

**Deteksi Molekuler Tumbuhan Langka menggunakan Marka *rpoC1*
secara *In Silico***

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



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Deteksi Molekuler Tumbuhan Langka menggunakan Marka *rpoCl* secara *In Silico*

Oleh
Aisyah Fikria Fauziah

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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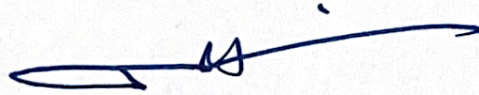
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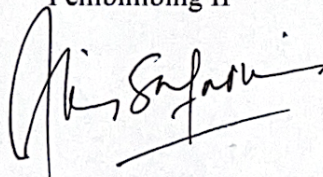
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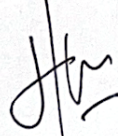
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*Dengan ini saya menyatakan bahwa skripsi yang berjudul, “**Deteksi Molekuler Tumbuhan Langka menggunakan Marka *rpoC1* secara *In Silico***” ini beserta seluruh isinya adalah benar-benar karya saya sendiri, dan saya tidak melakukan penjiplakan atau pengutipan dengan cara-cara yang tidak sesuai dengan etika ilmu yang berlaku dalam masyarakat keilmuan. Atas pernyataan tersebut, saya siap menanggung risiko yang dijatuhkan kepada saya apabila di kemudian hari ditemukan adanya pelanggaran etika keilmuan dalam karya ini, atau ada klaim dari pihak lain terhadap keaslian karya saya.*

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ABSTRAK

Penelitian ini bertujuan untuk mengembangkan primer diagnostik berbasis gen kloroplas *rpoC1* secara *in silico* untuk identifikasi spesies tumbuhan langka. Metode yang digunakan meliputi pengambilan data sekuen DNA dari GenBank, penyejajaran sekuen ganda (*multiple sequence alignment*) menggunakan ClustalX, pembuatan konsensus sekuen dengan BioEdit, dan perancangan primer menggunakan perangkat lunak FastPCR. Sebanyak 182 kandidat primer telah dihasilkan, kemudian diseleksi menjadi 17 primer terbaik berdasarkan kriteria panjang, kandungan GC, dan suhu leleh (T_m). Uji *in silico* PCR terhadap 25 sekuen spesies tumbuhan langka yang digunakan dalam proses desain menunjukkan bahwa satu pasangan primer terbaik (1:F_1035-1055 dan 1:R_1041-1061) mampu memberikan hasil amplifikasi positif sebesar 84-88%. Namun, pada uji efektivitas terhadap 10 sekuen spesies tumbuhan langka tambahan dan 10 sekuen spesies non-langka, tidak diperoleh hasil amplifikasi positif. Hal ini menunjukkan bahwa efektivitas penanda gen *rpoC1* dalam mendeteksi tumbuhan langka melalui primer diagnostik secara *in silico* belum dapat digeneralisasi terhadap spesies di luar dataset awal, sehingga memerlukan pengembangan lebih lanjut.

Kata kunci: DNA *barcoding*, *in silico* PCR, konservasi tumbuhan, primer *rpoC1*, tumbuhan langka.

ABSTRACT

*This study aims to develop diagnostic primers based on the chloroplast *rpoC1* gene in silico for the identification of rare plant species. The methods used include retrieval of DNA sequence data from GenBank, multiple sequence alignment using ClustalX, sequence consensus generation with BioEdit, and primer design using FastPCR software. A total of 182 primer candidates were generated, then selected into 17 best primers based on the criteria of length, GC content, and melting temperature (T_m). In silico PCR tests on 25 rare plant species sequences used in the design process showed that one of the best primer pairs (1:F_1035-1055 and 1:R_1041-1061) was able to provide positive amplification results of 84-88%. However, in the effectiveness test against 10 additional rare plant species sequences and 10 non-rare species sequences, no positive amplification results were obtained. This suggests that the effectiveness of the *rpoC1* gene marker in detecting rare plants through in silico diagnostic primers cannot be generalized to species outside the initial dataset, thus requiring further development.*

Keywords: DNA barcoding, in silico PCR, rare plants, *rpoC1* primer, plant conservation.

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