

Original Research Article

Unveiling the Impact of Salinity Level on Chilli: Growth, Yield and Quality Analysis

ABSTRACT

This research, conducted between August 2021 and February 2022 at the Horticulture Research Farm of SHUATS, Prayagraj, aimed to determine the suitable salinity levels for chilli cultivation in the lower Gangetic plains of Uttar Pradesh, India. The study also assessed the variability of chilli crops in India to identify appropriate genotypes for this region. A factorial randomized block design with three replications was implemented, consisting of combinations of ~~with~~ four salinity levels (0 dS/m, 3 dS/m, 6 dS/m, and 9 dS/m) and three genotypes (Surajmukhi, AVT-2 2019 CHIHBY-5, and AVT-2 2019 CHIHBY-6). Various growth, yield, quality, and disease infestation attributes were evaluated, including plant height (at 30, 60, and 90 days after transplanting), number of fruits per plant, average fruit weight, fruit yield per plant, fruit yield per hectare, total soluble solids (TSS), ascorbic acid content, chlorophyll content, and disease infestation. Among all the genotypes, AVT-2 2019 CHIHBY-6 exhibited superior performance when grown under a salinity level of 0 dS/m. It demonstrated desirable plant height at 30, 60, and 90 days after transplanting (30.06 cm, 32.50 cm, and 78.00 cm, respectively), along with a higher number of fruits per plant (40), average fruit weight (94.86 g), fruit yield per plant (1769.20 g), fruit yield per hectare (65.52 tons/ha), TSS (6.16 Brix), ascorbic acid content (113 mg/100g), chlorophyll content (34.42), and disease resistant (99%). Significant differences were observed among genotypes and their interactions concerning salinity levels across all attributes investigated.

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13 *Keywords: Chilli, Salinity, Growth, Yield, Genotypes.*

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15 1. INTRODUCTION

16 Chilli (*Capsicum annum* L.) is one of the vegetable or spices known and used all over the
17 world for its green fruits and pungency. Chilli belongs to the genus *Capsicum* family
18 Solanaceae. It is a diploid (2n=24) species and genetically self-pollinated and
19 chasmogamous crop whose flowers open only after pollination. However, 2 to 96% out-
20 crossing was observed under open pollination (AVRDC, 2000). There are mainly four
21 cultivated *Capsicum* species and they are originated from South and Central America, chilli
22 has more than 25 species of which only five (*C. annum* L., *C. chinense*, *C. frutescens* L.,
23 *C. baccatum* L. and *C. pubescens*.) are domesticated and cultivated (Costa et al., 2009).

24 Chilli has been used since ancient times, traditionally in the form of spice. It is also used as

25 a natural flavor and colorant in food industry as well as raw material for the pharmaceutical industry. Chilli is nutritious
26 crop, every 100 gm of green and dry chilli yield about 229 and

297 calories of energy. It is mainly cultivated for three constituents of fruits viz., capsaicin,

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27 capsanthin and oleoresin. Chilli requires 15-35°C of temperature for cultivation. Chillies
 28 should not be in a position where the night temperature falls below 12°C. Growth will be
 29 inhibited if temperatures fall below 15°C. Chilli plants are a type of seasonal crops (annual
 30 plant) which only live for one season and die. If cultivated, this plant can grow and
 31 produce for several months after planting after which it will die.

32 Salinity is becoming one of the major barriers against successful production of crops in
 33 India. It is one of the critical stresses to which crop plants are exposed and is a serious
 34 limiting factor against crop production. Salinity causes stunted growth of plants that
 35 ultimately lead to reduced yield. Many horticultural crops are more or less susceptible to
 36 salinity as a result of production of these crops is hugely affected by this. Chilli is reported as
 37 a crop which is sensitive to moderately sensitive to salinity. According to Carter (1994), a
 38 salinity level of less than 1920 ppm is suitable for chilli. Under stressed conditions such as
 39 low temperature and salinity, delayed and non-uniform germination of chilli is observed.

