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Abstract

Rice protein conjugated nanomaterials were synthesized and characterized by using anionic and cationic forms of rice protein. Both forms showed unique characteristic features when used in situ reaction conditions for synthesizing the protein stabilized gold (Au) and silver (Ag) nanoparticles (NPs). Au NPs synthesis was highly facilitated than Ag NPs synthesis while the reverse was true when rice protein was simply used in the basic medium. Photophysical behavior clearly showed the contributions of both electrostatic and non-electrostatic interactions driving the rice protein surface adsorption on nanometallic surfaces. Rice protein conjugated NPs were easily transferred and extracted into the organic phase while the extraction process was related to the amount of protein coating. Under the controlled pH reaction conditions, rice protein – dye colored NPs were synthesized which were further characterized by the DLS and SDS Page analysis. Both rice protein conjugated Au/Ag NPs and rice protein NPs showed remarkable biocompatibility with blood cells. These NPs demonstrated their excellent ability to selectively extract protein fractions from complex biological fluid like serum. The results proposed significant applications of rice protein conjugated NPs in biological systems as well as bio-nanotechnology.