Marin Tomičić[1]*, Bernarda Galjanić*[1]*, Ružica Nestić*[1]

Original scientific paper

Effect of Salt Stress on Radish (*Raphanus sativus L.*) Microgreens

Abstract
Salinity is a major abiotic stress factor affecting plant growth and productivity worldwide. This study investigated the effect of sodium chloride (NaCl) stress on germination, biomass, moisture content, photosynthetic pigments, and total phenolic compounds in radish (Raphanus sativus L.) microgreens. The experiment was conducted under controlled conditions using four NaCl treatments: 0 mM (control), 12.5 mM, 25 mM, and 50 mM. Germination tests revealed high tolerance to salinity, with no significant differences among treatments (95–98%). Fresh biomass increased significantly with salinity, peaking at 50 mM (9.92 g), while moisture content remained stable (78–79%). Chlorophyll a, chlorophyll b, total chlorophylls, carotenoids, and chlorophyll a/b ratio showed no significant variation, indicating that photosynthetic integrity was preserved. Similarly, total phenolic content did not differ significantly across treatments (210–240 mg GAE/100 g FW), suggesting that the applied salinity levels were insufficient to activate strong antioxidant responses. Polynomial regression confirmed a hormetic effect, with biomass increasing at moderate salinity before plateauing. These results indicate that radish microgreens can tolerate mild salt stress and even benefit from it through enhanced growth without compromising their total phenolic content. Controlled salinity could therefore be explored as a strategy to improve microgreen production in urban and hydroponic systems.

Keywords: *salinity, abiotic stress, Raphanus sativus L., yield, eustress*

Introduction

Contemporary agricultural production faces numerous challenges, particularly soil degradation and climate change, which lead to a reduction in available arable land and increasingly difficult cultivation conditions. In this context, there is growing interest in innovative and sustainable food production methods capable of ensuring high nutritional value with minimal resource consumption. One such approach is the cultivation of microgreens. Microgreens represent young shoots of vegetables, medicinal and aromatic herbs, as well as cereals, harvested just after the emergence of the first true leaves, which are grown in soil or other substrates. Unlike mature plants, they possess a significantly higher nutritional value and are harvested 7 to 21 days after sowing, depending on the species (Koloper & Gaćina, 2024). Despite their small size, microgreens possess exceptional nutritional value, intense flavor, and an attractive appearance. They are used in salads, as edible garnishes, and as supplements to a balanced

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1 ***Marin Tomičić****, mag. ing. hort,* ***Bernarda Galjanić****, Ružica Nestić, mag. ing. agr.*
Veleučilište u Rijeci, Vukovarska 58, 51000 Rijeka, Hrvatska
Autor za koresponednciju: ***mtomicic@veleri.hr***

diet (Opačić et al., 2018). Due to their short growth cycle, minimal spatial requirements, and ease of cultivation, microgreens can be produced year-round at home without the need for specialized experience. Radish stands out as one of the fastest and easiest species to grow. Its first shoots appear after just a few days, and it reaches full maturity within approximately ten days, making it extremely practical for home cultivation (Brlek, 2024).

Microgreens, like other plants, are sensitive to abiotic environmental stressors, which can significantly compromise their growth, development, and quality. One of the most widespread and detrimental abiotic stressors in global agriculture is salinity, defined as an elevated concentration of salts in the soil or growth substrate. The problem of soil salinization is becoming increasingly pronounced due to inadequate irrigation practices, the use of low-quality water, and climate change, all of which promote salt accumulation in the upper soil layers (Taiz & Zeiger, 2002; Bhatla & Lal, 2023). Studies on species within the *Brassicaceae* family indicate that NaCl concentrations exceeding 60 mM significantly inhibit germination (Noreen & Ashraf, 2008). Following germination, salinity continues to negatively affect growth, manifesting as a reduction in fresh and dry mass, shortening of roots and shoots, and a decrease in total leaf area (Sarker et al., 2014). The response to stress is complex: studies have shown that salinity can increase, decrease, or have no effect on the content of total phenols. This variability suggests that low levels of stress can act as “positive stress” or eustress, stimulating the accumulation of bioactive compounds and thereby improving the nutritional quality of microgreens, whereas severe stress overwhelms defense mechanisms and leads to metabolic inhibition (Amitrano et al., 2024). The impact of salt stress on microgreens is complex and depends on salt concentration, plant species, and cultivation conditions. High salinity concentrations adversely affect all physiological processes, ranging from germination to growth and photosynthesis. However, the application of moderate, controlled stress can stimulate the plant to synthesize protective compounds such as phenols, opening the possibility of using salinity as a treatment for the targeted enhancement of the functional and nutritional value of microgreens. Understanding the response of microgreens to salt stress is crucial for developing cultivation strategies in controlled environments, particularly in urban and vertical farms where hydroponic systems and various substrates are frequently used.

