



VALIDASI METODE ANALISIS NITRIT DAN NITRAT DALAM TANAH SECARA SPEKTROFOTOMETRI UV-Vis

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INTISARI

Validasi metode analisis nitrit dan nitrat dalam tanah secara spektrofotometri UV-Vis telah dilakukan. Penelitian ini bertujuan untuk mendapatkan kondisi optimum analisis ion nitrit dan nitrat menggunakan pereaksi PABA/NEDA dan memenuhi syarat validasi metode serta mengaplikasikannya untuk menganalisis nitrit dan nitrat dalam tanah (tanah pasir, tanah sawah, pupuk kompos dan pupuk kandang). Nitrat direduksi menjadi nitrit menggunakan *spongy* kadmium.

Hasil penelitian menunjukkan bahwa senyawa azo mempunyai panjang gelombang maksimum 555 nm dan stabil pada 10-120 menit. Hasil validasi menunjukkan linearitas nitrit dan nitrat memiliki $R^2=0,999$ pada rentang 0,1–1,0 mg L⁻¹ dengan nilai absorptivitas molar sebesar $3,3810 \times 10^4$ L mol⁻¹ cm⁻¹ untuk nitrit dan $3,7882 \times 10^4$ L mol⁻¹ cm⁻¹ untuk nitrat. Batas deteksi nitrit sebesar 3,17 µg L⁻¹ dengan %RSD antara 0,23–1,49%. Batas deteksi nitrat sebesar 7,71 µg L⁻¹ dengan %RSD antara 0,29–1,35%. Persentase perolehan kembali analisis nitrit dan nitrat masing-masing antara 87,15–100,76% dan 88,16–105,67%. Penambahan urea sangat berpengaruh terhadap peningkatan konsentrasi nitrit dan nitrat dalam tanah. Adanya penambahan urea dapat meningkatkan konsentrasi nitrit dan nitrat sekitar 0,23–19,9 mg kg⁻¹ pada berbagai jenis tanah.

Kata kunci : nitrit, nitrat, spektrofotometri UV-Vis, asam p-aminobenzoat, NEDA.



VALIDATION OF NITRITE AND NITRATE ANALYSIS METHOD IN SOILS BY UV-Vis SPECTROPHOTOMETRY

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ABSTRACT

Validation of nitrite and nitrate analysis methods in soils by UV-Vis spectrophotometry has been studied. The aims of this research were to get the optimum conditions for nitrite and nitrate analysis using PABA/NEDA reagent, qualified validation of methods and to apply it for nitrite and nitrate analysis in soils (sandy soil, paddy soil, compost soil and manure soil). Nitrate was reduced with spongy cadmium.

The result showed that azo compound had maximum wavelength at 555 nm and was stable between 10-120 minutes. The result of validation showed linearity nitrite and nitrate standard solutions with $R^2=0,999$ in range from 0.1-1.0 mg L⁻¹ with molar absorptivity 3.3810×10^4 L mol⁻¹ cm⁻¹ for nitrite and 3.7882×10^4 L mol⁻¹ cm⁻¹ for nitrate. Nitrite had limit of detection of 3.17 µg L⁻¹ with %RSD between 0.23–1.49%. Nitrate had limit of detection of 7.71 µg L⁻¹ with %RSD between 0.29–1.35%. The percent recovery of nitrite and nitrate were 87.15–100.76% and 88.16 – 105.67% respectively. The addition of urea improves nitrite and nitrate concentration in soils. The addition of urea can increase nitrite and nitrate concentration approximately 0.23-19.9 mg kg⁻¹ on various types of soil.

Keywords : nitrite, nitrate, UV-Vis spectrophotometry, p-aminobenzoic acid, NEDA.