4TH GENERAL MEETING OF COST ACTION CA21101 "COSY"

Development of Fluorescent Gold Nanoparticles using Rhodamine 6G, Sulforhodamine B, Rhodamine 101, Fluorescein and Coumarin dyes for sensing applications

İdris Yazgan[1], Selin Çeter[1]

[1]*Department of Biology, Kastamonu University, Kastamonu, 37150 Turkiye*

Fluorescence based sensing approaches have become popular for their sensitivity and high signal/noise ratio in biomedical applications. It is critical to keep the fluorescence character when the sensing agents interact with the analyte's matrix, which is currently a challenge since the fluorescent moiety loses its intrinsic character upon the interaction with proteins and certain organic groups (e.g. ascorbic acid)[a]. In this study, we developed a synthetic route to introduce fluorescent moieties on the gold nanoparticles, which decreases the loss of the fluorescent character of the agents when they interact with proteins (e.g. 20 mg/mL BSA) and such organic groups as ascorbic acid and carboxylic acid. We utilized cellobiose derivatives to initiate the gold nanoparticle synthesis, which was encapsulated into lab-made chitosan nanobeads (<200 nm) and used as the substrate for the fluorescent dye (i.e. Rhodamine 6G, Sulforhodamine B, Rhodamine 101, Fluorescein and Coumarin dyes) loading. The fluorescence characterization revealed that except Rhodamine 6G, the rest of the dyes can effectively strictly bind to the gold nanoparticles within the chitosan beads. Ongoing studies are to utilize the developed formulations for the detection of bacterial pathogens in water and food samples.

References:

[a]Kırbay, F.Ö., Yazgan, İ., Demirkol, D.O.. Comparison of Direct and Sandwich Type Immunoassays on Electrospun Nanofibers Using of Metal Organic Frameworks as a Fluorescence Probe, Sensors Actuators B. Chem. (2022) 132621. https://doi.org/10.1016/j.snb.2022.132621.