The aim of this study was to investigate and quantify the effect of salt stress, induced by different concentrations of sodium chloride (NaCl), on seed germination, biomass, moisture percentage, the content of photosynthetic pigments, and total phenols in radish microgreens. Furthermore, the aim was to evaluate the tolerance and physiological responses of radish microgreens to mild and moderate salinity levels (up to 50 mM NaCl).

Materials and Methods

The study was conducted during the summer of 2025 in two phases. The first phase investigated the effect of NaCl solution concentration on radish seed germination, while the second phase examined the effect of NaCl concentration on biomass, moisture, photosynthetic pigments, and total phenolic content of radish microgreens.

In both phases, a randomized complete block design (RCBD) was established with four treatments and four replications per treatment. In the second phase, to account for potential vertical environmental gradients, blocks were distributed across two shelves (blocks 1 and 2 on the upper shelf, blocks 3 and 4 on the lower shelf). All spectrophotometric measurements were performed in triplicate for each experimental unit, and the arithmetic means of these replicates were used for analysis.

The treatments were as follows: 0 mM (Control), 12.5 mM, 25 mM, and 50 mM NaCl concentrations. Solutions were prepared by dissolving NaCl (Sodium chloride, cryst., Kemika, purity 99.5%) in distilled water. Treatments were applied using 500 ml manual sprayers. PET containers measuring 10x10 cm were used for both germination testing and cultivation. Kitchen paper towels were used as the substrate for the germination test, while organically certified coconut coir (Homeogarden d.o.o., Slovenia) was used as the substrate for cultivation. The seed used in the experiment was organic seed for microgreen cultivation, GEO Sprouts by Bavicchi.

For the germination test, fifty seeds per replication were placed on kitchen paper to facilitate moisture retention and placed in containers. Seeds were not pre-soaked prior to this experiment to specifically investigate the effect of NaCl concentration on the germination process. Containers were placed in an illuminated position. After six days, germination was evaluated. All seeds that did not germinate or failed to develop a normal radicle were excluded from the count.

For microgreen cultivation, 4 g of seed was weighed per replication. Prior to sowing on the substrate, seeds were soaked for six hours in a 2% solution of Genox Professional (TLK Ekologija d.o.o., Croatia), a broad-spectrum disinfectant effective against bacteria, viruses, fungi, molds, algae, and spores. The same solution was used for soaking the substrate.

During cultivation, plants were irrigated twice daily, with equal solution volumes applied to all treatments and replications. No irrigation was applied on the first day as the seeds were imbibed during soaking. On the second, third, and fourth days of cultivation, 25 ml of solution was applied per replication, while on the fifth and sixth days, 37.5 ml was applied per replication. A total of 110 ml of NaCl solution was applied per container during the cultivation period. Temperature and humidity were recorded throughout the study using a digital indoor thermo-hygrometer (Home by Somogyi, Somogyi Elektronic Kft., Hungary).

The first three days, seeds were left to germinate in the dark. During this period, the temperature varied between 23.9 and 33.3°C, and relative humidity between 26% and 81%. After three days, when the seedlings were sufficiently etiolated, the containers were transferred to shelves in a room with a south-western exposure, where they continued to grow for the next three days under natural light. The photoperiod corresponded to the natural late-summer day length, providing approximately 13.5 to 14 hours of daylight. The plants were not exposed to direct sunlight to prevent heat stress and potential photochemical damage. During this phase, the temperature varied between 21.8 and 33.3°C, and relative humidity between 26% and 81%. The harvest took place on the seventh day.

