PENGARUH PERLAKUAN PRIMING TERHADAP EKSPRESI GEN *OsAPX1* DAN *OsAPX2* PADA EMPAT KULTIVAR PADI LOKAL DALAM KONDISI CEKAMAN KEKERINGAN

INTISARI

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Tumbuhan padi (*Oryza sativa* L.) membutuhkan air untuk keberlangsungan hidupnya. Kondisi minimnya ketersediaan air untuk kebutuhan hidup tumbuhan disebut cekaman kekeringan. Cekaman kekeringan lebih lanjut dapat menyebabkan cekaman oksidatif. Cekaman oksidatif disebabkan laju produksi *reactive oxygen species* (ROS) melebihi laju degradasinya. Tumbuhan padi merespons cekaman oksidatif melalui sistem pertahanan antioksidatif non-enzimatik berupa perubahan morfologi dan fisiologi serta enzimatik yang melibatkan enzim. Respons enzimatik melibatkan ekspresi gen terkait enzim antioksidatif seperti *ascorbate peroxidase* (APX). Penelitian ini bertujuan untuk mengetahui pengaruh perlakuan *priming* terhadap ekspresi gen *OsAPX1* dan *OsAPX2* pada empat kultivar padi lokal dalam kondisi cekaman kekeringan. Desain penelitian menggunakan Rancangan Acak Kelompok (RAK) faktorial (3 faktor). Faktor pertama adalah jumlah kultivar sebanyak 4 (empat), meliputi Merah Pari Eja, Inpari 24, Cempo Ireng WT, dan Putih Payo. Faktor kedua adalah perlakuan FTSW (*Fraction of Transpirable Soil Water*) sebanyak 3 (tiga) tingkat, FTSW 1 (kontrol), FTSW 0,5 (kekeringan sedang), dan FTSW 0,2 (kekeringan berat). Faktor ketiga adalah perlakuan *priming* dan *non-priming*. Cara kerja meliputi perlakuan *priming*, perlakuan FTSW, pengamatan morfologi dan *leaf scoring*, analisis ekspresi gen *OsAPX1* dan *OsAPX2*, dan analisis filogenetik. Analisis data utama berupa ekspresi gen *OsAPX1* dan *OsAPX2* menggunakan *qRT-PCR* dengan metode Livak. Analisis data pendukung meliputi pengamatan morfologi, *leaf scoring*, dan pohon filogenetik gen-gen homolog dari gen *OsAPX1* dan *OsAPX2*.

Kata kunci : cekaman kekeringan, padi, *OsAPX1*, *OsAPX2*, perlakuan *priming*

EFFECT OF PRIMING TREATMENT TO THE EXPRESSION OF *OsAPX1* AND *OsAPX2* GENES OF FOUR LOCAL RICE CULTIVARS IN DROUGHT STRESS CONDITION

ABSTRACT

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Rice plants (*Oryza sativa* L.) need water for their survival. The condition of the minimum availability of water for the needs of plant life is called drought stress. Further drought stress can cause oxidative stress. Oxidative stress is caused by the rate of production of reactive oxygen species (ROS) exceeding the rate of degradation. Rice plants respond to oxidative stress through non-enzymatic antioxidative defense systems in the form of morphological and physiological and enzymatic involving enzymes. The enzymatic response involves gene expression associated with antioxidative enzymes such as ascorbate peroxidase (APX). This study aims to determine the effect of priming treatment on *OsAPX1* and *OsAPX2* gene expression in four local rice cultivars under drought stress conditions. The research design used a factorial Randomized Block Design with 3 factors. The first factor is the number of cultivars of 4 (four), including Merah Pari Eja, Inpari 24, Cempo Ireng WT, and Putih Payo. The second factor is the FTSW (Fraction of Transpirable Soil Water) treatment with 3 (three) levels, FTSW 1 (control), FTSW 0.5 (moderate drought), and FTSW 0.2 (severe drought). The third factor is priming and non-priming treatment. The methods including priming treatment, FTSW treatment, morphological observation and leaf scoring, analysis of *OsAPX1* and *OsAPX2* gene expression, and phylogenetic analysis. The main data analysis in the form of *OsAPX1* and *OsAPX2* gene expression using qRT-PCR with the Livak method. Analysis of supporting data including morphological observations, leaf scoring, and phylogenetic trees of homologous genes from the *OsAPX1* and *OsAPX2* genes.

Keywords : drought stress, rice, *OsAPX1*, *OsAPX2*, priming treatment