40 2. MATERIAL AND METHODS

41 The investigation entitled "Unveiling the impact of salinity level on Chilli: Growth, Yield and
 42 Quality Analysis" was done to understand the plant growth, fruit yield and quality of Chilli using
 43 different combinations of treatment using different varieties which was carried out at Horticultural
 44 Research Farm (HRF), Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom
 45 University of Agriculture, Technology and Sciences (SHUATS), Prayagraj during the Rabi season
 46 of 2021-2022.
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48 2.1. Location and climatic conditions

49 Prayagraj is located in the central plains sub-zone of Agro-climatic Zone V, according to the
 50 Perspective and Strategic Plan (SPSP) for WMP of Uttar Pradesh, issued by the Department of
 51 Land Development and Water Resources, Government of U.P. Naini, situated between latitude
 52 20° 33' 40" to 21° 50' N and longitude 73° 27' 58" to 73° 56' 36" E, experiences a tropical climate.
 53 The area has relatively hot summers, moderately cold winters, and a humid and warm monsoon
 54 season. The region receives heavy rainfall primarily during June to September, with the majority
 55 of precipitation occurring during the monsoon months of July and August.

56 2.2. Experimental Materials

57 Table 1: Factor-A (Genotypes)

S.No.	Notations	Hybrid details	Source
1	V ₁	SURAJMUKHI	Sahavi Hybrid seeds
2	V ₂	AVT-22019(CHIHBY-5)	IIVR, Varanasi
3.	V ₃	AVT-22019(CHIHBY-6)	IIVR, Varanasi

58 Table 2: Factor-B (Treatments)

S.No.	Notations	Treatment Details
1.	T ₀	0dS/m
2.	T ₁	3dS/m
3.	T ₂	6dS/m
4.	T ₃	9dS/m

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63 Table 3: Factor-A X Factor-B (Genotypes and treatment combinations)

S.No.	Notations	Treatment Details (Factor-A x Factor-B)
1.	V ₁ T ₀	Surajmukhi (Salt concentration @ 0dS/m)
2.	V ₁ T ₁	Surajmukhi (Salt concentration @ 3dS/m)
3.	V ₁ T ₂	Surajmukhi (Salt concentration @ 6dS/m)

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4.	V ₁ T ₃	Surajmukhi(Saltconcentration@9dS/m)
5.	V ₂ T ₀	AVT-22019(CHIHBYB-5)(Saltconcentration@0dS/m)
6.	V ₂ T ₁	AVT-22019(CHIHBYB-5)(Saltconcentration@3dS/m)
7.	V ₂ T ₂	AVT-22019(CHIHBYB-5)(Saltconcentration@6dS/m)
8.	V ₂ T ₃	AVT-22019(CHIHBYB-5)(Saltconcentration@9dS/m)
9.	V ₃ T ₀	AVT-22019(CHIHBYB-6)(Saltconcentration@0dS/m)
10.	V ₃ T ₁	AVT-22019(CHIHBYB-6)(Saltconcentration@3dS/m)
11.	V ₃ T ₂	AVT-22019(CHIHBYB-6)(Saltconcentration@6dS/m)
12.	V ₃ T ₃	AVT-22019(CHIHBYB-6)(Saltconcentration@9dS/m)

64 3. RESULTS AND DISCUSSION

65 3.1. Growth Parameters

66 3.1.1. Plant Height for 30 DAT, 60 DAT and 90 DAT (cm)

67 Analysis of plants shows significant effect on plant height at 30, 60 and 90 DAT. The maximum
68 plant height was recorded in V₃T₀ [AVT-22019(CHIHBYB-6)(salt conc. @0dS/m)] with (30.06cm),
69 (32.50cm) and (78.00cm) respectively and the minimum plant height was recorded in V₁T₃
70 [Surajmukhi(salt conc. @9dS/m)] with (6.50cm), (12.66cm) and (25.26cm) respectively. The
71 results are in confirmation with **Kumar et al (2014)**. They found that salinity significantly reduced
72 plant height, stem diameter, and leaf area of chili plants. The decrease in plant height was
73 attributed to a reduction in cell expansion due to the osmotic stress caused by salinity. Salinity
74 can cause oxidative stress in plants by generating reactive oxygen species (ROS) such as
75 superoxide radicals, hydrogen peroxide, and hydroxyl radicals. ROS can damage lipids, proteins,
76 and nucleic acids, which can impair plant growth and development. Overall, the combined effects
77 of water stress, ion toxicity, and oxidative stress caused by salinity can result in reduced plant
78 height and biomass. 83

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90 **Table4:EffectofsalinityonPlantheight(cm)**