Plants were cut approximately 0.5 cm above the substrate, and the fresh mass was weighed using a precision laboratory scale (Kern PFB 1200-2, KERN & SOHN GmbH, Germany). Results represent the average mass of four replications per treatment, expressed in grams.

The moisture content in the plant material was determined after harvest using a moisture analyzer (PCE-MA 110, PCE Instruments, Germany). Approximately 1 gram of finely chopped plant material from each replicate was dried by gradually increasing the temperature to 120°C. Results represent the average moisture of four replications per treatment.

Photosynthetic pigment content was determined in the cotyledons of radish microgreens. A sample of plant tissue (0.2 g) was homogenized in 10 mL of 100% methanol using a homogenizer (ULTRA-TURRAX T 10 basic, IKA, Germany). The homogenate was centrifuged at 3000 rpm for 4 minutes. Pigment quantification was performed by measuring the absorbance of the supernatant at wavelengths specific for chlorophyll *a* (665 nm), chlorophyll *b* (652 nm), and total carotenoids (470 nm) using a GENESYS 50 UV-VIS spectrophotometer (Thermo Fisher Scientific, USA). Pigment concentrations were calculated using the equations established by Lichtenthaler (1987):

$$\text{Chl } a\ (\mu g/ml) = 16.72 \times A_{665} - 9.16 \times A_{652}$$
$$\text{Chl } b\ (\mu g/ml) = 34.09 \times A_{652} - 15.28 \times A_{665}$$
$$\text{Chl } a{+}b\ (\mu g/ml) = 1.44 \times A_{665} + 24.93 \times A_{652}$$
$$\text{C x+c}\ (\mu g/ml) = (1000 \times A_{470} - 1.63 \times \text{Chl } a - 104.96 \times \text{Chl } b) / 221$$

The final pigment content was expressed as mg/100 g of fresh weight (FW) using the formula: Pigment (mg/100 g FW) = (C x V) / (10 x M), where C = concentration (µg/ml), V = total volume of methanol (mL), and M = fresh mass of the sample (g).

Total phenols in radish microgreens were determined using a modified method described by Peršić et al. (2019). Approximately 1 g of chopped plant material was extracted in 6 ml of methanol:water solution (80:20, v/v) in a cold ultrasonic bath for 60 minutes. Samples were then centrifuged for 10 minutes at 8000 rpm. For the reaction mixture, 0.25 ml of Folin-Ciocalteu reagent (diluted 1:1 with water), 0.75 ml of sodium carbonate solution (Na_2CO_3, 20%), and 3.9 ml of distilled water were added to 100 µL of supernatant (total volume 5.0 ml). The mixture was heated at 40°C for 30 minutes to accelerate the reaction. Total phenolic content was determined using a GENESYS 50 UV-VIS spectrophotometer at 765 nm and expressed as milligrams gallic acid equivalents (GAE) per 100 grams of fresh mass, based on a standard calibration curve.

Data were analyzed using the R software environment (v.4.3.3). Normality of residuals was verified using the Shapiro-Wilk test, and homogeneity of variance was checked using Levene's test. A Two-Way Analysis of Variance (ANOVA) was performed with NaCl concentration as the fixed factor and block as the random factor to control for spatial variability. Where significant differences were found ($p<0.05$), means were separated using Tukey's HSD post-hoc test. Additionally, polynomial regression analysis was conducted to characterize the dose-response relationship between fresh mass and treatments.

Results and Discussion

The germination rate of radish seeds was high across all treatments, ranging from 95.0±3.8% to 98.5±1.9%. Statistical analysis revealed no significant inhibitory effect of salinity on germination percentage ($F_{3,9}=1.34$, $p=0.32$). Even at the highest concentration of 50 mM NaCl, germination (98.0±2.8%) remained statistically comparable to the control (97.5±2.5%) (Table 1).

