



Hydrogel sensor for ammonium nitrate detection

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A hydrogel colorimetric sensor was developed for a rapid and simple ammonium nitrate detection. The sensor was based on the entrapment of colorimetric reagent, *i.e.* Griess's reagents, within poly vinyl alcohol hydrogel matrix. A clear solution of reduced ammonium nitrate was turned to pink-violet using an elastic non-spongy clear gel sensor. This was because of the colorimetric reaction between the entrapped Griess's reagents and nitrite ions. When the colorimetric sensor was used in conjunction with digital image colorimetry (DIC), a rapid and simple semi-quantitative analysis of ammonium nitrate was achieved. The digital camera was used to photograph a colorimetric product from the sensor, while a custom-built program was used for color analysis of the digital images. A wide linear range calibration graph (5 to 500 mgL⁻¹) with good linearity (>0.99) was obtained. These demonstrate a significant potential of the hydrogel sensor and DIC for on-site ammonium nitrate quantification.

Keywords Ammonium nitrate; Hydrogel; Colorimetric sensor; Digital image colorimetry