PENGARUH IRADIASI UV-C TERHADAP PENURUNAN KADAR PESTISIDA IMIDAKLOPRID PADA BEBERAPA JENIS SEDUHAN TEH *Camellia sinensis*

SKRIPSI

Diajukan untuk memenuhi sebagian syarat untuk memperoleh gelar Sarjana Sains
Program Studi Kimia

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PERNYATAAN

Dengan ini saya menyatakan bahwa skripsi dengan judul "**Pengaruh Iradiasi UV-C terhadap Penurunan Kadar Pestisida Imidakloprid pada Beberapa Jenis Seduhan Teh *Camellia sinensis***" ini beserta seluruh isinya adalah benar-benar karya saya sendiri. Saya tidak melakukan penjiplakan dan pengutipan dengan cara-cara yang tidak sesuai dengan etika ilmu yang berlaku dalam masyarakat keilmuan. Atas pernyataan ini, saya siap menanggung resiko atau sanksi yang dijatuhkan kepada saya apabila ditemukan adanya pelanggaran terhadap etika keilmuan dalam karya ini, atau ada klaim dari pihak lain terhadap keaslian karya saya ini.

Bandung, Agustus 2023

Yang membuat pernyataan,

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ABSTRAK

Tanaman teh *Camellia sinensis* membutuhkan pestisida untuk melindunginya dari hama. Salah satu jenis pestisida yang digunakan adalah imidakloprid yang termasuk dalam jenis insektisida. Imidakloprid merupakan pestisida yang larut dalam air sehingga memungkinkannya untuk transfer dari daun ke dalam seduhan teh. Penelitian ini bertujuan untuk mengetahui pengaruh iradiasi UV-C terhadap penurunan kadar pestisida imidakloprid pada tiga jenis seduhan teh, yaitu teh hijau, putih, dan hitam serta dilakukan konfirmasi mengenai produk hasil degradasinya. Selain itu, dilakukan pula analisis penurunan aktivitas antioksidan setelah iradiasi UV-C. Analisis dilakukan dengan menambahkan imidakloprid pada ketiga jenis seduhan teh dan diberikan paparan iradiasi UV-C dengan rentang waktu yang sama untuk melihat penurunan kadar imidakloprid dan senyawa hasil degradasinya menggunakan instrumentasi UHPLC-ESI-QQQ-MS/MS serta penurunan aktivitas antioksidan dengan metode DPPH menggunakan spektrofotometer UV-Vis. Penelitian menunjukkan bahwa iradiasi UV-C dapat menurunkan kadar imidakloprid pada ketiga jenis seduhan teh dengan teh putih mengalami degradasi paling rendah sebesar 38,10%, diikuti teh hitam sebesar 48,77%, dan paling tinggi pada teh hijau sebesar 62,28%. Analisis struktur senyawa hasil degradasi menunjukkan bahwa terdapat tiga produk degradasi, yaitu imidakloprid urea, imidakloprid desnitro, dan 3-((6-kloropiridin-3-il)metil)-2-iminoimdazolidin-1-ol. Hasil penelitian juga menunjukkan bahwa iradiasi UV-C menyebabkan penurunan aktivitas antioksidan pada seduhan teh, dengan penurunan tertinggi pada teh putih sebesar 10,81%, diikuti teh hitam sebesar 9,82%, dan terendah pada teh hijau sebesar 7,20%. Persentase penurunan aktivitas antioksidan menunjukkan hasil yang lebih kecil dibandingkan dengan penurunan kadar pestisida imidakloprid. Sehingga, paparan iradiasi UV-C pada seduhan teh dapat menurunkan kadar pestisida imidakloprid tanpa banyak mengurangi kandungan senyawa antioksidannya.

Kata kunci: aktivitas antioksidan, degradasi, imidakloprid, iradiasi UV-C, teh *Camellia sinensis*

ABSTRACT

Camellia sinensis tea plants need pesticides to protect them from pests. One type of pesticide used is imidacloprid which is a type of insecticide. Imidakloprid is a water-soluble pesticide that allows it to transfer from the leaves into the tea brew. This study aims to determine the effect of UV-C irradiation on the reduction of imidacloprid pesticide levels in three types of tea brewing, which are green, white and black tea and to confirm the degradation products. In addition, the decrease of antioxidant activity after UV-C irradiation was also analyzed. The analysis was conducted by adding imidacloprid to the three types of tea brewing and given UV-C irradiation exposure with the same time span to see the decrease in imidacloprid levels and its degradation compounds using UHPLC-ESI-QQQ-MS/MS instrumentation as well as the decrease in antioxidant activity with the DPPH method using a UV-Vis spectrophotometer. The study showed that UV-C irradiation can reduce imidacloprid levels in the three types of tea brewing with white tea had the lowest degradation at 38.10%, followed by black tea at 48.77%, and the highest green tea at 62.28%. Structural analysis of the degraded compounds showed that there were three degradation products, namely imidacloprid urea, imidacloprid desnitro, and 3-((6-chloropyridin-3-yl)methyl)-2-iminoimdazolidin-1-ol. The results also showed that UV-C irradiation caused a decrease in antioxidant activity in brewed tea, with the highest decrease in white tea at 10.81%, followed by black tea at 9.82%, and the lowest in green tea at 7.20%. The percentage decrease of antioxidant activity showed smaller results compared to the decrease in imidacloprid pesticide levels. Thus, exposure to UV-C irradiation on tea brewing can reduce the levels of imidacloprid pesticide without much reducing the content of antioxidant compounds.

Keywords: *antioxidant activity, degradation, imidacloprid, UV-C irradiation, Camellia sinensis tea*

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