Asian Journal of Pharmceutical technology and Innovations

Abstract

Improved Synthesis of Dextrin-capped Gold Nanoparticles

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Abstract:

Dextrin-capped gold nanoparticles (d-AuNPs) were reportedly used in some biochemical detections and showed potentials for biosensing applications. However, synthesis of d-AuNP takes 8 long hours of reaction. This study described the modification of the procedure which simplified the standard method and equipment and reduced the reaction time to 1 hour. The key features of the improved synthesis are the reversal of the addition of reagents in the standard method and the increase of reaction temperature. Optimum synthesis was achieved by sequential neutralization and alkaline reduction of 2 mM HAuCl4 using 10% Na2CO3 and 25 g/L dextrin, respectively. The highest reaction temperature achieved was 91oC. The resulting d-AuNPs were monodisperse based on dynamic light scattering (DLS) measurements. The surface plasmon resonance band ranged from 517-520 nm indicating spherical d-AuNPs. High resolution transmission electron microscopy (HRTEM) confirmed their spherical shapes and sizes. The nanoparticle sizes were dependent on the amount of dextrin in the synthesis mixture. Chemical reactions are hereby proposed to explain the chemistry of d-AuNP formation based on the alkaline reduction of HAuCl4 with dextrin as the reducing agent. The resulting d-AuNPs were successfully applied as label in lateral flow biosensor for dengue-1 RNA detection.

Biography:

Flora Maitim Yrad currently works at Silliman University, Dumaguete City, Philippines. She completed her PhD in Chemistry from University of San Carlos, Cebu City, Philippines. Her research was hosted by the Nano-Biosensors Laboratory at Michigan State University, Michigan, USA, through the USAID STRIDE Advanced Research Scholarship. Her work on gold nanoparticle-based lateral flow biosensor was published in Diagnostics journal, DOI:10.3390/diagnostics9030074.

4th Webinar on Nanotechnology and Nanomedicine, November 12, 2020, London, UK

Citation: Flora Maitim Yrad; Improved Synthesis of Dextrin-capped Gold Nanoparticles, phillipines; Nanomedicine 2020; November 12, 2020; London, UK.