

Novel Carbon Dot for Glucose Analysis Using Standard Addition Paper Device

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Carbon dots (CD) are fluorescent nanoparticles with wide application in biosensing, optical and bioimaging, due to its biocompatibility, low toxicity, good solubility, photo stability and simple synthesis. The integration of CD with paper platform is a very interesting application for bioanalysis, due to low cost, availability, portability, biocompatible and simplicity of paper devices. Here, we describe a new CD nanoparticle for glucose determination using standard addition paper device. The CDs were synthesized using a one-step microwave route. Briefly, an aqueous solution of citric acid and tyramine was heated in a domestic microwave for 2 min. The product was dissolved in deionized water, centrifuged and filtered to remove large particles. Corel DRAW X5 was used to design the spot test paper device. The model was printed on filter paper using a wax printer. After printing, the paper was heated at 120 °C for 120 s for formation of the hydrophobic barriers. The fluorescent reagent solution consisted of a mixture of glucose oxidase (120 U mL⁻¹), horseradish peroxidase (30 U mL⁻¹) and CD stock solution. In each spot of the paper device, 1.0 μL of the reagent was spotted, followed by 0.5 μL of sample and 0.5 μL of standard glucose solution (5 – 30 mM). The analysis was conducted by extrapolation of the standard addition curves of quenching by concentration. The methodology was applied in certified urine and serum samples with good accuracy and precision.

Biography:

Eduardo Luiz Rossini is a PhD student at Institute of Chemistry of São Paulo State University – UNESP – Araraquara, Brazil. He received his master degree in chemistry in the same institution under the supervision of Prof. Helena Redigolo Pezza. He has experience in analytical chemistry with focus on micro fabrication, spectrometric methods and low-cost devices. His research interest is the development of paper platform for clinical analysis.