Vol 7, Issue 7, 2024 **Impact Factor: 5.099** DOI: https://doi.org/10.31426/ijamsr.2024.7.7.7511

International Journal of
Advanced Multidisciplinary Scientific Research (IJAMSR) ISSN:2581-4281

Soil Salinity Effect on Characteristic of Coriandrum Sativum L: A Special Investigation on Haryana, Punjab

Poonam Yadav

Department of Botany, All India Jat Heroe's Memorial College
Maharshi Dayanand University, Rohtak

A B S T R A C T

Soil salinity, characterized by high concentrations of soluble salts, poses a significant challenge to agriculture by disrupting essential plant processes. Coriandrum sativum, or coriander, is particularly vulnerable to saline conditions, which adversely affect its growth, development, and quality. Salinity stress impairs water uptake and nutrient absorption, leading to reduced germination rates, stunted growth, and decreased yield. Physiologically, it causes lower chlorophyll content and diminished photosynthetic efficiency, further compromising plant health. Additionally, high soil salinity disrupts the uptake of essential nutrients, resulting in deficiencies that impact seed development and reduce essential oil production. This reduction in essential oils affects coriander's flavor and aroma, diminishing its culinary and medicinal value. Addressing soil salinity involves exploring plant tolerance mechanisms and implementing effective soil management practices. Such strategies are crucial for improving coriander cultivation in saline-affected areas, enhancing both crop yield and quality, and ensuring its viability as a valuable agricultural product.

Keywords: Soil Salinity**,** Coriandrum sativum**,** Essential Oils

1. Introduction

Soil salinity, a growing concern in agricultural practices, has emerged as a significant factor influencing crop productivity and quality. It is characterized by the presence of excessive soluble salts in the soil, which disrupts plant growth and development. Among the myriad crops affected by soil salinity, *Coriandrum sativum*, commonly known as coriander or cilantro, is particularly vulnerable. This herb, widely valued for its culinary and medicinal applications, thrives under optimal conditions, but its productivity and quality can be severely compromised in saline environments. Coriander is a versatile herb with a global culinary presence, known for its distinctive

International Journal of
Advanced Multidisciplinary Scientific Research (IJAMSR) ISSN:2581-4281

flavor and aroma imparted by its essential oils. It is also utilized in traditional medicine and as a source of nutritional benefits. However, the growth and quality of coriander are highly sensitive to soil conditions, including salinity. Soil salinity can lead to several adverse effects on coriander plants, including reduced germination rates, stunted growth, and decreased yield. These impacts are primarily due to the physiological stress imposed by high salt concentrations, which interfere with water uptake and nutrient absorption [1-2].

The effects of soil salinity on coriander extend beyond mere growth parameters. Morphological changes, such as reduced leaf size and thinner stems, are common under saline stress. Additionally, salinity can affect the physiological processes of the plant, including photosynthesis and respiration, leading to lower chlorophyll content and diminished photosynthetic efficiency. These changes adversely impact the overall health and vigor of the plants. Moreover, the presence of excess salts in the soil disrupts the uptake of essential nutrients, which are crucial for the plant's development and oil production. As a result, coriander plants growing in saline conditions often exhibit deficiencies in key nutrients, leading to suboptimal seed development and reduced essential oil content. The alteration in essential oil composition can influence the flavor and aroma of the coriander, thereby affecting its culinary value [3].

2. Reviews of Literature

Mishra et al (2015). In order to isolate rhizospheric bacteria on selective nutrient agar media, fennel plant and soil samples were gathered from the districts of Ajmer, Pali, Jhalawar, and Kota in the state of Rajasthan. Fourteen soil samples were examined for phosphate solubilising bacteria count, pH, and EC. The pH of the fennel field soil samples that were obtained from various districts of the Indian state of Rajasthan varied from 8.8 to 7.6, while the EC ranged from 1.02 to 0.15 dS/m in the current examination of fennel soil samples. On Pikovskaya medium containing tricalcium phosphate, sixteen phosphate-solubilizing microorganisms were isolated. These were then tested on NBRIP phosphate broth, where the decolorisation of bromophenol blue indicated the presence of acid generation. In NBRIP broth, a quantitative test for phosphate solubilisation was conducted. The bacterial isolates FEN-14 showed the highest phosphate solubilisation in the broth experiment, comparable to FEN-1 and FEN-5.

