

## **Study on novel graphene quantum dots based material conjugated enzymes for biosensing system**

Uric acid (2,6,8-trihydroxypurine, UA) is end product of purine metabolism in human system. Monitoring of uric acid in body fluids (eg. serum and urine) is an important marker molecule for diseases related with variations of plasma urate level. Abnormal uric acid may cause several diseases such as gout, hyperuricemia or Lesch–Nyan syndrome. Several epidemiological studies have also suggested that the production of excess uric acid in human serum is also a risk factor for cardiovascular disease and type II diabetes. Thus, the determination of uric acid concentration is an urgent requirement for clinical analysis for disease diagnosis. Various analytical methods for detecting uric acid have been reported such as spectrophotometry, electrochemical techniques, flow injection chemiluminescence, high performance liquid chromatographic and fluorescence method. However, these methods involve laborious, slow procedures, expensive reagents and also associated with selectivity and sensitivity. Therefore, it is necessary to develop simple, accurate and sensitive methods for determination of uric acid. In this work, graphene quantum dots (GQDs) conjugated dual enzymes (uricase/HRP) sensing system for uric acid determination has been explored. The principle of detection will be based on fluorescence quenching of GQD which is expected induced from the enzymatic reaction. Furthermore, GQDs-enzyme conjugation can give economic advantages by having a greater stability, better downstream processing of the reaction products. Novel characteristics can be induced to make enzymes tolerant to even harsh reaction environments. The developed biosensing is expected to give high sensitivity and selectivity due to the application of nanomaterial.