₂ SO ₄ Conc. 5 min	26.33 ± 0.72 ^{cd}	35.00 ± 0.47 ^{bcd}	38.00 ± 0.47 ^{de}	33.33 ± 0.98 ^b	43.33 ± 1.51 ^{cde}
H ₂ SO ₄ Conc. 10 min	27.33 ± 0.98 ^{bcd}	33.00 ± 0.94 ^{def}	41.33 ± 0.72 ^c	36.33 ± 0.72 ^b	46.33 ± 1.44 ^{bc}
KNO ₃ (1%)	29.66 ± 0.72 ^b	37.33 ± 0.72 ^b	46.33 ± 0.72 ^b	30.33 ± 0.47 ^{cd}	41.66 ± 1.18 ^e
KNO ₃ (2%)	27.00 ± 0.47 ^{bcd}	36.66 ± 0.72 ^{bc}	40.00 ± 0.47 ^{cd}	26.66 ± 0.72 ^{cd}	45.33 ± 1.65 ^{bcd}
Kinetin (0.50 ppm)	26.00 ± 0.47 ^{cd}	37.00 ± 0.47 ^b	41.00 ± 0.47 ^c	35.00 ± 0.72 ^e	43.00 ± 1.41 ^{de}
Kinetin (0.75 ppm)	25.33 ± 1.18 ^d	31.00 ± 0.98 ^{efg}	38.33 ± 0.98 ^{de}	29.00 ± 0.47 ^c	47.00 ± 1.24 ^b
GA ₃ (500 ppm)	28.66 ± 1.65 ^{bc}	34.00 ± 0.47 ^{cde}	39.33 ± 0.72 ^{cde}	25.66 ± 0.98 ^{de}	30.66 ± 1.90 ^f
GA ₃ (1000 ppm)	24.66 ± 0.72 ^{de}	30.33 ± 0.47 ^g	37.66 ± 0.72 ^{ef}	44.66 ± 1.44 ^a	63.66 ± 0.72 ^a
GA ₃ (1500 ppm)	22.00 ± 0.47 ^e	28.66 ± 0.72 ^g	35.66 ± 1.18 ^f	46.66 ± 0.72 ^a	66.66 ± 1.18 ^a
Control	39.66 ± 0.72 ^a	49.66 ± 0.98 ^a	54.33 ± 0.72 ^a	0.00 ± 0 ^f	27.66 ± 0.72 ^f
CD (<i>p</i> ≤ 0.05)	2.938	2.898	2.260	3.091	3.256

Plant height

Soaking the seeds in GA₃ @ 1500 ppm solution for 24 hours recorded the maximum plant height (4.83 cm, 15.33 cm, 33.70 cm, 46.80 cm and 56.13 cm) on 30, 60, 90, 120 and 150 DAS respectively. The minimum plant height (2.86 cm) was observed in seeds soaked with 0.75 ppm of kinetin for 24 hours. However, no seed germination initiated up to 30 DAS in control. The control (untreated seeds) registered the minimum plant height (6.20 cm, 16.56 cm, 26.66 cm and 37.06 cm) at 60, 90, 120 and 150 DAS respectively. The maximum plant height in GA₃ treated seeds might be credited to the fact that this hormone improved osmotic uptake of nutrients, triggering cell multiplication and elongation in the cambium tissue of the internodal region leading to rise in height of the plant because GA₃ seemingly triggers the metabolic processes or nullifies the consequence of growth inhibitors (Barathkumar, 2019). The results are in accordance with the findings of Harshavardhan and Rajasekhar (2012) in jackfruit.