Table 1. Germination percentage of radish seeds under different NaCl concentrations
Tablica 1. Postotak klijavosti sjemena rotkvice pri različitim koncentracijama NaCl

Treatment (mM NaCl)	Seed germination (%)
0 mM	97.5±2.5 a
12.5 mM	98.5±1.9 a
25 mM	95.0±3.8 a
50 mM	98.0±2.8 a

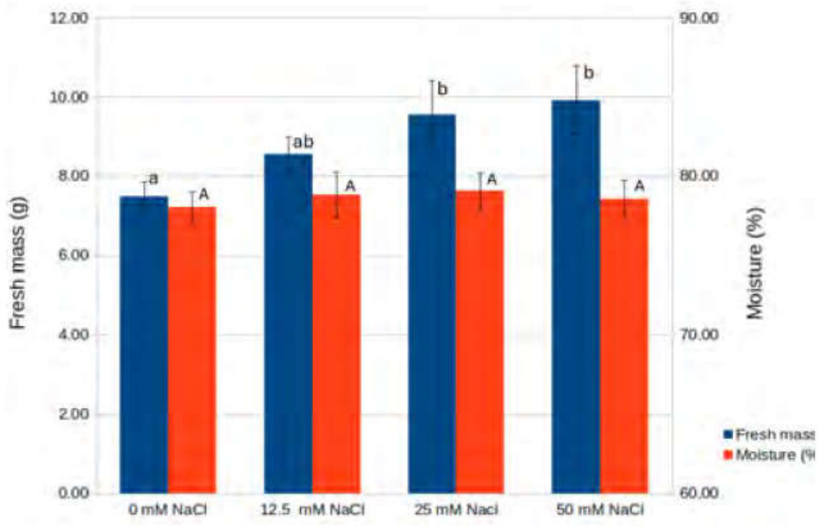
Values are means ± standard deviation (n=4). The same letter within the column indicates no significant difference (Tukey's HSD, p > 0.05)
Source/Izvor: Authors/Autori

The findings align with evidence suggesting that radish exhibits a notable tolerance to salinity during the critical phase of seed germination. Research conducted by Sarker et al. (2014) on radish demonstrated that germination at 2 dS/m (approximately 20 mM NaCl) was not significantly different from the control, a finding supported by Jamil et al. (2005), who reported no significant germination loss in related *Brassicaceae* species, cabbage and rapeseed, at 4.7 dS/m (approximately 47 mM NaCl). Noreen & Ashraf (2008) observed that higher concentrations are required to inhibit germination, noting noticeable reduction starting at 60 mM NaCl and statistically significant reduction at 120–240 mM NaCl across six radish cultivars, although the extent of the reduction depended on the cultivar.

Salinity primarily inhibits seed germination by lowering the osmotic potential of the medium, thereby altering seed water uptake (imbibition) (Sarker et al., 2014). Radish seeds exhibit resilience to low water potential (ψ) caused by salinity. Toscano et al. (2025) showed that radish seeds were able to germinate well (≥90%) at optimal temperatures (25 °C) even at salinity levels resulting in water potentials down to −0.9 MPa. Osmotic stress imposed by a 50 mM NaCl solution was easily overcome during initial water uptake.

Salinity can also affect germination through specific ion toxicity (Na^+ and Cl^-), which can disrupt enzyme function, metabolism, or hormonal signaling crucial for seed activation (Sarker et al., 2014). Since germination was successful, the ion concentration of 50 mM NaCl was likely below the toxic threshold for radicle emergence in radish.

A significant stimulatory effect of salinity on biomass was observed ($F_{3,9}=8.65$, $p< 0.01$). As shown in Figure 1, fresh mass increased with salt concentration, peaking at 50 mM (9.92±0.86 g). Both the 50 mM and 25 mM (9.55±0.87g) treatments resulted in significantly higher fresh mass compared to the control (7.48±0.37 g).



Values represent means ± standard deviation (n=4). Different lowercase letters (a, b) indicate significant differences for fresh mass, while same uppercase letters (A) indicate no significant differences for moisture content between treatments (Tukey HSD, p < 0.05).

