

**PENGARUH KONDISI PERKECAMBAHAN TERHADAP PENURUNAN DAN
PRODUK MODIFIKASI OKRATOKSIN A PADA KACANG TANAH**

SKRIPSI

Diajukan untuk memenuhi sebagian syarat untuk memperoleh gelar Sarjana Sains

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**Pengaruh Kondisi Perkecambahan terhadap Penurunan dan Produk
Modifikasi Okratoksin A pada Kacang Tanah**

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**Halaman Pernyataan tentang Keaslian Skripsi dan Pernyataan Bebas
Plagiarisme**

Dengan ini saya menyatakan bahwa skripsi dengan judul “**Pengaruh Kondisi Perkecambahan terhadap Penurunan dan Produk Modifikasi Okratoksin A pada Kacang Tanah**” ini beserta seluruh isinya adalah benar-benar karya sendiri. Saya tidak melakukan penjiplakan atau pengutipan yang tidak sesuai dengan etika ilmu yang berlaku dalam masyarakat keilmuan. Atas pernyataan ini, saya siap menanggung risiko/sanksi apabila di kemudian hari ditemukan adanya pelanggaran etika keilmuan atau ada klaim dari pihak lain terhadap keaslian karya ini.

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Yang memberi pernyataan,

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ABSTRAK

Keamanan pangan merupakan hal penting yang harus diperhatikan. Salah satu penyebab makanan menjadi tidak aman dikonsumsi adalah mikotoksin. Okratoksin A (OTA) adalah mikotoksin pada kacang tanah yang bersifat nefrotoksik dan dianggap memiliki kemungkinan karsinogenik. Metode detoksifikasi OTA dapat dilakukan secara biologis, seperti perkecambahan, selain itu juga dapat dilakukan dengan metode fisika yaitu menggunakan cahaya. Penelitian ini menggunakan metode modifikasi antara perkecambahan dengan cahaya. Tujuan dari penelitian ini untuk mengetahui pengaruh perkecambahan dalam kondisi gelap dan cahaya terhadap penurunan dan produk modifikasi OTA pada kacang tanah yang telah dkecambahkan. Kacang tanah dilakukan *spiking* dengan OTA sebanyak 100 ppb, kemudian dilakukan perkecambahan cahaya (cahaya putih dan cahaya biru) dan perkecambahan gelap. Kemudian dianalisis menggunakan *Ultra High Performance Liquid Chromatography Tandem Mass Spectrometry* (UHPLC-MS/MS) dengan metode *Multiple Reaction Monitoring* (MRM) untuk melihat penurunan OTA pada m/z OTA 404 dengan produk ion 358,85; 239,00 dan 221,00. Kemudian dilakukan analisis produk modifikasi OTA menggunakan metode *Product Ion Scan* (PIS) pada rentang m/z 100 – 1000 untuk mendapatkan perubahan produk OTA. Hasil analisis UHPLC-MS/MS dengan metode MRM didapatkan persentase penurunan OTA pada perkecambahan gelap sebesar 89,25%. Sedangkan perkecambahan cahaya putih sebesar 98,39% dan perkecambahan cahaya biru sebesar 82,59%. Penambahan cahaya pada perkecambahan ini diduga mempengaruhi kinerja enzim selama proses perkecambahan yang menyebabkan penurunan OTA. Hasil analisis PIS didapatkan perubahan struktur OTA. Perubahan struktur OTA ini diduga karena adanya reaksi yang terjadi selama proses perkecambahan dan perkecambahan cahaya. Oleh karena itu, dapat disimpulkan bahwa perkecambahan cahaya dengan cahaya putih merupakan metode potensial untuk mengurangi OTA pada kacang tanah.