Kumari, A., & Maiti, R. (2016). environment change is a multifaceted phenomenon characterised by gradual and ongoing changes in the environment, which have significant implications for different kinds of plants that were used to stable or mostly stable climates. A brief discussion is given of potential adaptation strategies for managing the effects of climate change, including creating cultivars resistant to floods and droughts and tolerant of heat and salinity stress, changing crop management practices, enhancing water management, implementing new farming methods like resource-conserving technologies, crop diversification, and improving pest management. The chapter provides a concise evaluation of studies conducted on the effects of global warming and climate change on a range of topics, including: (1) climate change's effects on forestry and agricultural production; (2) crop production; (3) the impact of rising carbon dioxide levels on life security; (4) the impact of climate change on food inflation; (5) suggestions for different climate change mitigation strategies; (6) carbon sequestration technology to reduce carbon pollution; (7) climate-smart agriculture; (8) conservation practices under rain-fed agriculture; (9) intercropping; (10) genotype × environment; and (11) the impact of climate change on livestock production. The chapter also discusses technologies that must be adopted to tackle climate change.

Banyal et al (2017). 15% of the world's landmass is made up of saline soils, which have a direct impact on how current land users produce their goods. 2.92 Mha of the 6.75 Mha of salt-affected land in India are made up of saline soils. The threat to the irrigated lands is growing yearly and has become a serious worry. Agroforestry is essential to the ecological improvement of these landmasses and serves as a check on their further spread. Agroforestry models and systems including multifunctional nitrogen-fixing tree species, fruit trees, halophytes, and economically significant arable crops are always beneficial for salty landmasses. Based on climate adaptability and tolerance level, prospective flora for saline soils has been identified. For salty soils, the effective planting techniques of furrow irrigation, ridge-trench, and subsurface planting have also been evaluated and suggested. Molecular gene networks, metabolic processes, and intricate physiological features are all involved in plants' adaptation to salinity. These three processes—exclusion, excretion, and aggregation among trees and/or crops—essentially control these adaptation mechanisms to such ecologies. Reclamation procedures, in actuality, also aid in keeping salt out of the way and/or within acceptable bounds for the rhizosphere's developing flora. Saline soils may provide productive service functions from plants if reclamation and management strategies are used in a practical manner. Farm agroforestry approaches that are suggested for saline soils include sequential agrisilviculture, agrihorticulture, silvopastoral, multifunctional wood lots, saline aquaforestry, household gardens, and energy plantings. These activities are both biologically and financially feasible. Agroforestry trees in system mode are successful in recovering the saline soils with economic gains for sustenance; examples of these include Prosopis cineraria (Khejri) for hot dryland, Eucalyptus tereticornis (Safeda), Melia composita (Dek), Aegle marmelos (Bael), Emblica officinalis (Aonla), and Carissa carandas (Karonda) for saline-irrigated area, and Casuarina equisetifolia (Casuarina), Eucalyptus camaldulensis (Safeda), and Acacia nilotica (Babul) for coastal regions. One may categorise the advantages of agroforestry into three main areas: biomass, soil/environment, and socioeconomic outputs. The problems in quantifying the system's output in terms of the current procedural procedures are highlighted in this chapter. Agroforestry has evolved and is now in many stages, with progress being the focus. As a result, a realistic future for agroforestry is offered by considering both the requirements of the present and the problems of the future in general and saline soils in particular. Agroforestry's all-encompassing techniques will surely restore saline soils and provide people living in arid and semi-arid areas with sustainable income, job creation, food and nutrition security, and environmental safety.

IJAMSR

International Journal of Advanced Multidisciplinary Scientific Research (IJAMSR) ISSN:2581-4281

Verma et al (2018). India is still the world's top producer of seed spices, which are used to give food goods flavour and perfume. Widely planted in dry and semiarid regions, seed spice crops must contend with the combined effects of salt, water shortage, and climate change. Spices grown from seed are somewhat susceptible to salt stress; high levels of salt in the root zone often hinder crop development and cause moderate to severe drops in economic output. A plant's ability to withstand salty stress without experiencing noticeable declines in growth and output is known as salt tolerance. Knowledge of the morphological features, genetic mechanisms, and physiological processes that confer salt resistance may be useful in creating management strategies to increase agricultural productivity in salinised environments. This chapter outlines a number of traditional and upgraded methods for controlling salinity in spice seed. The choice of salt-tolerant planting material is the first step in the mitigation of the salt danger. Other approaches that are covered include seed priming, nutrition management, microbial inoculants, plant growth regulators, and bio-stimulants. The conclusion is that high seed spice yields on salinised soils may be achieved with a well-considered set of agronomic techniques.

