

ABSTRAK

DETEKSI SIMULTAN BERBAGAI VIRUS YANG MENGINFEKSI TANAMAN TOMAT (*Solanum lycopersicum* L.) DAN CABAI RAWIT (*Capsicum frutescens* L.) DI KABUPATEN PRINGSEWU DAN KABUPATEN TANGGAMUS

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Tanaman Solanaceae merupakan tanaman yang banyak dikonsumsi oleh mayoritas masyarakat Indonesia terutama tomat (*Solanum lycopersicum* L.) dan cabai rawit (*Capsicum frutescens* L.). Namun, produksi tomat dan cabai rawit di Indonesia mengalami penurunan produksi yang disebabkan oleh penyakit yang diinfeksi virus. Beberapa jenis virus yang menginfeksi tomat dan cabai rawit diantaranya *Tomato yellow curl virus* (TYLCV), *Tomato infectious chlorosis virus* (TICV), *Pepper yellow leaf curl virus* (PepYLCV), dan *Cucumber mosaic virus* (CMV). Virus-virus ini dapat dideteksi dengan menggunakan teknik *Multiplex Polymerase Chain Reaction* (*Multiplex PCR*). Penelitian ini akan dilaksanakan dalam dua tahapan, yaitu koleksi sampel di Kabupaten Pringsewu dan Tanggamus serta penelitian molekuler di Laboratorium Bioteknologi, Jurusan Proteksi Tanaman, Fakultas Pertanian, Universitas Lampung pada bulan Oktober 2022–Februari 2023. Tujuan penelitian ini adalah mendeteksi adanya berbagai virus yang menginfeksi tomat dan cabai rawit di Kabupaten Pringsewu dan Tanggamus, mengetahui karakteristik berbagai virus yang menginfeksi tomat dan cabai rawit dengan teknik *Multiplex PCR*, dan mengetahui kekerabatan isolat virus di Kabupaten Pringsewu dan Tanggamus dengan isolat virus daerah lain dengan analisis sekuensing. Metode yang digunakan pada penelitian ini yaitu *Multiplex PCR* dengan desain untuk mengamplifikasi empat virus yang diduga menginfeksi tomat dan cabai rawit di Kabupaten Pringsewu dan Tanggamus, yaitu TYLCV, TICV, PepYLCV, dan CMV. Karakterisasi molekuler virus selanjutnya dilakukan dengan analisis sekuensing dan rekonstruksi filogenetik menggunakan *software* MEGA 11. Hasil deteksi menunjukkan 4 dari total 32 sampel tomat dan cabai rawit di Kabupaten Pringsewu dan Tanggamus positif terinfeksi TYLCV, TICV, PepYLCV, dan CMV dengan pita spesifik 898 bp, 852 bp, dan 428 bp. Karakterisasi molekuler pada masing-masing isolat Ca4 SPG (TYLCV), Ca2 SPG (PepYLCV), dan Ca4 KH (PepYLCV) menunjukkan jumlah sekuen 852 basa, 898 basa, dan 428 basa. Hasil analisis hubungan kekerabatan menunjukkan isolat Ca4 SPG (TYLCV) memiliki kedekatan dengan isolat asal Bali, isolat Ca2 SPG

memiliki kekerabatan dengan isolat asal Bengkulu, sedangkan isolat Ca4 KH (PepYLCV) berada pada cabang terpisah yang mengarah pada spesiasi.

Kata kunci : Tomat (*Solanum lycopersicum* L.), Cabai Rawit (*Capsicum frutescens* L.), TYLCV, PepYLCV, CMV, TICV, *Multiplex* PCR, Lampung

ABSTRACT

SIMULTANEOUS DETECTION OF TOMATO (*Solanum lycopersicum* L.) AND CHILI PEPPER (*Capsicum frutescens* L.)-INFECTING VIRUSES IN PRINGSEWU AND TANGGAMUS REGENCY

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Solanaceae are plants that are widely consumed by the majority of Indonesians, especially tomatoes (*Solanum lycopersicum* L.) and chili pepper (*Capsicum frutescens* L.). However, the production of tomatoes and chili pepper in Indonesia has decreased due to viral infections. Various species of viruses that infected tomatoes and chili pepper, such as *Tomato yellow curl virus* (TYLCV), *Tomato infectious chlorosis virus* (TICV), *Pepper yellow leaf curl virus* (PepYLCV), and *Cucumber mosaic virus* (CMV). These viruses can be detected using the Multiplex Polymerase Chain Reaction (Multiplex PCR) technique. This research was carried out in two stages, beginning with sample collection in Pringsewu and Tanggamus Regencies and molecular detection at the Biotechnology Laboratory, Department of Plant Protection, Faculty of Agriculture, University of Lampung, from October 2022 – February 2023. The purpose of this research is to detect the presence of various viruses that infect tomato and chili pepper in Pringsewu and Tanggamus Regencies, to find out the characteristics of several viruses that infect tomatoes and chili pepper using the Multiplex PCR technique, and to find out the kinship of virus isolates in Pringsewu and Tanggamus Regencies with virus isolates from other areas by sequencing analysis. The method used in this study was Multiplex PCR with four primers to amplify four viruses that were suspected of infecting tomatoes and chili pepper in Pringsewu and Tanggamus Regencies, namely TYLCV, TICV, PepYLCV, and CMV. The molecular characterization of the virus was then carried out by sequencing analysis and phylogenetic reconstruction using MEGA 11 software. The detection results showed that 4 out of 32 samples in a total of tomatoes and cayenne pepper in the Pringsewu and Tanggamus districts were positively infected with TYLCV, TICV, PepYLCV, and CMV with a specific band of 898 bp, 852 bp, and 428 bp. Molecular characterization of each isolate Ca4 SPG (TYLCV), Ca2 SPG (PepYLCV), and Ca4 KH (PepYLCV) showed the number of sequences of 852 bases, 898 bases,

and 428 bases. The results of the phylogenetic relationship analysis showed that the Ca4 SPG isolate (TYLCV) had a close relationship with the isolate from Bali, the Ca2 SPG isolate had a kinship with the isolate from Bengkulu, while the Ca4 KH isolate (PepYLCV) was in a separate branch leading to speciation.

Keywords : Chili paper (*Capsicum frutescens* L.), Lampung, *Multiplex* PCR, Tomato (*Solanum lycopersicum* L.), TYLCV, PepYLCV, CMV, TICV