Figure 1. Effect of NaCl concentration on fresh mass and moisture content of radish microgreens
Slika 1. Utjecaj koncentracije NaCl-a na svježu masu i postotak vlage mikrozelenja rotkvice
Source/Izvor: Authors/Autori

While the fresh mass increased with the NaCl concentrations, the percentage of moisture remained stable across all treatments. Statistical analysis confirmed that there were no significant differences in moisture content between the control group and any of the salinity treatments ($F_{3,9}$=0.44, p=0.73). The moisture content ranged from a minimum of 78.00±1.01 % in the control group to a maximum of 79.05±1.14 % in the 25 mM treatment (Figure 1). The lack of significant variation indicates that the osmotic adjustment mechanisms of radish were sufficient to maintain cellular turgor and water status even at the highest concentration of 50 mM NaCl. Plants use osmotic adjustment as a crucial strategy to acclimate to salt stress. This involves the accumulation of compatible solutes, such as proline and soluble sugars. These compounds lower the osmotic potential inside the cell, which helps maintain turgor pressure high enough to sustain cellular expansion and growth, thereby enabling continuous water absorption despite the external saline environment (Alsamadany et al., 2022; Rajabi Dehnavi et al., 2024; Taybi & Alyahya, 2025).

The finding that 25 mM and 50 mM NaCl treatments resulted in significantly higher fresh mass compared to the control, while there was no change in moisture content, suggests that this range of salinity acted as eustressor on radish microgreens. If the fresh mass increase were merely due to water uptake, the moisture percentage would typically increase significantly, as observed in some broccoli microgreens where increased fresh mass was linked to increased percentage moisture content (Plocek et al., 2023; Tomičić, 2025).

The stimulatory effect at moderate salinity levels is reported in related crops. Broccoli sprouts exhibited significant growth promotion when subjected to low salinity treatments (40 and 80 mM NaCl, respectively), although growth declined at higher concentrations (≥120 mM) (Wang et al., 2019). Similarly, broccoli microgreens showed the highest fresh weight under low NaCl treatment (1 dS/m) in comparison to 0, 0.5, and 1.5 dS/m (Plocek et al., 2023), and 25 mM NaCl treatment in comparison to 0 and 50 mM NaCl (Tomičić, 2025).

However, hormetic effect of NaCl stress in radish microgreens observed in this study, contrasts with our previous findings where the radish microgreens showed significant decline in fresh mass with the increase of NaCl concentration (Tomičić, 2025). We hypothesize that this discrepancy might be attributed to differences in cultivation protocols rather than genotypic variation, as the same seed stock was used in both studies. In the present study, seeds were pre-soaked for six hours and grown in a coconut substrate under natural light. In contrast, the comparative study utilized direct sowing without pre-soaking, moisture-retentive pads, and artificial LED lighting.

It is possible that the pre-soaking treatment prepared the seeds to better withstand the subsequent NaCl stress, potentially enabling the eustress effect. Hydropriming, a method that involves soaking seeds in water to activate pre-germinative metabolic processes without allowing radicle protrusion, enhances the seed’s metabolic activity, including repair processes of DNA and proteins, and stimulates antioxidant defenses during the pre-germinative phase (Mir et al., 2021; Boucelha et al., 2025). Additionally, coconut fiber provides a favorable balance of air and water to plant roots (Alloggia et al., 2023). While the LEDs are essential for controlled environment agriculture, the spectral quality and intensity can act as an abiotic elicitor of stress (Teng et al., 2023). In summary, we hypothesize that the seeds might have been pre-conditioned for stress, and the natural light environment may have provided a balanced spectrum or intensity, potentially buffering the plant against photochemical damage and allowing the beneficial hormetic effects of the salinity to dominate.

To characterize the dose-response relationship, polynomial regression analysis was performed (Table 2). Model comparison based on Akaike Information Criterion (AIC) indicated that the quadratic model (AIC=36.55) fit the data better than the linear model (AIC=39.28), explaining 72 % of the variance (R^2=0.72).

Table 2. Comparison of linear and quadratic regression models for the effect of NaCl concentration on the fresh mass of radish microgreens / **Tablica 2.** Usporedba linearnih i kvadratnih regresijskih modela za utjecaj koncentracije NaCl-a na svježu masu mikrozelenja rotkvice

Model	R²	Adj. R²	p-value	AIC
Linear	0.62	0.60	< 0.001	39.28
Quadratic	0.72	0.68	< 0.001	36.55

Source/Izvor: Authors/Autori

Regression coefficients indicated a significant positive linear effect (β_1=0.11, p<0.01) and a marginally significant negative quadratic term (β_2=−0.001, p=0.054). The resulting curve suggests that biomass initially increases with salinity, but the rate of increase diminishes at higher concentrations. This indicates that while biomass accumulation increases with salinity, the rate of increase diminishes as concentrations approach 50 mM, suggesting a saturation of the stimulatory hormetic effect. This finding aligns with studies on other microgreens and sprout species (Wang et al., 2019; Plocek et al., 2023; Galieni et al., 2025).

