ANALISIS EKSPRESI GEN PEMBUNGAAN *SUPPRESSOR OF OVEREXPRESSION OF CONSTANS* 1 *(SOC1)* SECARA SPASIAL DAN DIURNAL PADA UBI KAYU (*Manihot esculenta* Crantz)

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INTISARI

Ubi kayu (*Manihot esculenta* Crantz) merupakan tanaman umbi-umbian penting di daerah tropis seperti Indonesia, dan merupakan salah satu bahan pangan pokok setelah padi dan jagung. Produksi ubi kayu di Indonesia mencapai sekitar 19 juta ton per tahun, namun mengalami fluktuasi luas panen karena cekaman biotik, kekeringan, penyakit, dan serangga. Pemuliaan tanaman melalui stek batang dianggap potensial untuk meningkatkan produksi. Sementara itu, pemuliaan secara generatif termasuk jarang dilakukan karena menghasilkan pembungaan yang lebih lambat dan terdapat beberapa varietas yang tidak berbunga. Gen *SUPPRESSOR OF OVEREXPRESSION OF CONSTANS* 1 *(SOC1)* merupakan salah satu solusi untuk mendorong pembungaan ubi kayu. Penelitian ini bertujuan untuk mengatasi masalah pembungaan ubi kayu melalui tingkat ekspresi gen *SOC1* pada ubi kayu secara spasial dan diurnal, serta hubungan filogenetiknya dengan gen *SOC1* tanaman homolog lainnya. Sampel daun muda dan daun tua ubi kayu akan diambil sebanyak empat kali di waktu yang berbeda yaitu pukul 08.00, 12.00, 16.00, dan 20.00. Isolasi RNA total kemudian dilakukan untuk mendapatkan pelet RNA. Sintesis cDNA dan amplifikasi gen secara qRT-PCR dapat dilakukan jika total RNA diketahui sehingga diketahui level ekspresi gen *SOC1* ubi kayu secara akurat. Data sekuen gen ubi kayu yang diperoleh dari database *Phytozome* akan digunakan untuk mencari hubungan filogenetik tanaman homolog lainnya dengan gen *SOC1*. Hasil menunjukkan gen *SOC1* ubi kayu terekspresi baik di daun tua maupun daun muda dalam kondisi *Long-day* pada sore hari pukul 16.00 dan malam hari pukul 20.00. Gen *SOC1* pada tanaman ubi kayu secara genetik memiliki kekerabatan terdekat dengan tanaman jarak (*Ricinus communis*).

KATA KUNCI: Ubi kayu (*Manihot esculenta* Crantz), pembungaan, *SUPPRESSOR OF OVEREXPRESSION OF CONSTANS* 1 *(SOC1)*, filogenetik.

SPATIAL AND DIURNAL EXPRESSION ANALYSIS OF FLOWERING GENES SUPPRESSOR OF OVEREXPRESSION OF CONSTANS 1 (SOC1) IN CASSAVA (*Manihot esculenta* Crantz)

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ABSTRACT

Cassava (*Manihot esculenta* Crantz) is an important root crop in tropical regions such as Indonesia, and is one of the staple foods after rice and corn. Cassava production in Indonesia reaches about 19 million tons per year, but experiences fluctuations in harvest area due to biotic stress, drought, disease, and insects. Plant breeding through stem cuttings is considered potential to increase production. Meanwhile, generative breeding is rarely practiced because it results in slower flowering and there are several varieties that do not flower. The *SUPPRESSOR OF OVEREXPRESSION OF CONSTANS 1* (*SOC1*) gene is one solution to encourage cassava flowering. This study aims to address the problem of cassava flowering through the expression level of the *SOC1* gene in cassava spatially and diurnally, and its phylogenetic relationship with the *SOC1* gene of other homologous plants. Samples of young and old leaves of cassava will be taken four times at different times, namely at 08:00, 12:00, 16:00, and 20:00. Total RNA isolation is then carried out to obtain RNA pellets. cDNA synthesis and gene amplification via qRT-PCR can be conducted once the total RNA is quantified to accurately determine the expression level of the *SOC1* gene in cassava. The cassava gene sequence data obtained from the Phytozome database will be used to investigate the phylogenetic relationship of *SOC1* with homologous genes in other plants. Results show that the *SOC1* gene in cassava is expressed in both old and young leaves under long-day conditions in the afternoon at 16.00 and in the evening at 20.00. Genetically, the *SOC1* gene in cassava is most closely related to the castor bean plant (*Ricinus communis*).

KEY WORDS: Cassava (*Manihot esculenta* Crantz), flowering, SUPPRESSOR OF OVEREXPRESSION OF CONSTANS 1 (SOC1), phylogenetic.