

INTISARI

Penggunaan UV-B sebagai inovasi dapat mempengaruhi pembentukan umbi mikro bawang merah, serta perubahan ekspresi gen *sucrose phosphate synthase* (SPS) dan *Flowering Locus T1* (FT1). Penelitian ini bertujuan untuk memonitoring tingkat ekspresi gen FT1 dan SPS pada umbi bawang merah kultivar Sanren dan Merdeka, serta melihat respon kedua kultivar setelah diberi penyinaran UV-B. Tahapan penelitian meliputi kultur in vitro dengan benih TSS kultivar Sanren dan merdeka, penyinaran UV-B intensitas $1,67\text{W/m}^2$ selama 30 menit saat planlet berumur 4 minggu setelah tanam (mst), Pemindahan media sukrosa 8% hingga tanaman berumur 6mst. Sampling dilakukan pada tanaman berusia 4,5, dan 6mst, sebelum selanjutnya akan dilakukan ekstraksi RNA guna melihat ekspresi gen *Sucrose Phosphate Synthase* (SPS) dan *Flowering Locus T1* (FT1) pada organ umbi bawang merah. Dari penelitian ini didapatkan hasil bahwa penyinaran UV-B memberikan pengaruh yang signifikan terhadap parameter panjang umbi kultivar sanren dan signifikan pada bobot umbi kultivar Merdeka pada umur 6mst atau 2 minggu setelah paparan UV-B. Didapatkan perubahan ekspresi gen pada bagian umbi tanaman bawang merah bahwasannya ekspresi gen SPS pada kultivar Merdeka meningkat setelah paparan UV-B, sedangkan untuk gen FT1 meningkat pada kultivar Sanren setelah paparan UV-B. Keterkaitan SPS dalam sintesis sukrosa diduga berdampak pada peningkatan bobot umbi, sedangkan untuk pemanjangan umbi dipengaruhi oleh peningkatan ekspresi FT1. Terdapat pula ekspresi gen β -Tubulin, yang memiliki pola kurang stabil setelah paparan UV-B, sehingga kurang baik digunakan sebagai gen referen pada bawang merah.

Kata kunci: UV-B; FT1; SPS; bawang merah

ABSTRACT

The application of UV-B radiation as an innovative treatment can influence micro-bulb formation in shallots and modulate the expression of key genes, namely *Sucrose Phosphate Synthase* (SPS) and *Flowering Locus T1* (FT1). This study aimed to monitor the expression levels of *FT1* and *SPS* in the Sanren and Merdeka cultivars and to evaluate their physiological responses following UV-B exposure. The experimental procedures included tissue culture using TSS seeds of both cultivars, UV-B irradiation at an intensity of 1.67 W/m² for 30 minutes when plantlets were 4 weeks after planting (WAP), and subsequent transfer to a medium containing 8% sucrose until the plants reached 6 WAP. Sampling was performed at 4, 5, and 6 WAP, followed by RNA extraction to assess the expression of *SPS* and *FT1* in the developing bulb tissues. The results demonstrated that UV-B exposure significantly affected bulb length in the Sanren cultivar and significantly increased bulb weight in the Merdeka cultivar at 6 WAP, corresponding to two weeks after UV-B treatment. Gene expression analysis further revealed that *SPS* expression increased in the Merdeka cultivar following UV-B exposure, whereas *FT1* expression was upregulated in the Sanren cultivar. The enhanced *SPS* activity is presumed to contribute to increased bulb biomass through its role in sucrose synthesis, while elevated *FT1* expression is associated with bulb elongation. Additionally, the expression pattern of β -*Tubulin* was found to be unstable under UV-B treatment, indicating that it may not be suitable as a reference gene for gene expression studies in shallots.

Keywords: UV-B; FT1; SPS; Shallot