There were no statistically significant differences (p>0.05) for chlorophyll *a*, chlorophyll *b*, total chlorophylls, or carotenoids across any treatments (Table 3). Furthermore, the chlorophyll *a/b* ratio, a sensitive indicator of photosystem stress (Muradoğlu et al., 2025), remained stable (p=0.82), suggesting that the structural integrity of the light-harvesting complexes was preserved, and that the stress imposed by 50 mM NaCl was insufficient to trigger mechanisms that typically lead to pigment degradation.

Salinity stress, particularly at high concentrations, leads to a significant reduction in chlorophyll content (Stefanov et al., 2024). This reduction is often attributed to the inhibition of chlorophyll biosynthesis, increased activity of the chlorophyll-degrading enzyme chlorophyllase, and the destruction of the chloroplast ultrastructure caused by toxic ions and oxidative stress (Dadasoglu et al., 2022). Yildirim et al. (2008) showed that high salinity concentrations (80 mM and above) significantly decrease chlorophyll content even in moderately tolerant crops like radish.

When plants face severe salt or light stress, the chlorophyll *a/b* ratio typically increases (Stefanov et al, 2024). This increase is due to the preferential breakdown of chlorophyll *b* compared to chlorophyll *a*, which suggests an adaptive response wherein plants alter their pigment composition to optimize photosynthesis under adverse conditions (Muradoğlu et al., 2025). The stable chlorophyll *a/b* ratio suggests microgreens did not need to initiate structural reorganization or defensive catabolism to protect the photosystems. The observed stability of the chlorophyll *a/b* ratio up to 50 mM NaCl reinforces the conclusion from the biomass analysis that this range represents a “eustress” condition rather than a damaging stress.

Table 3. Effect of NaCl concentration on photosynthetic pigment content in radish microgreens / **Tablica 3.** Utjecaj koncentracije NaCl-a na sadržaj fotosintetskih pigmenata u mikrozelenju rotkvice

Treatment (mM NaCl)	Chl *a* (mg/100 g)	Chl *b* (mg/100 g)	Total Chl (mg/100 g)	Carotenoids (mg/100 g)	Chl *a* / Chl *b* Ratio
0 mM	21.14±3.15 a	6.83±0.94 a	27.96±4.05 a	7.88±0.76 a	3.09±0.14 a
12.5 mM	24.88±2.29 a	8.00±1.12 a	32.87±3.26 a	8.77±0.90 a	3.13±0.27 a
25 mM	24.33±2.03 a	7.73±0.76 a	32.06±2.78 a	8.03±0.76 a	3.15±0.06 a
50 mM	23.29±1.72 a	7.64±0.20 a	30.94±1.79 a	7.82±0.53 a	3.04±0.21 a

Values are means ± standard deviation (n=4). Same letters within a column indicate no significant difference (Tukey's HSD, p > 0.05).
Source/Izvor: Authors/Autori

Phenolic compounds are commonly identified as secondary metabolites that are induced when plants are exposed to environmental stress and other abiotic factors, such as salinity (Guo et al, 2014). In our study, the content of total phenols did not vary significantly ($F_{3,9}$=0.79, *p*=0.53) across the treatments (Table 4).

