

Peningkatan Toleransi Cekaman Kekeringan Pada Benih Mentimun (*Cucumis sativus*) Melalui Seed Priming Dengan Mikroalga (*Spirulina platensis*)

*Improvement of Drought Stress Tolerance in Cucumber (*Cucumis sativus*) Seeds via Seed Priming with the Microalgae *Spirulina platensis**

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ABSTRAK

Cekaman kekeringan merupakan faktor pembatas utama pada fase perkecambahan mentimun (*Cucumis sativus* L.) karena menurunkan viabilitas dan vigor benih. Penelitian ini bertujuan mengevaluasi pengaruh cekaman kekeringan terhadap mutu fisiologis benih mentimun serta efektivitas seed priming menggunakan mikroalga *Spirulina platensis* dalam meningkatkan toleransi benih terhadap kekeringan. Penelitian menggunakan Rancangan Acak Lengkap faktorial dengan perlakuan kombinasi konsentrasi polyethylene glycol (PEG 6000) 10%, 15%, dan 20% serta lama perendaman seed priming 24 jam dan 48 jam. Parameter yang diamati meliputi viabilitas dan vigor benih. Hasil penelitian menunjukkan bahwa peningkatan konsentrasi PEG menurunkan mutu fisiologis benih. Seed priming menggunakan *Spirulina platensis* meningkatkan viabilitas dan vigor benih pada seluruh tingkat cekaman dengan perendaman 24 jam memberikan hasil terbaik. Seed priming juga menurunkan proporsi kecambah abnormal.

Kata kunci: cekaman kekeringan, mentimun, seed priming, *Spirulina platensis*

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ABSTRACT

Drought stress is a major limiting factor during the germination stage of cucumber (*Cucumis sativus* L.) as it inhibits water imbibition and reduces seed viability and vigor. This study aimed to evaluate the effect of drought stress on the physiological quality of cucumber seeds and to assess the effectiveness of seed priming using the microalga *Spirulina platensis* in enhancing seed tolerance to drought stress. The experiment was arranged in a factorial Completely Randomized Design with treatments consisting of combinations of polyethylene glycol (PEG 6000) concentrations at 10%, 15%, and 20% as drought stress simulation and seed priming durations of 24 and 48 hours. Observed parameters included mean germination time, germination percentage, germination rate, emergence uniformity, maximum growth potential, vigor index, plumule length, and radicle length. Data were analyzed using analysis of variance followed by Tukey's test at a 5% significance level. The results showed that increasing PEG concentration significantly reduced the physiological quality of cucumber seeds. Seed priming with *Spirulina platensis* improved seed viability and vigor across all drought stress levels, with a priming duration of 24 hours producing the best results. Although maximum growth potential did not differ significantly among treatments, seed priming reduced the proportion of abnormal seedlings. These findings indicate that seed priming using *Spirulina platensis* is an effective and environmentally friendly pre-sowing technique to enhance cucumber seed tolerance to drought stress.

Keywords: drought stress, cucumber seed, seed priming, *Spirulina platensis*