Sarita Devi et al (2019). Studying the development and ion-accumulating traits of various native saline-arid plant species in relation to the ionic state of their rhizospheric soils is crucial when examining how plant species survive in challenging environments. To investigate the variability in halophytic species in various arid and saline regions, a survey of saline areas was conducted in Rajasthan (Lunkaransar in Bikaner, Sambhar Lake, Jaipur, and Gangani-Kaparda at Jodhpur) and Haryana (CCS Haryana Agricultural University and Central Institute for Research on Buffaloes at Hisar). Angiosperm families (Chenopodiaceae, Mimosaceae, Poaceae, Capparidaceae, Portulacaceae, Tamaricaceae, Fabaceae, Caesalpiniaceae, Aizoceae, Asteraceae, Salvadoraceae, Asclepiadaceae, Boraginaceae, Solanaceae, Amaranthaceae, and Cyperaceae) were among the 44 species that were observed to be growing in these areas. The majority of these species were from the Chenopodiaceae family. Salsola baryosma, Suaeda fruticosa, S. nudiflora, and Saccharum munja were among these very blooming plants, generating the maximum biomass per unit area of land. Different areas have saline to very saline rhizospheric soil. While investigating ionic homeostasis, it was shown that the majority of ions (such as Na+, K+, Ca2+, Mg2+, Cl-, and SO42-) were accumulating more in the leaves than in the stems. This finding may indicate that these halophytic species are adapted to survive in harsher salinity environments. The rhizospheric salinity of the soil in these examined sites is uneven and supports facultative halophytes and glycophytes.

Basak et al (2020). A thorough grasp of soil salinity assessment is necessary for the creation and implementation of rehabilitation plans as well as for the successful agricultural use of salt-affected soil (SAS). Since before independence, Indian agriculture has given major priority to restore SAS for taking agricultural communities' wellbeing into consideration. In general, soil acid soil (ASS) can be divided into three categories: saline, which is rich in soluble electrolytes; sodic soil, which has an excessive amount of sodium in comparison to calcium and magnesium in soil exchange sites and soil solution with alkaline reaction; saline-sodic soil, which has both sodicity and salinity issues; and special categories SAS that are specific to a particular region. Generally speaking, hazards related to SAS include saline and sodic subterranean water, a lack of rainfall, and high crop evapotranspiration requirements. Consequently, in order to fully understand the scope of the salinity issue, extensive and timely surveying, delineation, and mapping are needed. Here, we made an effort to draw attention to the various aspects of the salinity assessment process, including the classification and behaviour of SAS, the threat posed by these soils, and the methodological appraisal of both traditional laboratory chemical analysis and standardised, quick, and non-destructive methods like EM-38, which is based on electromagnetic geophysical tools, time domain reflectometry, resistivity survey, hypo-spectral remote sensing, etc. Additionally, a number of technical approaches are discussed in order to battle salinity and maintain agricultural productivity, such as the necessity for amendment in order to restore sodic soils and agro-technologies for salt management.

Choudhary et al (2021). Emerging in a naturally salinised environment, halophytes adapt well to high salinity levels via the use of efficient mechanisms. Research on these survival strategies might help develop solutions for managing very salinised soil. In the semi-arid and salt-affected areas of the Haryana districts of Rohtak and Jhajjar, several dominant salt hyper-accumulator plants were gathered. These included Atriplex nummularia, Atriplex lentiformis, Arundo donax, Tamarix aphylla, Heliotropium ramossimum, Suaeda fruticosa, and Suaeda nudiflora, all of which were discovered to be thriving. The purpose of the research was to assess the native halophytes' biochemical responses (proline, total soluble sugar, and soluble protein) and chlorophyll content at various salinity levels, with ECe values ranging from 9.75 to 53.9 dS/m. While there was a little drop in chlorophyll content and a considerable decrease in total soluble sugar and soluble protein, there was an increase in proline content buildup that may have resulted from enhanced halophyte osmotic fluctuations.