Table 2. Effect of seed priming on plant height (cm) of peach cv. Sharbati

Treatments	30 Days	60 Days	90 Days	120 Days	150 Days
H ₂ SO ₄ Conc. 5 min	3.26 ± 0.07 ^b	7.16 ± 0.36 ^c	23.83 ± 0.17 ^d	36.56 ± 0.65 ^c	45.20 ± 0.87 ^d
H ₂ SO ₄ Conc. 10 min	3.00 ± 0.04 ^b	7.80 ± 0.38 ^{de}	20.60 ± 0.43 ^c	31.56 ± 0.62 ^d	47.96 ± 0.81 ^c
KNO ₃ (1%)	2.90 ± 0.04 ^b	8.50 ± 0.23 ^d	17.90 ± 0.62 ^f	28.60 ± 0.43 ^{ef}	42.50 ± 0.82 ^e
KNO ₃ (2%)	3.10 ± 0.14 ^b	8.03 ± 0.02 ^d	17.40 ± 0.52 ^f	30.36 ± 0.73 ^{de}	45.06 ± 0.09 ^d
Kinetin (0.50 ppm)	3.23 ± 0.19 ^b	12.03 ± 0.19 ^b	29.73 ± 0.42 ^b	37.76 ± 0.77 ^c	45.00 ± 0.68 ^{de}
Kinetin (0.75 ppm)	2.86 ± 0.21 ^b	10.03 ± 0.19 ^c	26.86 ± 0.50 ^c	32.16 ± 0.43 ^d	47.00 ± 1.29 ^{cd}
GA ₃ (500 ppm)	3.03 ± 0.07 ^b	7.32 ± 0.27 ^c	24.03 ± 0.28 ^d	36.63 ± 0.78 ^c	50.93 ± 0.73 ^b
GA ₃ (1000 ppm)	4.56 ± 0.23 ^a	14.40 ± 0.04 ^a	31.76 ± 0.40 ^{ab}	45.26 ± 0.36 ^a	52.90 ± 0.53 ^b
GA ₃ (1500 ppm)	4.83 ± 0.07 ^a	15.33 ± 0.23 ^a	33.70 ± 1.00 ^a	46.80 ± 0.61 ^a	56.13 ± 0.52 ^a
Control	0.00 ± 0 ^c	6.20 ± 0.12 ^f	16.56 ± 0.61 ^f	26.66 ± 0.43 ^f	37.06 ± 0.14 ^f
CD (<i>p</i> ≤ 0.05)	0.491	0.792	2.062	1.942	2.537

Stem diameter

Seeds soaking in GA₃ @ 1500 ppm for 24 hours recorded the maximum stem diameter (1.07 mm) at 30 DAS which was at par with GA₃ @ 1000 ppm for 24 hours and KNO₃ @ 1 % for 24 hours followed by concentrated H₂SO₄ for 10 minutes (0.87 mm). There were no seed germination takes place in control on 30 days after sowing. At 60, 90, 120 and 150 DAS, seeds treated with GA₃ @ 1500 ppm for 24 hours showed significantly higher stem diameter (2.02 mm, 3.11 mm, 4.58 mm and 5.51 mm). The minimum stem diameter was recorded in control (0.21 mm, 1.62 mm, 1.63 mm and 3.42 mm). The increase in the stem diameter by the treatment of gibberellic acid may be due to the fact that it caused the stimulation of cambium cells and immediate cell progeny by cell multiplication process (Dhankhar and Singh, 1996). Our results are in agreement with Kumar and Shahnaz (2013), who visualized an increased seedling diameter in the wild apricot seeds soaked in different concentrations of gibberellic acid.

