SAMPLE 1


Studies developing microfluidic paper-based analytical devices (µPADs) are increasing in the literature due to the low cost characteristics of the device for a rapid qualitative analysis. Furthermore, the µPAD can provide a chemical analysis without necessity of a complex laboratory structure and/or well-trained persons. Therefore, a combination of colorimetric analysis and paper spot test is a powerful method to reduce expensive equipment uses, a minimal sample consumption and enable the portability. This poster reports a simple and accurate µPAD to detect a cutting agent, procaine, in seized cocaine samples. The inference of some cutting agents found in cocaine samples was verified and a novel electrochemical approach was developed to increase the selectivity. The device was designed in CorelDRAW® X6 software and fabricated on a filter paper using a wax printing technology. Finally, the printed sheets were placed in a thermal press for 3 minutes at 120°C. The optimal experimental conditions for procaine detection were 2 mg mL\(^{-1}\) acid chromotropic (CTA) + 0.4 mol L\(^{-1}\) NaOH solution and 0.8 mmol L\(^{-1}\) NaNO\(_2\) + 0.1 mol L\(^{-1}\) HCl solution containing procaine. The specific pattern consist of two white circles with a diameter of 8 mm spaced one each other in 1 cm by a wax barrier.

The unprinted zone of the first circle was removed using hole punch and was attached in the screen-printed electrode, this region was used as sample zone and to perform the electrochemical pre- treatment. The second 8 mm circle was printed with channel of 2 mm width and 2 cm long containing one spot in the middle for diazotization reaction and the final spot for colorimetric detection. In the first spot, the sample pretreatment were by application of 1.2 V for 30 min in a 40 µL droplet containing 0.1 mmol L\(^{-1}\) of the compounds in 0.1 mol L\(^{-1}\) HCl. Besides that, both of the 8 mm spots were closed together and the solution percolates channel passing through a prior spot to conduct the diazotization step (2 µL NaNO\(_3\) 50 mmol L\(^{-1}\) was previously pipetted), finally reaching the detection step (2 µL CTA 2 mg L\(^{-1}\) in NaOH 0.4 mol L\(^{-1}\) was previously pipetted). We have demonstrated a simple, portable, low cost, high throughput visual colorimetric paper-based analytical device that can detect and quantify procaine in seized cocaine samples. The interference of most common adulterants found in seized cocaine samples was verified, and a novel electrochemical approach was used for sample pre- treatment in order to increase the selectivity. We evaluated the accuracy of the device with the addition and recovery protocol. The recovery values in seized cocaine samples were (95.5 ± 5.6)%. The device has excellent analytical parameters and is promising for field analysis in forensic police intelligence.