

PENGARUH SEED HALOPRIMING TERHADAP AKTIVITAS ENZIM ASKORBAT PEROKSIDASE DAN KATALASE TANAMAN PADI (*Oryza sativa* L.) BERPIGMENT PADA KONDISI CEKAMAN SALINITAS

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INTISARI

Padi (*Oryza sativa* L.) merupakan makanan pokok bagi sebagian besar masyarakat Indonesia. Penurunan produktivitas padi dipengaruhi berbagai macam faktor, salah satunya adalah cekaman salinitas yakni kondisi lahan pertanian dengan kadar garam tinggi. Salah satu cara untuk meningkatkan ketahanan padi dalam cekaman salinitas adalah dengan *seed halopriming*. *Seed halopriming* adalah metode merendam benih dalam garam anorganik untuk meningkatkan ketahanan benih secara bertahap. *Seed halopriming* memacu produksi aktivitas senyawa antioksidan baik enzimatis maupun non-enzimatis. Aktivitas enzimatis tersebut berupa ascorbat peroksidase (APX) dan katalase (CAT), sedangkan aktivitas non-enzimatis berupa klorofil, antosianin, dan karotenoid. Penelitian yang mengaplikasikan *seed halopriming* pada padi berpigmen masih jarang dilakukan, sehingga dilakukan pengamatan pengaruh *seed halopriming* terhadap aktivitas APX dan CAT serta senyawa antioksidan lainnya yakni klorofil, antosianin, dan karotenoid pada tanaman padi. Varietas padi berpigmen yang digunakan adalah Merah Kalimantan Selatan, dan Cempo Ireng Pendek, sedangkan varietas IR 64 digunakan sebagai kontrol negatif, dan varietas Inpari 35 digunakan sebagai kontrol positif. Biji padi direndam dalam larutan *halopriming*, kemudian dikecambahkan selama tujuh hari, dan ditanam secara hidroponik dalam larutan nutrisi Yoshida. Padi yang telah berusia 21 hari dan diberi cekaman salinitas kemudian dilakukan pengukuran aktivitas antioksidan. Data yang diperoleh berdasarkan analisis variansi (ANOVA) *two ways* dan Duncan's Multiple Range Test (DMRT) dengan tingkat signifikansi $p < 0,05$ menunjukkan bahwa *seed halopriming* berpengaruh terhadap aktivitas enzimatis dan non-enzimatis padi. *Seed halopriming* meningkatkan produksi enzim APX dan CAT, serta mencegah penurunan klorofil dan karoten padi berpigmen dalam keadaan cekaman salinitas. Sebaliknya, *seed halopriming* tidak membantu mencegah penurunan antosianin padi berpigmen dalam keadaan cekaman salinitas. Berdasarkan hasil penelitian, dapat disimpulkan bahwa *seed halopriming* membantu meningkatkan aktivitas enzimatis padi mencegah penurunan signifikan senyawa non-enzimatis padi dalam keadaan cekaman salinitas.

Kata kunci: padi, cekaman salinitas, *seed halopriming*, enzim, antioksidan

EFFECT OF SEED HALOPRIMING ON ASCORBATE PEROXIDASE AND CATALASE ACTIVITIES OF PIGMENTED RICE (*Oryza sativa* L.) IN SALINITY STRESS CONDITIONS

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ABSTRACT

Rice (*Oryza sativa* L.) is a staple food for most Indonesians. The decline in rice productivity is influenced by various factors, one of them is salinity stress, which is the condition of agricultural land with high salt content. One way to increase the resilience of rice in salinity stress is by seed halopriming. Seed halopriming is a method of soaking seeds in inorganic salt to gradually increase seed resistance. Seed halopriming stimulates the production of antioxidant compound activity both enzymatic and non-enzymatic. The enzymatic activities are ascorbate peroxidase (APX) and catalase (CAT), while the non-enzymatic activities are chlorophyll, anthocyanins, and carotenoids. Research that applies seed halopriming to pigmented rice is still rare, so an observation of the effect of seed halopriming on APX and CAT activities as well as other antioxidant compounds namely chlorophyll, anthocyanins, and carotenoids in rice plants was carried out. The pigmented rice varieties used were Merah Kalimantan Selatan, and Cempo Ireng Pendek, while the IR 64 variety was used as a negative control, and the Inpari 35 variety was used as a positive control. Rice seeds were soaked in halopriming solution, then germinated for seven days, and grown hydroponically in Yoshida nutrient solution. Rice seeds that were 21 days old and treated with salinity stress were then measured for antioxidant activity. Data obtained based on two ways analysis of variance (ANOVA) and Duncan's Multiple Range Test (DMRT) with a significance level of $p < 0.05$ showed that seed halopriming affected the enzymatic and non-enzymatic activities of rice. Seed halopriming increased the production of APX and CAT, and prevented the decrease of chlorophyll and carotene of pigmented rice under salinity stress. In contrast, seed halopriming did not help prevent the decline of anthocyanins in pigmented rice under salinity stress. In conclusion, seed halopriming helps increase enzyme activities and prevent a significant decline in non-enzymatic compound of rice under salinity stress.

Keywords: rice, salinity stress, seed halopriming, enzyme, antioxidant