Table 3: Effect of seed priming on stem diameter (mm) of peach cv, sharbati

Treatments	30 Days	60 Days	90 Days	120 Days	150 Days
H ₂ SO ₄ Conc. 5 min	0.73 ± 0.09 ^{bc}	1.42 ± 0.07 ^{bcd}	2.56 ± 0.06 ^{bcd}	3.42 ± 0.09 ^{cd}	4.56 ± 0.06 ^{bc}
H ₂ SO ₄ Conc. 10 min	0.87 ± 0.09 ^{ab}	1.61 ± 0.04 ^{bc}	2.67 ± 0.02 ^{bc}	3.57 ± 0.06 ^{cd}	4.49 ± 0.04 ^{bc}
KNO ₃ (1%)	1.02 ± 0.01 ^a	1.63 ± 0.14 ^b	2.87 ± 0.03 ^{ab}	4.18 ± 0.02 ^b	4.65 ± 0.05 ^b
KNO ₃ (2%)	0.52 ± 0.08 ^c	1.28 ± 0.13 ^d	2.33 ± 0.13 ^d	3.32 ± 0.05 ^d	3.69 ± 0.08 ^d
Kinetin (0.50 ppm)	0.60 ± 0.08 ^c	1.33 ± 0.12 ^{cd}	2.42 ± 0.12 ^{cd}	3.51 ± 0.05 ^{cd}	4.39 ± 0.06 ^c
Kinetin (0.75 ppm)	0.65 ± 0.10 ^{bc}	1.46 ± 0.06 ^{bcd}	2.47 ± 0.06 ^{cd}	3.50 ± 0.09 ^{cd}	4.40 ± 0.06 ^c
GA ₃ (500 ppm)	0.73 ± 0.09 ^{bc}	1.42 ± 0.07 ^{bcd}	2.64 ± 0.03 ^{bcd}	3.43 ± 0.10 ^{cd}	4.37 ± 0.11 ^c
GA ₃ (1000 ppm)	1.03 ± 0.03 ^a	2.01 ± 0.01 ^a	3.09 ± 0.05 ^a	3.63 ± 0.11 ^c	5.12 ± 0.007 ^a
GA ₃ (1500 ppm)	1.07 ± 0.007 ^a	2.02 ± 0.01 ^a	3.11 ± 0.04 ^a	4.58 ± 0.01 ^a	5.51 ± 0.08 ^a
Control	0.00 ± 0 ^d	0.21 ± 0.002 ^c	1.62 ± 0.15 ^e	1.63 ± 0.14 ^e	3.42 ± 0.10 ^e
CD (<i>p</i> ≤ 0.05)	0.232	0.305	0.320	0.310	0.234

Number of leaves per seedling

Seeds treated with GA₃ @ 1500 ppm for 24 hours recorded the maximum number of leaves per seedling (4.66) on 30 DAS which was statistically at par with GA₃ @ 1000 ppm solution for 24 hours. However, no seed germination takes place in control at 30 days after sowing. At 60, 90, 120 and 150 DAS, seeds treated with GA₃ @ 1500 ppm for 24 hours showed significantly higher number of leaves (21.66, 36.33, 43.66 and 48.33) respectively. The minimum number of leaves was recorded in control (5.00, 14.33, 16.33 and 31.00). Plant height is directly correlated to the number of leaves, which means more height, more will be the number of leaves and hence additional photosynthetic area which ultimately leads to more yield and productivity (Kaushal, 2016). Our findings are in consonance with the studies of Al-Hawezy (2013), who also found that the seed treatment of GA₃ resulted into increased number of leaves, while studying the effect of different concentration of gibberellins on germination and seedling growth in loquat.

Leaf area

Maximum leaf area (15.76 mm²) was recorded in seedling raised from seeds treated with GA₃ @ 1500 ppm for 24 hours at 30 DAS followed by GA₃ @ 1000 ppm for 24 hours (13.43 mm²). However, no seed germination initiated up to 30 days after sowing in control. At 60, 90, 120 and 150 DAS, seeds treated with GA₃ @ 1500 ppm for 24 hours showed significantly higher leaf area (25.00 mm², 32.60 mm², 38.50 mm² and 44.56 mm²) respectively. The minimum leaf area was recorded in control (10.03 mm², 15.60 mm², 18.40 mm² and 24.30 mm²) respectively. The increase in leaf area with seed coat removal may be due to the reason that early germination ultimately increased the seedling vigour. Hence, the better leaf area was correlated with

vigorous plants. These results are in line with Muralidhara et al. (2016), who studied the effect of seed coat removal on seed germination and seedling vigour in mango and found that the elimination of seed coat caused maximum leaf area. The present results are in conformism with the conclusions of Anjanawe et al. (2013) who also spotted the maximum leaf area in papaya seedlings with GA₃ application.