Kaur et al (2022). One important worldwide environmental issue affecting plant production and development is soil salinity. For long-term production, wheat seeds must be able to sprout and grow seedlings in salty soils. In order to assess the salt stress resistance of 239 different Iranian wheat landraces, we looked at characteristics connected to seed germination under salt stress in this research. The landrace seeds were germinated for 14 days in salt and control solutions, along with pertinent inspections. Initially, six different salinity levels (25 mM, 50 mM, 75 mM, 100 mM, 125 mM, and 150 mM) were applied to ten randomly chosen accessions in order to standardise the results. It was discovered that the salt level of 125 mM NaCl was a more efficient concentration for genotype discrimination for a variety of physiological indicators, including vigour index, fresh root and shoot weight, dry root and shoot weight, coleoptile length, and root and shoot length. After 14 days, it was discovered that salinity had an impact on all seedling attributes, including germination %. The results show that the salt tolerance index and seedling features have a strong positive connection, suggesting that these parameters might be used as selection criteria to protect wheat genotypes against salt stress. Among the wheat landraces, there were notable variations in coleoptile length, root-shoot length, fresh root-a shoot weight, dry shoot weight, and vigour index. Based on a comprehensive analysis of germination percentage and early seedling growth, it was determined that Kharchia 65, the universal salt-tolerant variety used in wheat breeding programs up to this point, was not as salt-tolerant as the wheat landrace accessions IWA 8600278, IWA 8600291, IWA 8611786, IWA 8600179, IWA 8600303, and IWA 8610487.

Phougat et al (2023). Salt-affected soils may be exploited via the development of genotypes that are more tolerant to salt, contingent on the degree of genetic diversity and the responsiveness of donor and adapted wheat sources to salt. Twenty percent of all arable land worldwide is under salt stress, and this percentage is steadily rising due to human activities and climate change. Around 3.1%, or 397 mha, of the world's land surface is covered by salty soils, while 6.74 mha of India's land area is impacted by salinity. Wheat grows and develops poorly under salinity stress, which results in reduced grain production and quality. In Rabi 2021–22, at the Research Area of Wheat and Barley Section, Department of Genetics and Plant Breeding and Department of Soil Science (pH 8.5, ECe 4.5 dsm-1), CCS HAU, Hisar, 24 genotypes, including 4 checks, namely, KRL 19, WH 157, KRL 210, and KRL 283, were evaluated in 6 replications in 4.0 m x 1.20 m in RBD under natural saline patch (pH 8.5, ECe 4.2 dsm–1). The following parameters were noted: plant height (cm), tillers per metre row, 1000-grain weight (g), grain yield per plot (g/plot), days to heading, days to maturity, and hectolitre weight (kg/hl). There is a strong positive association between 1000-GW (g) and GY/P (g/plot) and PH (cm) and hectolitre weight (kg/hl). Plant height and hectolitre weight were shown to have no significant link with the number of days to heading and germination. In order to put identical genotypes together, genotypes were clustered using Ward's Euclidean approach; a total of 24 genotypes were sorted into three separate clusters. The hectolitre weight (kg/hl) is the point of dissection for the features under study, with germination (%), DH, T/meter row, GY/P (g/plot), 1000-GW (g), DM, and PH (cm) falling on one side and on the other. The Department of Genetics and Plant Breeding's best check, WH 157 (43.5+8.2 q/ha), was greatly outperformed by the entries, WH 1313 (59.6 q/ha), WH 1306 (54.9 q/ha), and WH 1309 (52.9 q/ha). In the Department of Soil Sciences, P 13582 (61.6 q/ha) and P 13650 (62.1 q/ha) outperformed and were judged to be considerably superior than the best check, KRL 283 (46.4+13.7 q/ha). Grain yield will be increased by genotyping wheat based on concurrent selection of contributory features. In order to promote nutritional food security, breeding programs at the state and federal levels may include stable and promising genotypes in an effort to generate salt-tolerant cultivars.