Notations	TreatmentDetails	PlantHeight(cm)		
		30DAT	60DAT	90DAT
V ₁ T ₀	Surajmukhi(saltconc. @0dS/m)	15.00	30.20	70.66
V ₁ T ₁	Surajmukhi(saltconc. @3dS/m)	9.76	16.5	32.90
V ₁ T ₂	Surajmukhi(saltconc. @6dS/m)	7.33	14.46	28.96
V ₁ T ₃	Surajmukhi(saltconc. @9dS/m)	6.50	12.66	25.26
V ₂ T ₀	AVT-22019(CHIHBYB-5) (saltconc. @0dS/m)	23.23	31.30	72.13
V ₂ T ₁	AVT-22019(CHIHBYB-5) (saltconc. @3dS/m)	11.33	23.5	46.83
V ₂ T ₂	AVT-22019(CHIHBYB-5) (saltconc. @6dS/m)	8.50	16.7	32.3
V ₂ T ₃	AVT-22019(CHIHBYB-5) (saltconc. @9dS/m)	7.13	14.10	28.13
V ₃ T ₀	AVT-22019(CHIHBYB-6) (saltconc. @0dS/m)	30.06	32.50	78
V ₃ T ₁	AVT-22019(CHIHBYB-6) (saltconc. @3dS/m)	24.45	25.50	47.16
V ₃ T ₂	AVT-22019(CHIHBYB-6) (saltconc. @6dS/m)	22.23	17.46	35.5
V ₃ T ₃	AVT-22019(CHIHBYB-6) (saltconc. @9dS/m)	20.20	15.40	27.76

91 **3.2. YieldParameters**

92 **3.2.1. Number of fruits per plant**

93 The average number of fruits per plant varied significantly among different treatment
 94 combinations. The maximum average number of fruits per plant (40.00) was observed
 94 in V₃T₀
 95 [AVT-22019(CHIHBYB-6)(saltconc. @0dS/m)] and the minimum average number of fruits per
 96 plant (6.00) were observed in V₁T₃ [Surajmukhi(saltconc. @9dS/m)] while the remaining
 97 treatments were moderate. Salinity significantly reduced the number of fruits per plant, with the
 98 highest reduction observed at the highest salinity level. The study also found that the genotypes
 99 differed in their response to salinity, with some genotypes being more tolerant than others. Similar
 100 findings were reported by [Ahmed et al \(2010\)](#).

101 **3.2.2. Average Weight of 10 fruits per plant (g)**

102 The average weight of 10 fruits varied significantly among different treatment combinations. The
 103 maximum average fruit weight (94.86g) was observed in V₃T₀ [AVT-22019(CHIHBYB-6)(salt
 104 conc. @0dS/m)] and the minimum average weight of 10 fruits (13.53g) were observed in V₁T₃
 105 [Surajmukhi(saltconc. @9dS/m)] while the remaining treatments were moderate. Salinity levels
 106 led to a decrease in the availability of nutrients such as nitrogen, phosphorus, and potassium,
 107 resulting in reduced growth and fruit weight. The researchers also found that salinity caused
 108 oxidative stress in the plants, leading to a decrease in photosynthesis and ultimately a reduction
 109 in fruit weight.

110 **3.2.3. Average fruit yield per plant (g)**

111 The average fruit yield per plant varied significantly among different treatment combinations. The
 112 maximum average fruit yield per plant (1769g) was observed in V₃T₀ [AVT-22019(CHIHBYB-6)