Table 4: Effect of seed priming on number of leaves of peach cv. Sharbati

Treatments	30 Days	60 Days	90 Days	120 Days	150 Days
H ₂ SO ₄ Conc. 5 min	9.13 ± 0.16 ^e	12.80 ± 0.14 ^{ef}	17.16 ± 0.19 ^d	21.83 ± 0.39 ^e	27.83 ± 0.38 ^e
H ₂ SO ₄ Conc. 10 min	10.90 ± 0.54 ^{cde}	17.83 ± 0.82 ^{bc}	21.73 ± 1.39 ^b	27.56 ± 0.87 ^{bcd}	33.56 ± 0.43 ^{bcd}
KNO ₃ (1%)	10.06 ± 0.68 ^{de}	14.53 ± 0.89 ^{cde}	20.03 ± 0.34 ^{bc}	25.63 ± 0.89 ^d	31.70 ± 0.47 ^d
KNO ₃ (2%)	10.53 ± 0.61 ^{cde}	16.80 ± 0.96 ^{bcd}	20.93 ± 0.27 ^b	26.53 ± 0.44 ^{cd}	32.46 ± 0.43 ^{cd}
Kinetin (0.50 ppm)	11.66 ± 0.89 ^{bcd}	17.40 ± 0.53 ^{bcd}	22.00 ± 0.63 ^b	28.63 ± 0.42 ^{bc}	34.63 ± 0.53 ^{bc}
Kinetin (0.75 ppm)	12.46 ± 0.40 ^{bc}	18.40 ± 2.10 ^b	22.66 ± 0.97 ^b	29.56 ± 1.36 ^b	35.53 ± 1.03 ^b
GA ₃ (500 ppm)	9.90 ± 0.66 ^{de}	13.90 ± 0.66 ^{de}	17.90 ± 0.70 ^{cd}	22.16 ± 0.28 ^e	28.23 ± 0.28 ^e
GA ₃ (1000 ppm)	13.43 ± 0.28 ^b	23.16 ± 1.08 ^a	31.50 ± 0.51 ^a	37.50 ± 0.46 ^a	43.60 ± 0.38 ^a
GA ₃ (1500 ppm)	15.76 ± 1.01 ^a	25.00 ± 1.48 ^a	32.60 ± 0.90 ^a	38.50 ± 0.82 ^a	44.56 ± 1.10 ^a
Control	0.00 ± 0 ^f	10.03 ± 0.43 ^f	15.60 ± 0.43 ^d	18.40 ± 0.77 ^f	24.30 ± 0.71 ^f
CD ($p \leq 0.05$)	2.077	3.827	2.680	2.643	2.354

