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Sensitivitas Methylene Blue Sebagai Alternatif Pewarna DNA Pasien Positif Hepatitis B Pada Proses Elektroforesis Agarose

Xvi + 33 halaman, 9 tabel, 14 gambar dan 12 lampiran

ABSTRAK

Deteksi DNA virus Hepatitis B menggunakan metode elektroforesis gel agarosa membutuhkan pewarna DNA, di mana pewarna umum adalah EtBr bersifat toksik dan membutuhkan sinar UV untuk visualisasi. GelRed merupakan salah satu alternatif yang lebih aman dari EtBr, karena bersifat non-mutagenik dan memberikan fluoresensi tinggi saat diamati di bawah sinar UV. Namun, penggunaannya tetap membutuhkan alat transiluminator UV dan biayanya relatif mahal. Methylene blue dikenal sebagai alternatif yang lebih aman, tidak karsinogenik, dapat diamati menggunakan cahaya tampak, dan lebih ekonomis. Penelitian ini bertujuan untuk mengetahui sensitivitas methylene blue sebagai pewarna alternatif DNA pada sampel pasien positif Hepatitis B. Penelitian dilakukan di Laboratorium Biologi Molekuler Poltekkes Tanjungkarang pada Mei-Juni 2025. Penelitian dilakukan secara eksperimental dengan desain Rancangan Acak Lengkap, menggunakan variasi lama waktu pewarnaan (10, 15, 20, dan 25 menit) serta volume sampel (2, 4, 6, dan 8 µL). Hasil penelitian menunjukkan intensitas warna pita DNA tertinggi diperoleh pada lama pewarnaan 20 menit dan volume 8 µL. Uji Kruskal-Wallis menunjukkan adanya perbedaan bermakna antar perlakuan ($p<0,05$). Dilanjutkan dengan uji sensitivitas dengan melihat perbandingan intensitas warna dengan GelRed. Berdasarkan hasil penelitian, methylene blue lebih sensitive dibandingkan dengan GelRed. Dapat disimpulkan bahwa methylene blue konsentrasi 0,025% sensitif dan efektif sebagai pewarna DNA.

Kata Kunci : Methylene blue, GelRed, Elektroforesis agarosa, Hepatitis B, Sensitivitas.
Daftar Bacaan : 37 (1996-2024)

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The Sensitivity Of Methylene Blue As An Alternative DNA Stain For Hepatitis B Positive Patients In Agarose Gel Electrophoresis Process

Xvi + 33 pages, 9 tables, 14 figures dan 12 attachment

ABSTRACT

Detection of Hepatitis B virus (HBV) DNA using agarose gel electrophoresis requires the use of DNA stains. Ethidium bromide (EtBr), the most commonly used dye, is toxic and requires ultraviolet (UV) light for visualization. GelRed is considered a safer alternative to EtBr due to its non-mutagenic properties and strong fluorescence under UV illumination. However, its application still necessitates a UV transilluminator and is relatively expensive. Methylene blue is recognized as a safer alternative, being non-carcinogenic, observable under visible light, and more cost-effective. This study aimed to determine the sensitivity of methylene blue as an alternative DNA stain in samples from Hepatitis B-positive patients. The research was conducted at the Molecular Biology Laboratory of Poltekkes Tanjungkarang during May–June 2025. The study was experimental in nature, using a Completely Randomized Design (CRD) with variations in staining duration (10, 15, 20, and 25 minutes) and sample volume (2, 4, 6, and 8 µL). The results showed that the highest DNA band intensity was observed with a staining duration of 20 minutes and a sample volume of 8 µL. The Kruskal–Wallis test indicated significant differences between treatment groups ($p < 0.05$). This was followed by a sensitivity test by comparing band intensities with those of GelRed. Based on the results, methylene blue demonstrated greater sensitivity than GelRed. It can be concluded that methylene blue at a concentration of 0.025% is sensitive and effective as a DNA stain.

Keywords : Methylene Blue, GelRed, Agarose Electrophoresis, Hepatitis B, Sensitivity
Reading List : 37 (1996-2024)