Green Nanoparticles: Promising Approach For Malaria Treatment

Sujeet Singh¹ Tarun Kumar Bhatt¹

¹Central University Of Rajasthan, Bandar Sindiri, India

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Malaria is one of the most prevalent protozoan parasitic diseases around the world caused by the apicomplexan protozoan parasites and the genus is Plasmodium. It is transmitted by the bite of the female Anopheles mosquito, and it creates a major global burden in tropical and subtropical regions. According to the WHO 2020 reports a total of 241 million cases of malaria were recorded and 6,27,000 humans died from malaria. There are five Plasmodium species that caused human malaria, Plasmodium falciparum, P. vivax, P. ovale, P. malariae, and P. knowlesi. In the last two decades, the WHO approved several types of drugs to cure malaria, however, the emergence of drug resistance against existing drugs has worsened the current scenario. Though there are no effective vaccines are not available, this is hampering the path of eradicating malaria. There is a high priority to discover or develop new drugs/vaccines to eradicate malaria, here we have used nanotechnology to develop new kinds of drug molecules from the plant extract. There are many reports also suggest that secondary metabolites of plants play a vital role in treating malaria, and act as an anti-malarial activity. We select the two plants Terminalia Bellirica and Prosopis juliflora because these plants have shown antimalarial activity through the aqueous-based extract. We have synthesized the plant-based silver nanoparticles to increase the efficacy of these metabolites of these plants. Plant bark and leaf are used for the aqueous extraction, which is used for the synthesis of green silver nanoparticles (AgNPs). Synthesized AgNPs were characterized through dynamic light scattering (DLS), zeta potential, Fourier transform infrared (FTIR), scanning electron microscope (SEM), Energy Dispersive x-ray EDX, and x-ray diffraction (XRD) analysis. These characterization techniques determine the synthesis of silver nanoparticles is uniform, stable, and crystalline in nature. The silver nanoparticles size was 31.62nm, 44.05nm, 31.40nm, and 30.88nm for Terminalia Bellirica bark, Terminalia Bellirica leaf, Prosopis juliflora bark, and Prosopis juliflora leaf respectively. Simultaneously we will be performed the cytotoxicity assay and antimalarial of synthesized nanoparticles. These findings help us establish the new antimalarial drug compounds and might help to create new therapies to treat malaria.