Kata Kunci: Cahaya, Kacang Tanah, Okratoksin A, Perkecambahan, UHPLC-MS/MS

ABSTRACT

Food safety is an important aspect that must be considered. One of the causes of unsafe food consumption is mycotoxins. Ochratoxin A (OTA) is a mycotoxin found in peanuts that is nephrotoxic and considered to have potential carcinogenic effects. OTA detoxification methods can be carried out biologically, such as through germination, and also through physical methods, namely using light. This study employs a modified method combining germination with light exposure. The aim of this research is to determine the effects of conditions germination in the dark and light on the reduction and modification product OTA in germinated peanuts. Peanuts were spiked with 100 ppb of OTA, followed by light-assisted germination (white light and blue light) and dark germination. Subsequently, analysis was conducted using Ultra High Performance Liquid Chromatography Tandem Mass Spectrometry (UHPLC-MS/MS) with the Multiple Reaction Monitoring (MRM) method to observe the reduction of OTA at m/z OTA 404 with product ions 358.85, 239.00, and 221.00. Furthermore, an analysis of modified OTA products was performed using the Product Ion Scan (PIS) method within the m/z range of 100 – 1000 to elucidate OTA product changes. The UHPLC-MS/MS analysis using the MRM method revealed a percentage reduction of OTA by 89.25% during dark germination. Meanwhile, white light-assisted germination resulted in a reduction of 98.39%, and blue light-assisted germination showed a reduction of 82.59%. The addition of light during germination is believed to influence enzyme performance during the germination process, leading to OTA reduction. The PIS analysis results indicated structural changes in OTA. These structural changes in OTA are likely due to reactions occurring during the germination and light-assisted germination processes. Therefore, it can be concluded that light-assisted germination, particularly with white light, holds the potential as a method to reduce OTA in peanuts.

Keywords: *Light, Peanuts, Ochratoxin A, Germination, UHPLC-MS/MS*

DAFTAR ISI

KATA PENGANTAR	i
UCAPAN TERIMAKASIH	ii
ABSTRAK	iv
ABSTRACT	v
DAFTAR ISI	vi
DAFTAR GAMBAR	viii
DAFTAR TABEL	ix
DAFTAR LAMPIRAN	x
BAB I PENDAHULUAN	1
1.1 Latar Belakang Penelitian	1
1.2 Rumusan Masalah Penelitian	3
1.3 Tujuan Penelitian	3
1.4 Manfaat / Signifikansi Penelitian	4
BAB II TINJAUAN PUSTAKA	5
2.1 Keamanan Pangan	5
2.2 Okratoksin A	6
2.3 Perkecambahan dengan Kondisi Cahaya	9
2.4 Metode Pengurangan Okratoksin A menggunakan Perkecambahan dengan Kondisi Cahaya	11
2.5 Kacang Tanah.....	12
2.6 <i>Liquid Chromatography/Mass Spectrometry</i> (UHPLC-ESI-MS/MS).....	14
BAB III METODE PENELITIAN	22
3.1 Waktu dan Tempat Penelitian	22
3.2 Alat dan Bahan Penelitian	22

3.2.1 Alat.....	22
3.2.2 Bahan	23
3.3 Bagan Alir Penelitian	23
3.4 Prosedur Penelitian.....	25
3.4.1 Prosedur Penyimpanan Kacang Tanah	25
3.4.2 Preparasi Pelarut <i>Spiking</i> Okratoksin A.....	25
3.4.3 Perkecambahan Kacang	25
3.4.4 Analisis Okratoksin A	29
BAB IV HASIL DAN PEMBAHASAN	31
4.1 Sterilisasi Kacang Tanah.....	31
4.2 Proses Perkecambahan	31
4.4 Ekstraksi OTA pada Kecambah Kacang Tanah.....	37
4.5 Analisis OTA menggunakan UHPLC-ESI-MS/MS	38
4.5.1 Analisis Penurunan OTA menggunakan UHPLC-ESI-QQQ	39
4.5.2 Analisis Produk Modifikasi OTA selama perkecambahan cahaya.....	41
BAB V KESIMPULAN DAN SARAN	47
5.1 Kesimpulan	47
5.2 Saran.....	47
DAFTAR PUSTAKA	48
LAMPIRAN.....	65

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