ABSTRAK

EVALUASI MUTU FISIOLOGIS BENIH PADI (*Oryza sativa* L.) YANG MENGANDUNG KADAR ZINC (Zn) BERBEDA PADA KONDISI MEDIA CEKAMAN MASAM

Oleh

Fahrul Azzami

Produksi padi di Indonesia mengalami penurunan akibat berkurangnya luas lahan pertanian produktif. Salah satu solusinya dengan memanfaatkan lahan marginal seperti tanah masam, namun memiliki kendala berupa tingkat keasaman tinggi dan kandungan Aluminium (Al) yang meracuni tanaman. Zinc (Zn) sebagai unsur mikro penting berperan dalam proses fisiologis tanaman, seperti sintesis protein, pemanjangan sel, dan detoksifikasi spesies oksigen reaktif. Penelitian ini bertujuan untuk mengetahui pengaruh kandungan zinc dalam benih padi terhadap mutu fisiologis benih saat dikecambahkan pada media dengan kondisi masam. Penelitian ini dilakukan di Laboratorium Benih dan Pemuliaan Tanaman dan Rumah Kaca, Fakultas Pertanian, Universitas Lampung pada Januari 2025 sampai April 2025. Percobaan menggunakan rancangan non faktorial yang disusun menggunakan Rancangan Acak Kelompok (RAK) yang diulang sebanyak empat kali sebagai kelompok berdasarkan waktu tanam. Terdapat 7 perlakuan benih dengan kandungan zinc berbeda yaitu : 11,40 mg/kg, 14,04 mg/kg, 16,74 mg/kg, 17,84 mg/kg, 21,39 mg/kg, 23,95 mg/kg dan 33,49 mg/kg. Data yang diperoleh diuji Bartlett dan uji Tukey, kemudian data dianalisi ragam dan dilakukan uji lanjut Beda Nyata Terkecil (BNT) dengan taraf kepercayaan 5%. Hasil penelitian menunjukkan bahwa kandungan zinc berpengaruh nyata terhadap kecepatan perkecambahan, panjang radikula, panjang plumula, serta bobot basah dan bobot kering kecambah, baik pada media kertas maupun tanah masam. Benih dengan kandungan zinc tertinggi (33,49 mg/kg) menunjukkan performa fisiologis terbaik memberikan respon terbaik dengan memberikan hasil konsisten baik dikecambahkan pada media masam kertas maupun tanah.

Kata kunci: Media Masam, Mutu Fisologis, Padi, Zinc

ABSTRACT

EVALUATION OF PHYSIOLOGICAL SEED QUALITY OF RICE (*ORYZA SATIVA* L.) WITH VARYING ZINC (ZN) CONCENTRATIONS UNDER ACID STRESS CONDITIONS

By

Fahrul Azzami

The decline in rice productivity in Indonesia is partly attributed to the shrinking area of arable land. Exploiting marginal lands such as acid soils offers a viable alternative, although such soils pose challenges including high acidity and phytotoxic levels of aluminum (Al). Zinc (Zn), an essential micronutrient, is known to play critical roles in several physiological and biochemical processes in plants, such as protein synthesis, cell elongation, and the detoxification of reactive oxygen species (ROS). This study aimed to assess the effect of different endogenous Zn concentrations in rice seeds on seed physiological performance under acid stress conditions. The experiment was conducted from January to April 2025 at the Seed and Plant Breeding Laboratory and the Greenhouse Facility, Faculty of Agriculture, University of Lampung. A non-factorial experiment was arranged in a Randomized Complete Block Design (RCBD) with four replicates. Seven Zn concentration treatments were evaluated: 11.40, 14.04, 16.74, 17.84, 21.39, 23.95, and 33.49 mg/kg. Data were subjected to Bartlett's and Tukey's tests for homogeneity and additivity, followed by analysis of variance (ANOVA), and means were compared using the Least Significant Difference (LSD) test at a 5% significance level. The results demonstrated that Zn concentration significantly influenced key physiological parameters, including germination rate, radicle length, plumule length, seedling fresh weight, and dry weight, under both paper-based and acid soil media. Seeds with the highest Zn concentration (33.49 mg/kg) exhibited superior and consistent physiological performance across both media types, indicating enhanced tolerance to acid stress conditions.

Keywords: Acid soil, Physiological Quality, Oryza sativa, Zinc