Kotiyal et al (2024). Conditions that are too saline or alkaline pose a serious threat to ecology and the environment because they affect soil health, plant development, and productivity. The goal of this work is to isolate and characterise halophilic bacteria from Punjab and Haryana, India's salt-affected regions. In order to evaluate their potential as plant growth-promoting rhizobacteria (PGPR) for reducing salt stress in soils impacted by salt, morphological, biochemical, and molecular

International Journal of
Advanced Multidisciplinary Scientific Research (IJAMSR) ISSN:2581-4281

investigations were carried out. Four strains of bacteria were isolated and given names: HR3-PM, PB01-KB, PB-424, and PB-466. Various characteristics of the isolates were uncovered by morphological and biochemical tests, such as their ability to excrete ammonia, produce indole-3-acetic acid (IAA), and solubilise phosphate. Their taxonomic categorisation was validated by molecular identification using 16S rRNA sequencing, which also shown strong similarities with well-known bacterial taxa including Klebsiella aerogenes, Pseudomonas mosselii, Lysinibacillus acetophenoni, and Pseudomonas stutzeri. Their evolutionary ties were revealed by the use of phylogenetic analysis. In salt-affected soils, these salt-tolerant bacteria show encouraging PGPR activities, indicating their potential for sustainable agriculture and soil remediation techniques. Using their potential might provide low-cost and eco-friendly ways to reduce soil salinity, increase plant yield, and add to environmental stressors on a global scale. To fully comprehend and use the biotechnological potential of these halophilic bacteria in ecosystems impacted by salt, additional study is necessary. This will pave the way for a future in which the environment is more sustainably managed.

3. Soil Salinity and Its Impact

Soil salinity, defined by high concentrations of soluble salts, poses a significant challenge in modern agriculture. This phenomenon occurs when salts accumulate in the soil, often as a result of irrigation practices, poor drainage, or natural processes. Elevated soil salinity disrupts the balance of essential plant nutrients and water availability, creating a hostile environment for crop growth. The primary impact of soil salinity is its interference with water uptake by plants. High salt concentrations in the soil create osmotic pressure that makes it more difficult for plants to absorb water through their roots. This results in water stress, which manifests as reduced seed germination, stunted growth, and poor plant health. As plants struggle to take up sufficient water, their overall productivity declines, leading to lower yields and diminished crop quality. In addition to water stress, soil salinity affects nutrient availability. Excess salts can impede the uptake of crucial nutrients such as potassium, calcium, and magnesium, which are vital for plant development. Nutrient deficiencies weaken plants, making them more susceptible to diseases and pests, further exacerbating the problem. The impact of soil salinity extends to the physiological and biochemical processes within plants. For instance, high salinity levels can lead to reduced photosynthesis and lower chlorophyll content, impairing the plant's ability to produce energy. These changes negatively influence plant growth and development, ultimately affecting the quality of the harvest [4].

4. Vulnerability of Coriander

- **Sensitivity to Soil Salinity:** Coriandrum sativum, commonly known as coriander, is highly susceptible to the adverse effects of soil salinity. This sensitivity significantly impacts the herb's growth and development. Excessive salt concentrations in the soil create osmotic stress, making it difficult for coriander plants to absorb adequate water through their roots. As

IJAMSR
International Journal of Advanced Multidisciplinary Scientific Research (IJAMSR) ISSN:2581-4281

a result, plants experience reduced germination rates, where seeds either fail to sprout or emerge weakly. This stunted germination adversely affects overall plant establishment and growth. In addition to impaired germination, high soil salinity leads to stunted plant development. Coriander plants may exhibit reduced leaf size, thinner stems, and a shortened root system. These morphological changes not only hinder the plant's ability to capture sunlight and nutrients but also compromise its overall health. Consequently, the reduced vigor and productivity translate into lower crop yields. Salinity-induced stress also affects the plant's ability to carry out essential physiological processes, further exacerbating growth issues. The culmination of these factors results in a significant decline in both the quantity and quality of coriander harvests, making soil salinity a critical challenge for successful coriander cultivation [5].

