Detection of Nitrogen Levels in Sample Using Novel, Accessible, Cost Effective, Accurate, Safe, Simple, Reusable Method

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Many environmental troubles stem from excess of Nitrogen (N), for example, the runoff of surplus N from soil causes algae blooms and endangers marine wildlife. To deal with this, farmers currently use N test kits to measure and confirm that the soil has healthy amounts of N. Since I found the average N test kit to be expensive, I aspired to find a more cost effective, accessible, safe, and equally accurate N tester. I went from testing for pH (N excess means a higher pH level) by using beetroot and turmeric to running electrolysis on a sample of N (I learned of these concepts in school), the latter of which was a more successful method. By running electrolysis (using 2 copper-wire electrodes) on a sample of 2.57M Ammonium Hydroxide (NH4OH), and comparing to my results from different concentrations of fertilizer-in-water, I could create a spectrum of different shades of blue solutions (after electrolysis) which were either lacking, healthy, or a surplus for plants. I succeeded in meeting my original criteria - anyone with a 9V 1amp battery, 2 copper wires, and a container to keep their liquids in could complete this test at home within 10 minutes. The initial price of both methods being the same, my method costs 6 cents per use, and the current commercial N-test-kits, 60 cents per use. By comparing results between my method and a commercial test kit, I concluded that both are equally effective.

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