An optical fibre reflectance sensor for p-aminophenol determination based on tetrahydroxycalix[4]arene as sensing reagent

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A fibre optic sensor for p-aminophenol (PAP) based on the use of 25,26,27,28-tetrahydroxycalix[4]arene (CAL4) (Fig. 1) immobilised onto amberlite XAD-16 and reflectance spectrometry has been developed. The sensor is based on the reaction of PAP with CAL4 in presence of an oxidant to produce an indophenol dye\(^1\). The reflectance measurements were carried out at a wavelength of 620 nm since it yielded the largest divergence difference in reflectance spectra before and after reaction with the analyte (Fig. 2.). A reasonable calibration curve was observed in the PAP concentration range of 0.5–35 ppm (linear within 0.5–5.5 ppm) with a calculated limit of detection (LOD) of 0.109 ppm. The sensor response from different probes (n = 5) gave an R.S.D. of 1.8 % at 10.9 ppm PAP concentration. The response time of the optical one-shot sensor was 5 min for a stirred solution. The repeatability, reproducibility, and lifetime of the sensor were also satisfactory. Using the optical sensing probe, PAP in urine, pharmaceutical and pharmaceutical wastewater was determined. The effects of potential interferences such as inorganic and organic compounds were also evaluated. The proposed technique has been tested by replicate analysis of several samples with spiked PAP.

![Fig. 1. 25,26,27,28-tetrahydroxycalix[4]arene (CAL4)](image)

**Fig. 2.** Reflectance (%) spectra of immobilised CAL4 after reaction with PAP.

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**References**


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