- **Impact on Quality and Viability:** Soil salinity has a profound impact on both the growth and quality of Coriandrum sativum, commonly known as coriander. This herb, renowned for its distinctive flavor and medicinal properties, is particularly vulnerable to saline conditions. High concentrations of salts in the soil disrupt essential physiological processes in coriander plants, leading to stunted growth and reduced yield. The stress imposed by salinity impairs the plant's ability to absorb water and nutrients, resulting in weakened plants with diminished health and productivity. Beyond affecting growth, soil salinity also compromises the quality of coriander. The production of essential oils, which are vital for the herb's characteristic flavor and aroma, is significantly impaired under saline stress. Essential oils are not only crucial for the culinary appeal of coriander but also contribute to its medicinal benefits. Reduced oil production leads to a decrease in the herb's aromatic properties and overall effectiveness, undermining its value in both culinary and medicinal applications. Consequently, the market viability of coriander is adversely affected, as lower quality and reduced oil content diminish its appeal to consumers and its competitive edge in the market [6].

5. Effects on Growth and Development

Soil salinity exerts several detrimental effects on the growth and development of coriander plants. High salt concentrations create physiological stress that disrupts essential processes, leading to reduced germination rates, stunted growth, and decreased yield. The primary issue stems from the impaired ability of plants to absorb water and nutrients effectively due to increased osmotic pressure in the soil. This results in weakened plant health, characterized by slower development and lower overall productivity. The adverse effects of salinity undermine coriander's growth potential and economic viability, highlighting the need for effective management strategies to address soil salinity and support healthy crop development.

International Journal of
Advanced Multidisciplinary Scientific Research (IJAMSR) ISSN:2581-4281

6. Morphological and Physiological Changes

- **Morphological Changes:** Salinity stress induces significant morphological changes in coriander plants, manifesting as smaller leaves and thinner stems. These alterations are direct responses to the high salt concentrations in the soil, which impose severe stress on the plant. The reduced leaf size and stem thickness are indicative of the plant's impaired ability to manage and adapt to saline conditions. High salt levels disrupt water uptake and nutrient absorption, limiting the plant's growth potential and structural development. Consequently, coriander plants exhibit stunted growth and a weakened overall structure, reflecting their struggle to maintain normal physiological functions under adverse conditions. These morphological changes highlight the severe impact of soil salinity on coriander, underscoring the need for effective management strategies to mitigate the detrimental effects and support healthier plant development.

- **Physiological Impact:** Physiologically, salinity stress severely disrupts essential plant processes such as photosynthesis and respiration. High salt concentrations in the soil lead to reduced chlorophyll content, which impairs the plant's ability to capture light and perform photosynthesis effectively. This reduction in chlorophyll limits the plant's capacity to produce the energy required for growth and development. Additionally, the stress affects respiration by altering the balance of gases and energy production within the plant cells. The combined effects of diminished photosynthesis and disrupted respiration lead to overall reduced plant health, stunted growth, and lower productivity. As a result, coriander plants suffering from salinity stress exhibit weakened vitality, reduced yields, and compromised quality, highlighting the critical need for effective salinity management strategies to support healthy plant development and maintain agricultural productivity [7-9].

7. Nutrient Disruption and Essential Oil Production

Excessive soil salts disrupt the uptake of essential nutrients required for the healthy growth and development of coriander (Coriandrum sativum). High salinity levels create an osmotic imbalance in the soil, making it more difficult for the plant roots to absorb vital nutrients such as potassium, calcium, and magnesium. This interference leads to nutrient deficiencies, which can impair various physiological functions within the plant. As a result, coriander plants may experience suboptimal seed development, affecting their overall yield and quality. Moreover, the nutrient disruption has a direct impact on essential oil production, which is crucial for coriander's flavor and aroma. Essential oils, responsible for the herb's distinctive characteristics, are synthesized in response to nutrient availability and overall plant health. When nutrient uptake is hindered by high soil salinity, the production of these oils is adversely affected, leading to reduced oil content. This decrease in essential oil concentration not only diminishes the flavor and aroma of coriander but also compromises its value in culinary and medicinal applications. Consequently, the herb's marketability and overall quality are negatively impacted, underscoring the need for effective salinity management practices in coriander cultivation.