Table 5: Effect of seed priming on leaf area (mm²) of peach cv. Sharbati

Treatments	30 Days	60 Days	90 Days	120 Days	150 Days
H ₂ SO ₄ Conc. 5 min	3.33 ± 0.54 ^{abcd}	13.33 ± 0.72 ^{cd}	25.33 ± 1.44 ^{bcd}	33.00 ± 0.47 ^{cd}	43.33 ± 0.72 ^{def}
H ₂ SO ₄ Conc. 10 min	2.66 ± 0.27 ^{cde}	12.00 ± 0.94 ^{cde}	26.33 ± 0.98 ^{bc}	34.00 ± 0.47 ^{bc}	44.00 ± 0.47 ^{cde}
KNO ₃ (1%)	1.33 ± 0.27 ^{ef}	10.33 ± 0.72 ^e	24.00 ± 0.47 ^{cd}	32.66 ± 0.72 ^{cd}	42.33 ± 0.72 ^{ef}
KNO ₃ (2%)	3.00 ± 0.00 ^{bcd}	11.00 ± 0.47 ^{de}	23.33 ± 0.72 ^{cd}	33.66 ± 0.72 ^{bcd}	41.00 ± 0.94 ^f
Kinetin (0.50 ppm)	2.00 ± 0.47 ^{de}	12.66 ± 1.18 ^{cde}	27.66 ± 0.72 ^b	31.00 ± 0.94 ^d	44.66 ± 0.72 ^{bcd}
Kinetin (0.75 ppm)	3.66 ± 0.54 ^{abc}	17.66 ± 0.72 ^b	28.00 ± 0.47 ^b	35.00 ± 0.94 ^{bc}	45.00 ± 0.47 ^{bcd}
GA ₃ (500 ppm)	2.33 ± 0.54 ^{cde}	14.00 ± 0.94 ^c	22.33 ± 0.72 ^d	36.33 ± 0.72 ^b	46.00 ± 0.47 ^{abc}
GA ₃ (1000 ppm)	4.33 ± 0.27 ^{ab}	20.66 ± 0.72 ^a	35.00 ± 0.47 ^a	42.00 ± 0.94 ^a	47.00 ± 0.47 ^{ab}
GA ₃ (1500 ppm)	4.66 ± 0.27 ^a	21.66 ± 0.72 ^a	36.33 ± 0.98 ^a	43.66 ± 0.72 ^a	48.33 ± 0.72 ^a
Control	0.00 ± 0 ^f	5.00 ± 0.47 ^f	14.33 ± 1.96 ^e	13.33 ± 0.72 ^e	31.00 ± 0.94 ^g
CD ($p \leq 0.05$)	1.435	2.740	3.510	2.928	2.614

Conclusion

On the basis of study, it was concluded that GA₃ @ 1500 ppm and GA₃ @ 1000 ppm for 24 hours proved to be an effective seed treatment for better seed germination and seedling growth of peach cv. Sharbati.

References

Al-Hawezy SMN (2013) The role of the different concentrations of GA₃ on seed germination and seedling growth of loquat (*Eriobotrya japonica* L.). Journal of Agricultural and Veterinary Science 4:03-06.

- Ali J and Hama SF (2014) Utilization of wild pear rootstock as a natural resource for Loquat production under rainfed condition in Sulaimani Governorate. *Tikrit University Journals for Humanities* 19:1-12.
- Anburani A and Shakila A (2010) Influence of seed treatment on the germination and seedling vigour of papaya. *Acta Horticulture* 851:295-298.
- Anjanawe SR, Kanpure RN, Kachouli BK, et al. (2013) Effect of plant growth regulators and growth media on seed germination and growth vigour of papaya (*Carica papaya* L.) seedlings cv. Barwani Red. *Annals of Plants and Soil Research* 15:31-34.
- Babu KD, Patel RK, Singh A, et al. (2010) Seed germination, seedling growth and vigour of papaya under north east condition. *Acta Horticulture* 851:299-306.
- Bagal AB (2004) Effect of various treatments on seed germination and seedling vigour in aonla (*Emblica officinalis* Gaertn.). M.Sc. Thesis Mahatama Phule Krishi Vidyapeeth, Rahuri.
- Barathkumar TR (2019) Studies on effect of different seed treatments in dormancy breaking in aonla (*Phyllanthus emblica* L.). *Journals of Pharmacy and Phytohormones* 2:131-133.
- Barche SK, Singh K and Singh DB (2010) Response of seed treatment on germination, growth, survivability and economics of different cultivars of papaya (*Carica papaya* L.). *Acta Horticulture* 851:279-281.
- Binang WB, Shiyam JO and Ntia JD (2012) Effect of seed priming methods on agronomic performance and cost effectiveness of rainfed, dry-seeded NERICA rice. *Research Journal Seed Science* 5:136-143.
- Chaurasiya PC and Mishra RK (2017) Varietal performance of peach (*Prunus persica* L. Batsch) under north hill zone of Chhattisgarh 5:37-40.
- Cho JS and Lee CH (2018) Effect of germination and water absorption on scarification and stratification of kousa dogwood seed. *Horticultural Environment and Biotechnology* 59:335-344.
- Dhankar DS and Singh M (1996) Seed germination and seedling growth in aonla (*Phyllanthus emblica* L.) as influenced by gibberellic acid and thiourea. *Crop Research* 12:363-366.
- Dhinesh Babu K, Patel RK, Singh A, et al. (2010) Seed germination, seedling growth and vigour of papaya under north east India condition. *Acta Horticulture* 851:299-306.
- Gangwar D, Arora RL and Gaur GS (2005) Compatibility behavior of plum rootstocks with peach scions. *Acta Horticulture* 696:177-180.
- Hancock JF, Scorza R and Lobos GA (2008) Temperate fruit crop breeding: Germplasm to genomics 265-298.
- Harshavardhan A and Rajasekhar M (2012) Effect of pre-sowing seed treatments on seedling growth of jackfruit (*Artocarpus heterophyllus* Lam.) *Journal Research ANGRAU* 40:87-89.
- Hartman HT and Kester DE (1979) *Plant propagation principles and practices*. Fourth Edition, Prentice Hall of India, Ltd., New Delhi pp. 407.
- Kant R, Shukla RK and Shukla A (2018) A review on peach (*Prunus persica*): an asset of medicinal phytochemicals. *International Journal for Research in Applied Science and Engineering Technology* 6:2186-2200.
- Kaushal M (2016) Studies on macro and micro nutrients on yield and quality of garlic. M.Sc. Thesis. Dr. YS Parmar University of Horticulture and Forestry, Nauna, Solan.
- Kim DH (2014) Practical methods for rapid seed germination from seed coat-imposed dormancy of *Prunus yedoensis*. *Science and Horticulture* 243:451-456.