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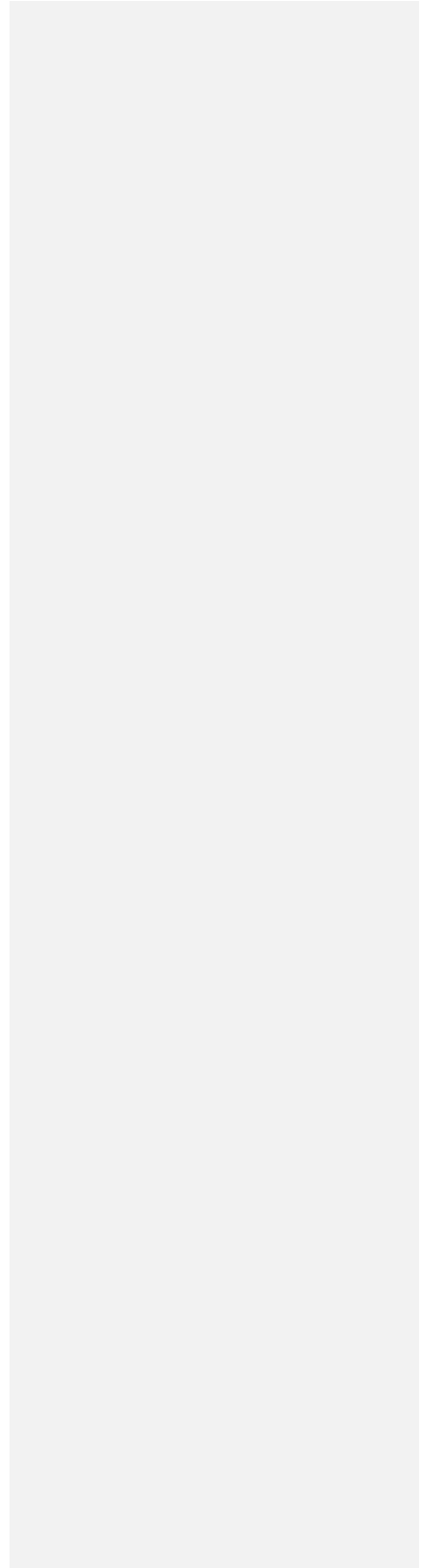
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113 (saltconc.@0dS/m)]andtheminimumaveragefruityieldperplant(261.19g)wasobservedin
114 V₁T₃[Surajmukhi(saltconc.@9dS/m)]whiletheremainingtreatmentsweremoderate.when
115 plantsareexposedtohighlevelsofsalt,theosmoticpotentialofthesoilsolutionincreases,
116 makingitmoredifficultforplantstoabsorbwaterandnutrients.Thiscanleadtowaterstress,

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117 nutrient deficiency, and reduced plant growth. Additionally, salt stress can damage the plant's
 118 cellular membranes, affect enzyme activity, and disrupt the balance of ions and hormones in the
 119 plant, further reducing fruit yield. Similar findings were reported by [Moradi et al. \(2018\)](#)

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120 3.2.4. Fruit yield per hectare (ton/ha)

121 The fruit yield per hectare varied significantly among different treatment combinations. The
 122 maximum fruit yield per hectare (65.52 ton/ha) was observed in V₃T₀ [AVT-22019 (CHIHBY-6)
 123 (salt conc. @ 0dS/m)] and the minimum average fruit yield per plant (9.67 ton/ha) was observed
 124 in V₁T₃ [Surajmukhi (salt conc. @ 9dS/m)] while the remaining treatments were moderate. Salinity
 125 level affected the physiological and biochemical properties of the plants. Specifically, they found
 126 that the salinity level increased the concentration of sodium and chloride ions in the plant tissues,
 127 which can cause ion toxicity and damage to the plant cells. In addition, they found that the salinity
 128 level decreased the concentration of chlorophyll and carotenoid pigments, which can lead to a
 129 decrease in photosynthesis and a reduction in the plant's ability to produce fruit. This study
 130 provides evidence that high levels of salinity can have a negative impact on the yield and quality
 131 of chilli fruit by causing water stress, ion toxicity, and reducing the plant's ability to carry out
 132 photosynthesis. Similar findings were reported by [Razzaghi et al. \(2011\)](#).

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133 Table 5: Effect of salinity on Number of fruits per plant, weight of 10 fruits (g), average fruit yield per plant
 134 (g) and fruit yield per hectare (t/ha).

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Notations	Treatment Details	Number of fruits per plant	Weight of 10 fruits	Average fruit yield per plant	Fruit yield per hectare
V ₁ T ₀	Surajmukhi (salt conc. @ 0dS/m)	23.33	28.06	868.39	32.16
V ₁ T ₁	Surajmukhi (salt conc. @ 3dS/m)	18.66	24.4	706.41	26.16
V ₁ T ₂	Surajmukhi (salt conc. @ 6dS/m)	16.33	19.26	605.59	22.42
V ₁ T ₃	Surajmukhi (salt conc. @ 9dS/m)	6.00	13.53	261.19	9.67
V ₂ T ₀	AVT-22019 (CHIHBY-5) (salt conc. @ 0dS/m)	30.00	28.36	1070.20	39.63
V ₂ T ₁	AVT-22019 (CHIHBY-5) (salt conc. @ 3dS/m)	27.00	24.30	955.8	35.39
V ₂ T ₂	AVT-22019 (CHIHBY-5) (salt conc. @ 6dS/m)	20.66	19.36	736.21	27.26
V ₂ T ₃	AVT-22019 (CHIHBY-5) (salt conc. @ 9dS/m)	13.66	16.70	510.21	18.89
V ₃ T ₀	AVT-22019 (CHIHBY-6) (salt conc. @ 0dS/m)	40	94.86	1769.20	65.52
V ₃ T ₁	AVT-22019 (CHIHBY-6) (salt conc. @ 3dS/m)	31.66	81.93	1441.60	53.39
V ₃ T ₂	AVT-22019 (CHIHBY-6) (salt conc. @ 6dS/m)	28.33	48	1137.99	42.14
V ₃ T ₃	AVT-22019 (CHIHBY-6) (salt conc. @ 9dS/m)	25.66	58.1	1118.61	41.42

