

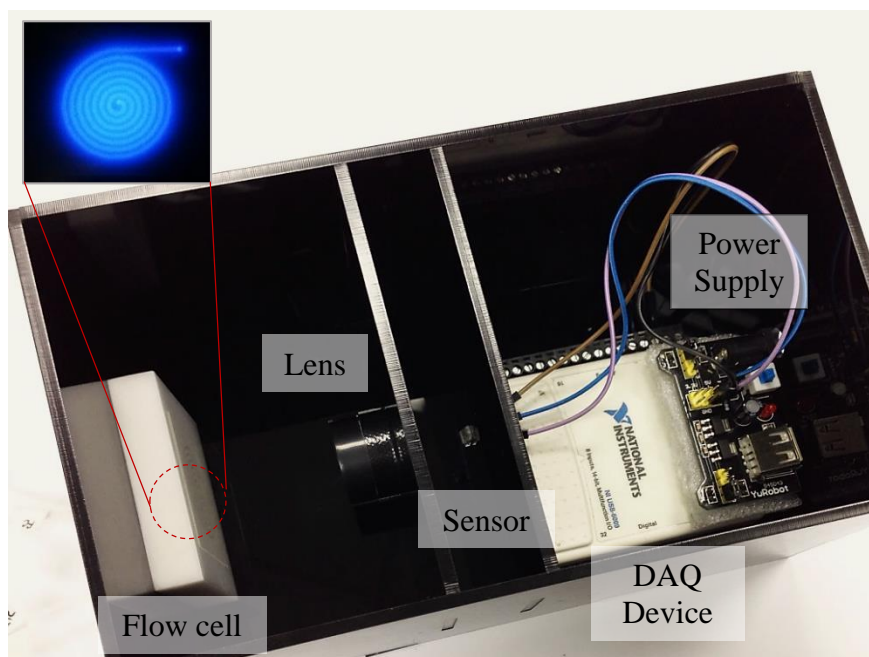
Development of chemiluminescence system for determination of total antioxidant content in beverages

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A new chemiluminescence (CL) detection system was developed for determination of total antioxidant content (TAC) in beverages. The method is based on the CL reaction between luminol and hydrogen peroxide in alkaline medium with the presence of a $K_3Fe(CN)_6$ catalyst. The antioxidants in the sample scavenged hydrogen peroxide resulting in a decrease in the CL intensity which was related to the TAC in sample. A cost-effective CL detector with a spiral configuration flow-cell was designed and constructed. The spiral flow-cell was fabricated using a white polymer of polymethyl methacrylate (PMMA) or acrylic plastic, which the dimension of 45 x 60 x 12 mm and 30 mm diameter of reaction zone. The developed CL detector was coupled with a sequential injection analysis (SIA) technique. The linear range for gallic acid was obtained from 0.5 to 4.0 mM, the limit of detection (LOD) was 0.1 mM, correlation coefficient (r^2) of 0.999 and the sample throughput was 60 samples h^{-1} . A light-to-voltage optical sensor was used as a low cost alternative detector. This optical sensor is small size that also used for a miniaturization of instrument. The developed CL detector system is cost-effective, portable and easy to couple with flow-based systems.



Keywords: Chemiluminescence; Total antioxidant content; Sequential injection analysis; Flow-cell; Optical sensors