ELIMINATION OF VIRUSES IN THE BULB OF SHALLOT THROUGH HEAT TREATMENT

ABSTRACT

Shallot (*Allium cepa* L. Aggregatum group) is usually cultivated vegetatively, as a result viruses tend to accumulate within the host plants and spread to healthy plants every crop cycle, reducing yield and bulb quality. The study about elimination of shallot viruses through heat treatment were very limited. The objective of this research was to eliminate shallot viruses through heat treatment to produce viruses free plantlets.

The leaves of Biru Lancor with specific visual virus symptoms were detected by Reverse Transcription – Polymerase Chain Reaction (RT-PCR). Then bulbs of Biru Lancor were positive infected by viruses used as materials for heat treatment. The treatments were control (without treatment), electric treatment at 15 mA for 10 minutes, heat treatment in the incubator at 37°C for 4 weeks, heat treatment in the waterbath at 45°C for 60 minutes and combination of heat treatment in the incubator at 37°C for 4 weeks and heat treatment at in the waterbath 45°C for 60 minutes. After subjected to heat treatment, the shoots tip were cultivated in the MS Medium + 1 mg/L BAP + 1 mg/L IBA.Viruses detection by RT-PCR conducted after 28 days after planting using sampel of leaves from each plantlet.

The results of this research showed that the treatments of electric treatment at 15 mA for 10 minutes and combination of heat treatment in the incubator at 37°C for 4 weeks and heat treatment in the waterbath at 45°C for 60 minutes could suppress the incidence of *Shallot latent virus* (SLV) until 100%. The heat treatment might have an important role in the degradation of the virus particle by boosting Virus-Induced Gene Silencing (VIGS) as plant responses to virus infection.

Key words: shallot, *Shallot latent virus,* heat treatment

ELIMINASI VIRUS PADA UMBI BAWANG MERAH DENGAN PERLAKUAN PANAS

INTISARI

Budidaya bawang merah (*Allium cepa* L. Aggregatum *group*) secara vegetatif menggunakan umbi dari pertanaman sebelumnya rentan terhadap penularan virus sehingga menurunkan kualitas dan produktvitas umbi. Studi tentang eliminasi virus pada umbi bawang merah menggunakan perlakuan panas masih sangat terbatas. Penelitian ini bertujuan untuk mendapatkan plantlet bawang merah bebas virus melalui perlakuan panas dalam inkubator dan perlakuan panas dalam *waterbath* pada umbi bawang merah.

Umbi bawang merah Biru Lancor yang positif terinfeksi virus hasil pengamatan gelaja visual dan dikonfirmasi dengan *Reverse Transcription – Polymerase Chain Reaction* (RT-PCR) digunakan sebagai sampel untuk perlakuan panas. Perlakuan panas terdiri dari: tanpa perlakuan (kontrol), perlakuan arus listrik 15 mA selama 10 menit, perlakuan panas dalam inkubator pada temperatur 37°C selama 4 minggu, perlakuan panas dalam *waterbath* pada temperatur 45°C selama 60 menit dan kombinasi perlakuan panas dalam inkubator pada temperatur 37°C selama 4 minggu dan perlakuan panas dalam *waterbath* pada temperatur 45°C selama 60 menit. Setelah perlakuan panas, batang semu dari umbi ditanam pada medium MS + 1 mg/L BAP + 1 mg/L IBA. Deteksi virus dengan RT-PCR dilakukan pada sampel daun plantlet bawang merah umur 28 hari setelah tanam.

Hasil penelitian menunjukkan bahwa perlakuan arus listrik 15 mA selama 10 menit dan kombinasi perlakuan panas dalam inkubator pada temperatur 37°C selama 4 minggu dan perlakuan panas dalam *waterbath* pada temperatur 45°C selama 60 menit dapat menekan insidensi *Shallot latent virus* (SLV) hingga 100%. Perlakuan panas diduga berperan dalam degradasi atau eliminasi virus dengan meningkatkan mekanisme *Virus-Induced Gene Silencing* (VIGS) sebagai respon tanaman terhadap infeksi virus.

Kata kunci: bawang merah, *Shallot latent virus*, perlakuan panas