140 minimum TSS (3.73 Brix^o) was observed in V₁T₃ [Surajmukhi (salt conc. @ 9dS/m)] while the remaining treatm
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142 stress on the accumulation of TSS in chilli fruits. The researchers found that salt stress reduced
143 the activity of key enzymes involved in the synthesis of sugars, such as sucrose synthase and
144 invertase. They suggested that this reduction in enzyme activity may be responsible for the
145 decrease in TSS accumulation.

146 3.3.2. Ascorbic acid (mg/100g)

147 The ascorbic acid of the fruit varied significantly among different treatment combinations. The
148 maximum ascorbic acid (113 mg/100g) was observed in V₃T₀ [AVT-22019 (CHIH YB-6) (salt
149 conc. @0 dS/m)] and the minimum ascorbic acid content (70.33 mg/100g) was observed in V₁T₃
150 [Surajmukhi (salt conc. @9 dS/m)] while the remaining treatments were moderate. A study by
151 **Zhang et al. (2018)** found that salinity stress decreased the net photosynthetic rate, stomatal
152 conductance, and transpiration rate in chilli plants, leading to a reduction in plant growth and
153 ascorbic acid content. Salinity stress also caused an imbalance in ion homeostasis, with higher
154 accumulation of sodium and chloride ions in leaves, leading to toxicity symptoms and decreased
155 ascorbic acid content. Salinity stress affects multiple physiological processes in chilli plants,
156 leading to decreased ascorbic acid content. The disruption of photosynthesis and ion transport,
157 as well as the induction of oxidative stress, contribute to the negative impact of salinity on
158 ascorbic acid content in chilli peppers.

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159 3.3.3. Chlorophyll content

160 The chlorophyll content in the fruit varied significantly among different treatment combinations.
161 The maximum chlorophyll content (34.4) was observed in V₃T₀ [AVT-22019 (CHIH YB-6) (salt
162 conc. @0 dS/m)] and the minimum chlorophyll content (10.23) was observed in V₁T₃ [Surajmukhi
163 (salt conc. @9 dS/m)] while the remaining treatments were moderate. A study by **Zhang et al.**
164 **(2018)** showed that salinity stress decreased chlorophyll content in different chilli cultivars by
165 reducing the activities of enzymes involved in chlorophyll synthesis, such as δ -aminolevulinic acid
166 synthase and protochlorophyllide oxidoreductase. Salinity also impaired the uptake and transport
167 of minerals, such as nitrogen, magnesium, and iron, which are essential for chlorophyll synthesis
168 and stability. Moreover, salinity-induced oxidative stress affects the stability and function of
169 chlorophyll molecules, leading to chlorophyll degradation and reduced chlorophyll content.
170 Another study by **Yang et al. (2014)** found that salinity stress increased the production of reactive
171 oxygen species (ROS) in chloroplasts, leading to oxidative damage to chlorophyll molecules and
172 decreased chlorophyll content.

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184 **Table6:EffectofsalinityonTSS(Brix⁰),ascorbic acid(mg/100g)andchlorophyllcontent**