8. Mitigation Strategies and Future Directions

Mitigating the impact of soil salinity on coriander requires a dual approach of exploring plant tolerance mechanisms and implementing effective soil management practices. Research into genetic and physiological traits that confer salt tolerance can help develop coriander varieties better suited to saline conditions. Simultaneously, adopting soil management strategies such as improving drainage, using salt-tolerant rootstocks, and applying soil amendments can alleviate the adverse effects of salinity. Understanding these mechanisms and practices is essential for optimizing coriander cultivation in saline-affected areas, enhancing crop yield and quality, and ensuring the herb's continued success and economic viability as a valuable agricultural product [10].

9. Conclusion

Soil salinity presents a substantial challenge to the cultivation of Coriandrum sativum, impacting both its growth and quality. The accumulation of soluble salts in the soil interferes with water and nutrient uptake, leading to reduced germination rates, stunted growth, and lower yields. Physiological stress from salinity diminishes chlorophyll content and photosynthetic efficiency, further compromising plant health. Nutrient disruption caused by high salt levels affects essential oil production, crucial for the herb's flavor and medicinal properties. To mitigate these effects, a comprehensive approach involving research into salt-tolerant plant varieties and the adoption of effective soil management practices is essential. With addressing these challenges, it is possible to improve coriander cultivation in saline environments, ensuring the herb's continued success and maintaining its agricultural and economic value.

References

1. **Mishra, B. K., Singh, B., Singh, P., Rathore, S. S., Aishwath, O. P., Kant, K., & Dubey, P. N. (2015).** Isolation and evaluation of phosphate solubilizing microorganisms from fennel (Foeniculum vulgare Mill.) rhizospheric soils of Rajasthan. *International Journal of Seed Spices*, *5*(1), 71-75.
2. **Kumari, A., & Maiti, R. (2016).** Climate change: Its impact on bio-resource and sustainable agriculture. *Bioresource and Stress Management*, 13-32.
3. **Banyal, R., Rajkumar, Kumar, M., Yadav, R. K., & Dagar, J. C. (2017).** Agroforestry for rehabilitation and sustenance of saline ecologies. *Agroforestry: Anecdotal to Modern Science*, 413-454.
4. **Verma, A. K., Singh, A., Meena, R. L., & Singh, B. (2018).** Approaches for Enhancing Salt Tolerance in Seed Spices. In *Engineering Practices for Management of Soil Salinity* (pp. 417-452). Apple Academic Press.
5. **Sarita Devi, S. D., Ashwani Kumar, A. K., Mann, A., Arya, S. S., Gurdev Chand, G. C., Neeraj Kumar, N. K., ... & Arvind Kumar, A. K. (2019).** Intra-habitat variability of halophytic flora of north-west India. In *Halophytes and climate change: adaptive mechanisms and potential uses* (pp. 38-54). Wallingford UK: CABI.

Vol 7, Issue 7, 2024 **Impact Factor: 5.099** DOI: https://doi.org/10.31426/ijamsr.2024.7.7.7511

IJAMSR

International Journal of Advanced Multidisciplinary Scientific Research (IJAMSR) ISSN:2581-4281

6. **Basak, N., Barman, A., Sundha, P., & Rai, A. K. (2020).** Recent trends in soil salinity appraisal and management. *Soil analysis: recent trends and applications*, 143-161.
7. **Choudhary, P., Kumar, M., & Arya, S. S. (2021).** Biochemical characterization of some salinity phyto-remediating plants.
8. **Kaur, S., Suhalia, A., Sarlach, R. S., Shamshad, M., Singh, P., Grover, G., ... & Sharma, A. (2022).** Uncovering the Iranian wheat landraces for salinity stress tolerance at early stages of plant growth. *Cereal Research Communications*, *50*(4), 895-904.
9. **Phougat, D., Saharan, R. P., Panwar, I. S., Verma, A., & Choudhary, S. (2023).** Multivariate Analysis in Wheat (Triticum aestivum L.) for Yield and Attributing Traits under Soil Salinity and Alkalinity in Haryana. *International Journal of Environment and Climate Change*, *13*(10), 10-17.
10. **Kotiyal, P. B., & Sharma, S. K. (2024).** Phylogenetic Analysis of Bacterial Isolates Recovered from Salt-affected Soils of Haryana & Punjab, India. *Asian Journal of Biotechnology and Bioresource Technology*, *10*(2), 20-32.