Kumar A and Shahnaz E (2013) Effect of growth regulating substances on stratification of wild apricot (*Prunus armeniaca* L.) kernels under Kashmir conditions. *Indian Journal of Agricultural Sciences* 83:1253-1256.

Martinez-Gomez P and Dicenta F (2001) Mechanisms of dormancy in seeds of peach (*Prunus persica* L. Batsch) cv. GF305. *Scientia Horticulturae* 91:51-58.

Muralidhara BM, Reddy YTN, Srilatha V, et al. (2016) Effect of seed coat removal treatments on seed germination and seedling attributes in mango varieties. *International Journal of Fruit Science* 16:01-09.

Parera C and Cantliffe DJ (1994) Pre –sowing seed priming. Horticulture Science Department University of Florida, Gainesville Florida 32611.

Shah RA, Arti S, Wali VK, et al. (2013) Effect of seed priming on peach, plum and apricot germination and subsequent seedling growth. *Indian Journal of Horticulture* 70:591-594.

Vasanth PT, Vijendrakumar RC, Guruprasad TR, et al. (2014) Studies on effect of growth regulators and biofertilizers on seed germination and seedling growth of tamarind (*Tamarindus indica* L.). *Plant Archives* 14:155-160.

Wang M, Van Der Meulen RM, Visser K, et al. (1998) Effects of dormancy-breaking chemicals on ABA levels in barley grain embryos. *Seed Science Research* 8:129–137.

Ynoue CK, Ono EO, Marchi L, et al. (1999) The effect of gibberellic acid on kiwi (*Actinidia chinensis* Pl.) seed germination. *Science Agricola* 56:9-12.

Author Contributions

GK, VS, MS and MK conceived the concept, wrote and approved the manuscript.

Acknowledgements

Not applicable.

Funding

There is no funding source for the present study.

Availability of data and materials

Not applicable.

Competing interest

The authors declare no competing interests.

Ethics approval

Not applicable.



Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution, and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The images or other third-party material in this article are included in the article's Creative Commons license unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. Visit for more details <http://creativecommons.org/licenses/by/4.0/>.

Citation: Kaur G, Singh V, Singh M and Kaur M (2022) Seed Priming for Improving Seed Germination and Growth of Peach cv. Sharbati. *Environ Sci Arch* 1(STI-1): 34-40.