Table 4. Effect of NaCl concentration on total phenolic content in radish microgreens
Tablica 4. Utjecaj koncentracije NaCl-a na sadržaj ukupnih fenola u mikrozelenju rotkvice

Treatment (mM NaCl)	Total Phenolic Content (mg GAE /100 g F.W.)
0 mM	240.07±41.91 a
12.5 mM	210.75±6.04 a
25 mM	229.24±13.04 a
50 mM	232.73±23.07 a

Values are means ± SD (n=4). Same letters indicate no significant difference. (Tukey's HSD, p > 0.05).
Source/Izvor: Authors/Autori

The expected response to increasing stress in plants is typically a significant increase in total phenolic content as the plant activates its antioxidant defense system to cope with reactive oxygen species (ROS) generated by salinity. The non-significant variation in total phenolic content suggests that the NaCl concentrations used were below the threshold level required to trigger a substantial defense response. This reinforces the previous findings that the applied salinity resulted in eustress and did not compromise the photosynthetic apparatus. The lack of significant phenolic accumulation in our study aligns with findings by Guo et al. (2014), who reported that low NaCl concentrations (10 and 50 mM) were insufficient to enhance total phenolic content in radish sprouts, and in their case even led to a decrease. Only a much higher concentration (100 mM) was sufficient to increase the total phenolic content.

Phenolic compounds are integral to plant defense, but their synthesis is metabolically costly. Since the radish microgreens successfully used osmotic adjustment and maintained photosynthetic integrity to cope with the mild stress, they may not have needed to divert significant metabolic resources toward the energetically expensive accumulation of general total phenolics (Ghanem et al., 2021).

Conclusion

The results of this study demonstrate that radish microgreens show a high tolerance to salinity within the examined low-to-moderate range (0–50 mM NaCl). However, since no growth inhibition was observed at this maximum tested concentration, the absolute salinity tolerance threshold is likely higher. Contrary to the typical growth inhibition observed in glycophytes, the application of low-to-moderate salinity acted as a biostimulant, inducing a hormetic response that significantly increased fresh biomass without affecting moisture content. The photosynthetic apparatus remained intact, as evidenced by the stability of chlorophylls, carotenoids, and the chlorophyll *a/b* ratio, indicating that the photosystems were protected from oxidative damage. Furthermore, the lack of significant variation in total phenolic content suggests that the applied stress levels were within the physiological coping capacity of the plants, requiring no diversion of metabolic energy toward secondary antioxidant defense. These findings indicate that commercial growers can utilize saline water sources (up to 50 mM) to potentially enhance radish microgreens yield, without negatively affecting their physiological status or visual quality, provided that appropriate seed priming and substrate are used in cultivation. Future research should explore the impact of different seed priming techniques and growing substrates on salinity stress mitigation in radish and other microgreens species.

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Utjecaj solnog stresa na mikrozelenje rotkvice (Raphanus sativus L.)

Sažetak

Salinitet je jedan od glavnih abiotičkih stresnih čimbenika koji utječu na rast i produktivnost kod biljaka. U ovom istraživanju ispitivan je učinak stresa uzrokovanog natrijevim kloridom (NaCl) na klijavost, biomasu, sadržaj vlage, fotosintetske pigmente i ukupne fenole u mikrozelenju rotkvice (Raphanus sativus L.). Pokus je proveden u kontroliranim uvjetima s četiri tretmana NaCl-a: 0 mM (kontrola), 12,5 mM, 25 mM i 50 mM. Klijavost je bila visoka u svim tretmanima (95–98%) bez značajnih razlika. Svježa masa značajno je porasla s porastom saliniteta, dosegnuvši maksimum pri 50 mM (9,92 g), dok je sadržaj vlage ostao stabilan (78–79%). Sadržaj klorofila a, klorofila b, ukupnog klorofila, karotenoida i omjer klorofila a/b nisu se značajno mijenjali, što ukazuje na očuvani fotosintetski aparat. Ukupni fenoli također nisu pokazali značajne razlike (210–240 mg GAE/100 g SM), što sugerira da primijenjene koncentracije nisu bile dovoljne za aktivaciju snažnog antioksidativnog odgovora. Polinomna regresija potvrdila je hormetički učinak, pri čemu se biomasa povećava pri umjerenom salinitetu prije nego što se stabilizira. Rezultati pokazuju da mikrozelenje rotkvice dobro podnosi blagi solni stres, koji djeluje kao eustresor koji povećava prinos bez narušavanja sadržaja ukupnih fenola. Kontrolirani salinitet mogao bi se koristiti kao strategija za poboljšanje proizvodnje mikrozelenja u urbanim i hidroponskim sustavima.

Ključne riječi: *salinitet, abiotski stres, Raphanus sativus L., prinos, eustres*