Annexure

S1. Calibration plots of nitrite and nitrate and sample calculation

Nitrate-nitrogen (NO_3-N)

The concentration of NO_3-N was determined by APHA Method 4-115. Also, separately NO_2-N was determined by APHA Method 4-115. Absorbance at 220nm and 275nm for nitrate, as well as nitrite, was measured, and a standard calibration plot was prepared for nitrate (Plot 1a) and nitrite (Plot 1b). A spectrum of nitrate is shown in Figure S1a and nitrite in Figure S1b.

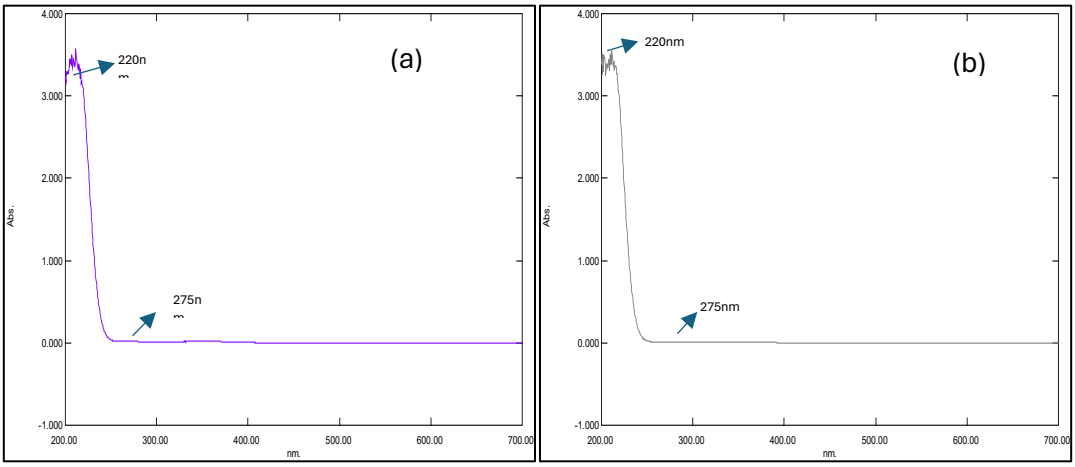
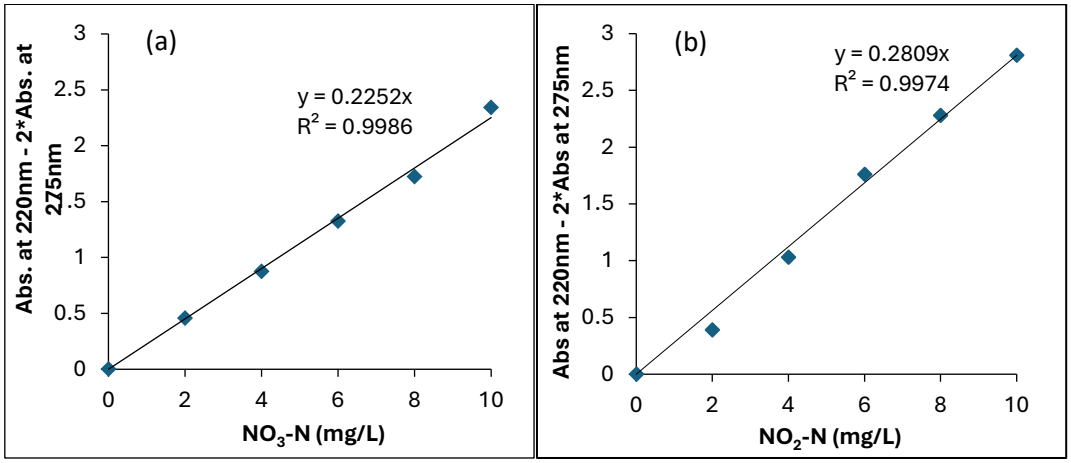


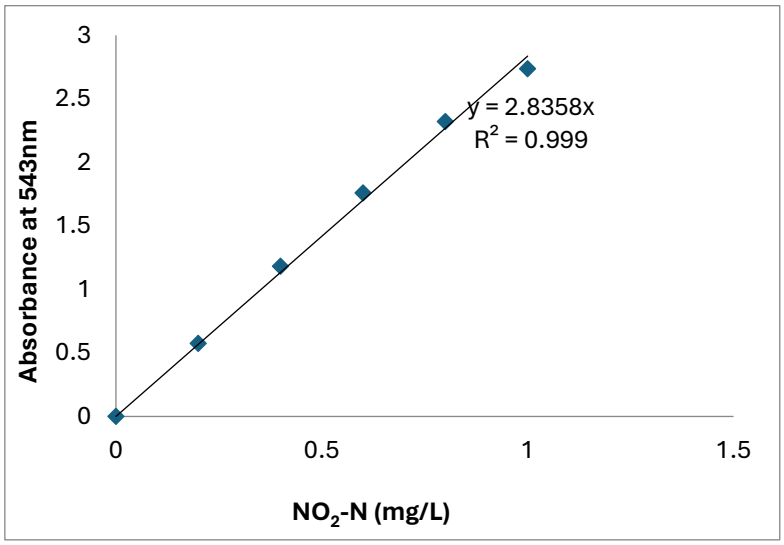
Figure 1. Spectrum of NO_3-N (a) and NO_2-N (b) absorbance at 220nm and 275nm



Plot 1. Standard calibration plot of NO_3-N (a) and NO_2-N (b) determined by APHA Method 4-115

Nitrite- Nitrogen (NO_2-N)

The concentration of nitrite was determined by APHA Method 4-112, N(1-naphthyl) Ethylenediamine Dihydrochloride (NEDA) method. Absorbance at 543nm was measured and a standard calibration plot was prepared (Plot 2).



Plot 2. Standard calibration plot of NO_2-N determined by APHA Method 4-112

Calculation of residual nitrate concentration after 15min of reaction time.

Step 1: Total absorbance of nitrate + nitrite = $Abs_{at220} - 2*Abs_{at275}$

$= 0.497 - 2*0.018$

$= 0.461$

Step 2: Absorbance of nitrite (by APHA Method 4-112) = 0.222

∴The concentration of nitrite in the sample = 0.222 / 2.835 (from Plot 2)

= 0.0783

Step 4: Absorbance at (220nm-2*275nm) of nitrite = 0.0783 * 0.289 (from Plot 1b)

= 0.022

Step 5: Net Absorbance of nitrate = Total absorbance of (nitrate + nitrite) – Absorbance of nitrite at (220nm - 2*275nm)

= 0.461 – 0.022

= 0.439

Net Nitrate concentration = 0.439 / 0.2252 (from Plot 1a)

= 1.949 mg/L

As the sample was diluted 10times, ∴ 1.949 * 10 = 19.49 mg/L

So, after 15min, nitrate concentration = 19.49 mg/L

Similarly, residual nitrate concentration was achieved after every reaction time.