

**EFEKTIVITAS RADIASI UV-B TERHADAP PENURUNAN KADAR
PESTISIDA SIPERMETRIN PADA SEDUHAN TEH HIJAU DAN
TEH HITAM (*Camellia sinensis*)**

SKRIPSI

diajukan untuk memenuhi salah satu syarat memperoleh gelar Sarjana Sains
Program Studi Kimia



disusun oleh:

Elisa Fitri

2005378

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Oleh:

Elisa Fitri

Sebuah skripsi yang diajukan untuk memenuhi salah satu syarat
memperoleh gelar Sarjana Sains pada Fakultas Pendidikan
Matematika dan Ilmu Pengetahuan Alam

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LEMBAR PENGESAHAN

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Oleh

Elisa Fitri

2005378

disetujui dan disahkan oleh:

Pembimbing I



Amelinda Pratiwi, M.Si.

NIP.920200419910505201

Pembimbing II



Dr. Siti Aisyah, M.Si.

NIP. 197509302001122001

Mengetahui,

Ketua Program Studi Kimia



Prof. Dr. Fitri Khoerunnisa, M.Si., Ph.D.

NIP.197806282001122001

ABSTRAK

Keamanan pangan merupakan aspek penting yang harus diperhatikan. Salah satu penyebab makanan menjadi tidak aman dikonsumsi ialah pestisida. Sipermetrin (CPM) merupakan pestisida jenis insektisida golongan piretroid yang digunakan untuk memberantas hama dalam berbagai komoditas termasuk tanaman teh (*Camellia sinensis*). Fotodegradasi menjadi metode paling efektif untuk mendegradasi residu pestisida salah satunya dengan menggunakan radiasi ultraviolet B (UV-B) karena selain energinya mampu mendegradasi residu pestisida juga relatif lebih aman dan mudah diaplikasikan dengan pemanfaatan sinar matahari. Pada penelitian sebelumnya radiasi UV-B diaplikasikan pada sampel bayam dan gandum hasilnya menunjukkan bahwa perbedaan kandungan metabolit dalam matriks dapat memengaruhi efektivitas fotodegradasi CPM. Sehingga dalam penelitian ini digunakan matriks berbeda berupa dua jenis teh yaitu teh hijau (GT) dan teh hitam (BT). Penelitian ini bertujuan untuk mengetahui efektivitas radiasi UV-B terhadap penurunan kadar pestisida CPM pada kedua jenis seduhan teh dengan variasi waktu tertentu dan mengetahui pengaruh perbedaan matriks terhadap penurunan kadar CPM. Analisis dilakukan dengan menambahkan pestisida CPM sebanyak 100 ppm ke dalam kedua jenis seduhan teh dan dilakukan radiasi UV-B pada variasi waktu selama 15; 30; dan 45 menit. Hasil radiasi diekstraksi dengan ekstraksi cair-cair menggunakan pelarut etil asetat dilanjutkan ekstraksi fase padat dengan QuEChERS dan hasilnya dianalisis menggunakan *Gas Chromatography Flame Ionization Detector* (GC-FID). Hasil penelitian menunjukkan bahwa radiasi UV-B secara efektif mampu menurunkan kadar pestisida CPM dengan tingkat degradasi tertinggi pada sampel BT dengan waktu radiasi UV-B selama 45 menit sebesar $82,31 \pm 4,12\%$ dibandingkan sampel GT hanya sebesar $79,65 \pm 0,64\%$. Selain itu, perbedaan waktu radiasi UV-B memberikan pengaruh terhadap penurunan kadar pestisida CPM baik dalam sampel GT maupun BT dimana jumlah penurunan konsentrasi pestisida CPM semakin meningkat seiring dengan penambahan waktu radiasi.

Kata kunci: teh (*camellia sinensis*), fotodegradasi, radiasi UV-B, sipermetrin

ABSTRACT

Food safety is an important aspect that must be considered. One of the causes of food becoming unsafe to consume is pesticides. Cypermethrin (CPM) is a pyrethroid class insecticide used to eradicate pests in various commodities including tea plants (Camellia sinensis). Photodegradation is the most effective method for degrading pesticide residues, one of which is using ultraviolet B (UV-B) radiation because apart from the energy it can degrade pesticide residues, it is also relatively safer and easier to apply by using sunlight. In previous research, UV-B radiation was applied to spinach and wheat samples. The results showed that differences in metabolite content in the matrix could influence the effectiveness of CPM photodegradation. So in this research a different matrix was used in the form of two types of tea, namely green tea (GT) and black tea (BT). This study aims to determine the effectiveness of UV-B radiation in reducing CPM pesticide levels in both types of tea brewing at certain time variations and determine the effect of different matrices on reducing CPM levels. Analysis is carried out by adding 100 ppm CPM pesticide into both types of tea brewing and UV-B radiation was carried out at varying times for 15; 30; and 45 minutes. The radiation results were extracted by liquid-liquid extraction using ethyl acetate solvent followed by solid phase extraction with QuEChERS and the results were analyzed using Gas Chromatography Flame Ionization Detector (GC-FID). The results showed that UV-B radiation was effectively able to reduce CPM pesticide levels with the highest degradation rate in BT samples with a UV-B radiation time of 45 minutes of $82.31 \pm 4.12\%$ compared to GT samples which was only $79.65 \pm 0.64\%$. In addition, the difference in UV-B radiation time had an effect on reducing CPM pesticide levels in both GT and BT samples, where the amount of decrease in CPM pesticide concentration increased with increasing radiation time.

Keywords: *tea (camellia sinensis), photodegradation, UV-B radiation, cypermethrin*

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