Notations	TreatmentDetails	TSS (Brix ⁰)	Ascorbic acid(mg/100g)	Chlorophyll content
V ₁ T ₀	Surajmukhi(saltconc. @0dS/m)	5.43	102.33	21.30
V ₁ T ₁	Surajmukhi(saltconc. @3dS/m)	5.33	96.33	19.36
V ₁ T ₂	Surajmukhi(saltconc. @6dS/m)	4.23	72.33	15.30
V ₁ T ₃	Surajmukhi(saltconc. @9dS/m)	3.73	70.33	10.23
V ₂ T ₀	AVT-22019(CHIHBYB-5) (saltconc. @0dS/m)	5.96	102.33	23.3
V ₂ T ₁	AVT-22019(CHIHBYB-5) (saltconc. @3dS/m)	5.26	91.33	21.3
V ₂ T ₂	AVT-22019(CHIHBYB-5) (saltconc. @6dS/m)	4.96	81.33	15.33
V ₂ T ₃	AVT-22019(CHIHBYB-5) (saltconc. @9dS/m)	4.70	72.33	12.33
V ₃ T ₀	AVT-22019(CHIHBYB-6) (saltconc. @0dS/m)	6.16	113	34.42
V ₃ T ₁	AVT-22019(CHIHBYB-6) (saltconc. @3dS/m)	6.00	106.33	32.26
V ₃ T ₂	AVT-22019(CHIHBYB-6) (saltconc. @6dS/m)	5.16	93	28.23
V ₃ T ₃	AVT-22019(CHIHBYB-6) (saltconc. @9dS/m)	4.93	85.66	25.26

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186 **3.4. Disease incidence**

187 Disease incidence varied significantly among different treatment combinations. Leaf curl
 188 resistance (99%) was observed in V₃T₀ [AVT-22019(CHIHBYB-6) (saltconc. @0dS/m)] and the
 189 leaf curl susceptible (49.80%) was observed in V₁T₃ [Surajmukhi (saltconc. @9dS/m)] while the
 190 remaining treatments were moderate. A study by **Zaidi et al. (2019)** investigated the effect of
 191 salinity on the incidence of Chili Leaf Curl Virus (CLCV) disease in chili plants. The result of this
 192 study showed that as salinity levels increased, the incidence of CLCV disease also increased.
 193 The authors suggested that the high salt levels may have affected the activity of enzymes
 194 involved in the biosynthesis of plant hormones, leading to a decrease in the levels of salicylic acid
 195 (SA) and jasmonic acid (JA) in the plant. These two hormones are known to play a key role in
 196 plant defense against viral infections. Another study by **Khan et al. (2019)** investigated the effect
 197 of salinity on the incidence of Pepper vein yellowing virus disease in chili plants. The result of this
 198 study showed that as salinity levels increased, the incidence of PeVYV disease also increased.

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199 **4. CONCLUSION**

200 From the experimental finding it is concluded that V₃T₀ [AVT-22019 CHIHBYB-6(salt
 201 conc. @0dS/m)] is best in terms of growth, yield, quality and disease incidence parameters
 202 viz., plant height (30, 60 and 90 DAT), weight of 10 fruits per plant, number of fruits per plant, fruit
 203 yield per plant, fruit yield per hectare, TSS, ascorbic acid and chlorophyll content and disease
 204 incidence

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REFERENCES

1. Munns, R., & Tester, M. (2008). Mechanisms of salinity tolerance. *Annual Review of Plant Biology*, 59, 651-681.
2. Mustafa, G., Ahmad, R., & Hameed, A. (2014). Morpho-physiological responses of different chilli (*Capsicum annuum* L.) genotype to NaCl-induced salinity. *Pakistan Journal of Botany*, 46(2), 681-690.
3. Gupta, B., Huang, B., & Huang, Y. (2014). Mechanism of salinity tolerance in plants: physiological, biochemical, and molecular characterization. *International Journal of Genomics*, 2014, 1-18.
4. Khan, N., Bano, A., & Rahman, M. A. (2016). Priming with NaCl improves hot pepper seed performance under salinity stress. *Journal of Plant Interactions*, 11(1), 77-84.
5. Munns, R., James, R. A., & Läuchli, A. (2006). Approaches to increasing the salt tolerance of wheat and other cereals. *Journal of Experimental Botany*, 57(5), 1025-1043.
6. Zaidiet al. (2019) Effect of sodium chloride on the performance of chili pepper (*Capsicum annuum* cv. Landung). *Journal of Horticulture and Plant Research*, 1(2), 49-53.
7. Mandal, B., Sarkar, B. L., & Kundu, S. (2009). Salinity induced changes in the growth and enzyme activities in contrasting rice (*Oryza sativa* L.) cultivars. *African Journal of Biotechnology*, 8(7), 1244-1252.
8. Hasanuzzaman, M., Nahar, K., Alam, M. M., Bhowmik, P. C., Hossain, M. A., Rahman, M. M., ... & Fujita, M. (2014). Physiological, biochemical, and molecular mechanisms of heat stress tolerance in plants. *International Journal of Molecular Sciences*, 15(5), 9643-9684.

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