

ABSTRAK

INVIGORASI LIMA GENOTIPE BENIH SORGUM (*Sorghum bicolor* [L.] Moench.) YANG TELAH MENGALAMI KEMUNDURAN ALAMIAH DENGAN APLIKASI PRIMING

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Salah satu masalah dalam penyediaan benih sorgum bermutu yaitu kemunduran benih selama proses penyimpanan dan tidak bisa dihentikan sehingga dapat menurunkan viabilitas dan vigor benih. Invigorasi menjadi salah satu upaya untuk meningkatkan viabilitas dan vigor benih akibat permasalahan tersebut. Metode yang bisa digunakan dalam invigorasi yaitu *hormopriming* menggunakan hormon atau Zat Pengatur Tumbuh (ZPT) seperti giberelin (GA₃) dan *osmopriming* menggunakan agen osmotik seperti kalsium klorida (CaCl₂). Penelitian ini bertujuan untuk mengetahui konsentrasi optimum GA₃ dan CaCl₂ dan pengaruh perbedaan genotipe dalam memulihkan kinerja perkecambahan lima genotipe sorgum. Benih yang digunakan telah disimpan di suhu ±18 °C selama 52 bulan.

Penelitian terdiri dari dua percobaan yang masing-masing disusun secara factorial (5x5) yang diulang tiga kali diterapkan dalam Rancangan Acak Kelompok (RAK). Faktor pertama adalah lima genotipe benih sorgum yaitu GH-8, Kawali, P/I 150-21-A Cymit, PF-10/90-A, dan Suri. Faktor kedua pada percobaan pertama yaitu larutan GA₃ 0, 25, 50, 75, dan 100 ppm perendamannya selama 6 jam dan pada percobaan kedua yaitu larutan CaCl₂ 0, 50, 100, 150, dan 200 mM perendamannya selama 24 jam. Keseragaman data diuji menggunakan Uji Bartlett dan aditivitas diuji menggunakan Uji Tukey, jika asumsi tersebut terpenuhi maka dilakukan analisis ragam, apabila terjadi interaksi antar faktor pertama dan kedua dilanjutkan dengan Polinomial Ortogonal dan apabila tidak terjadi interaksi maka setiap faktor yang berpengaruh nyata pada analisis ragam dilanjutkan dengan Uji BNJ 5%.

Hasil penelitian menunjukkan bahwa konsentrasi optimum GA₃ dalam memulihkan kinerja perkecambahan pada setiap genotipe sorgum berbeda, pada GH-8 yaitu 95,25 ppm, Kawali 54,85 ppm, P/I 150-21-A Cymit 51,87 ppm, PF-10/90-A 41,69 ppm, dan Suri 84,86 ppm selanjutnya konsentrasi optimum CaCl₂ dalam memulihkan kinerja perkecambahan pada setiap genotipe sorgum juga berbeda, yaitu pada GH-8 68,1 mM, Kawali 99,3 mM, P/I 150-21-A Cymit 80,2 mM, PF-10/90-A 80,1 mM, dan Suri 124,1 mM. Perbedaan respon antar genotipe tersebut karena perbedaan karakter fisik dan kimia serta vigor genetik setiap genotipe berbeda.

Kata kunci: Benih Sorgum, CaCl₂, GA₃, Viabilitas, dan Vigor

ABSTRACT

INVIGORATION OF FIVE SORGHUM SEED GENOTYPES (*Sorghum bicolor* [L.] Moench.) THAT HAVE NATURAL DETERIORATION THROUGH PRIMING APPLICATION

By

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One of the issues in providing quality sorghum seeds is seed deterioration during storage, which cannot be halted and may reduce seed viability and vigor. Invigoration is one approach to improve seed viability and vigor in response to this problem. Methods that can be used for invigoration include hormoprimering with hormones or Plant Growth Regulators (PGRs) such as gibberellic acid (GA₃), and osmoprimering with osmotic agents such as calcium chloride (CaCl₂). This study aims to determine the optimum concentrations of GA₃ and CaCl₂, as well as the effect of genotype differences in restoring germination performance of five sorghum genotypes. The seeds used have been stored at a temperature of ±18 °C for 52 months.

The research consisted of two experiments, each designed factorially (5x5) and repeated three times, applied in a Randomized Complete Block Design (RCBD). The first factor was five sorghum seed genotypes: GH-8, Kawali, P/I 150-21-A Cymit, PF-10/90-A, and Suri. The second factor in the first experiment was GA₃ solution concentrations of 0, 25, 50, 75, and 100 ppm, with a 6-hour soaking period, while in the second experiment, the second factor was CaCl₂ solution concentrations of 0, 50, 100, 150, and 200 mM, with a 24-hour soaking period. Data uniformity was tested using Bartlett's Test, and additivity was tested using Tukey's Test. If these assumptions were met, an analysis of variance (ANOVA) was conducted. If there was an interaction between the first and second factors, it was followed by Orthogonal Polynomial Analysis, and if no interaction occurred, each factor that had a significant effect in the ANOVA was followed by a 5% Least Significant Difference (LSD) test.

The results of the study showed that the optimum GA₃ concentration to restore germination performance differed for each sorghum genotype. For GH-8, it was

95.25 ppm; for Kawali, it was 54.85 ppm; for P/I 150-21-A Cymit, it was 51.87 ppm; for PF-10/90-A, it was 41.69 ppm; and for Suri, it was 84.86 ppm. Furthermore, the optimum CaCl_2 concentration to restore germination performance also differed for each sorghum genotype: GH-8 was 68.1 mM, Kawali was 99.3 mM, P/I 150-21-A Cymit was 80.2 mM, PF-10/90-A was 80.1 mM, and Suri was 124.1 mM. The differences in responses among genotypes were due to variations in physical and chemical characteristics, as well as genetic vigor.

Keyword: GA_3 , CaCl_2 , Sorghum seeds, Viability, and Vigor