

**PENGEMBANGAN KODE BATANG DNA TUMBUHAN  
MAGNOLIOPSIDA DAN LILIOPSIDA SECARA *IN SILICO*  
BERDASARKAN SEKUEN MAT-K DARI GENOM KLOOROPLAS**

**SKRIPSI**

diajukan untuk memenuhi sebagian dari syarat untuk memperoleh gelar  
Sarjana Sains Program Studi Biologi



Oleh :

Denia Dwi Citra Resmi

1704637

**PROGRAM STUDI BIOLOGI  
DEPARTEMEN PENDIDIKAN BIOLOGI  
FAKULTAS PENDIDIKAN MATEMATIKA DAN ILMU PENGETAHUAN ALAM  
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# **Pengembangan Kode Batang DNA Tumbuhan Magnoliopsida dan Liliopsida Secara *In silico* Berdasarkan Sekuen mat-K dari Genom Kloroplas**

Oleh  
Denia Dwi Citra Resmi

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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**DENIA DWI CITRA RESMI**  
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disetujui dan disahkan oleh pembimbing:

Pembimbing I



Prof. Topik Hidayat, M.Si., Ph.D.

NIP. 197004101997021001

Pembimbing II



Dr. Hj. Siti Sriyati, M.Si.

NIP. 196409281989012001

Mengetahui,

Ketua Program Studi Biologi



Dr. Nj. Diah Kusumawaty, M.Si.

NIP. 197008112001122001

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**ABSTRAK**

Indonesia diperkirakan memiliki 20,000 spesies tumbuhan Magnoliophyta yang ada di dunia, tetapi yang teridentifikasi baru 15.5%. Rendahnya persentase tersebut mengharuskan peneliti untuk memperoleh metode identifikasi cepat agar spesies yang belum teridentifikasi dapat dikelompokkan, minimal pada tingkat kelas. Kode batang DNA (DNA *barcoding*) merupakan salah satu teknik yang dapat digunakan untuk mengidentifikasi spesies secara cepat. Tujuan penelitian ini adalah untuk menganalisis hubungan kekerabatan serta memperoleh kode batang DNA untuk kelas Magnoliopsida dan Liliopsida berdasarkan penanda mat-K dari genom kloroplas. Gen mat-K banyak digunakan dalam studi filogenetika kelompok tumbuhan Magnoliophyta. Penelitian ini menggunakan pendekatan *in silico*, karena waktu yang diperlukan relatif singkat dan murah. Rekonstruksi pohon filogenetika berdasarkan DNA mat-K menunjukkan hasil yang selaras dengan penelitian terdahulu. Pohon filogenetika yang menggunakan data molekuler menegaskan bahwa Magnoliopsida merupakan nenek moyang dari Liliopsida. Perancangan primer dilakukan setelah menganalisis hubungan filogenetika Magnoliopsida dan Liliopsida. Penelitian ini berhasil mendapatkan dua pasang primer spesifik masing-masing untuk Magnoliopsida dan Liliopsida. Primer ini nantinya dapat digunakan untuk membedakan kelompok Magnoliopsida dari Liliopsida pada kegiatan identifikasi di lapangan dan di laboratorium. Ke depan, dengan menggunakan teknik yang sama dapat dirancang primer-primer spesifik lainnya pada level takson di bawah kelas, seperti familia, marga, bahkan spesies.

**Kata kunci :** Filogenetika, Kode batang DNA, Liliopsida, Magnoliopsida, mat-K

# **DEVELOPMENT OF DNA BARCODE FOR MAGNOLIOPSIDA AND LILIOPSIDA PLANTS USING *IN SILICO* APPROACH BASED ON MAT-K SEQUENCES FROM CHLOROPLAST GENOMES**

## **ABSTRACT**

Indonesia has been estimated contain 20,000 species of Magnoliophyta around the world. The current status of Indonesia's biodiversity shows that only 15.5% of the total flora in Indonesia has been identified. This is such a low percentage, requires researchers to obtain a rapid identification method, so that unidentified species can be grouped, at least at the level of the Magnoliopsida and Liliopsida classes. DNA barcoding is a technique that can be used to quickly identify species based on short sequences of specific regions in the genome. The purpose of this study was to analyze the relationship between Magnoliopsida and Liliopsida plants based on the mat-K marker and to obtain DNA barcodes for each of the Magnoliopsida and Liliopsida classes based on the mat-K marker. The mat-K gene is widely used in phylogenetic studies of the Magnoliophyta plant group. This study uses an *in silico* approach, because the time required is relatively short and inexpensive. Reconstruction of the phylogenetic tree based on mat-K DNA showed results that were in line with previous studies. The phylogenetic tree using molecular data confirms that Magnoliopsida is the ancestor of Liliopsida. The primary design was carried out after analyzing the phylogenetic relationship between Magnoliopsida and Liliopsida. This study succeeded in obtaining two pairs of specific primers for Magnoliopsida and Liliopsida, respectively. This primer can later be used to distinguish the Magnoliopsida group from Liliopsida in identification activities in the field and in the laboratory. In the future, using the same technique, other specific primers can be designed at the taxon level below the class, such as families, genera, and even species.

**Keywords :** DNA barcode, Liliopsida, Magnoliopsida, mat-K, Phylogenetics

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