Indian Journal of Experimental Biology
Vol. 62, July 2024, pp. 504-514
DOI: 10.56042/ijeb.v62i07.12069

Invitro inhibition of *Daboia russelii* (Shaw & Nodder) venom with alginic acid-based silver nanoparticles

Kanchan Saha[1], Poulami Parua[2], Sumana Sarkhel[1]* & Nuzhat Ara Jamal[2]

[1]DepartmentofHumanPhysiologywithCommunityHealth,VidyasagarUniversity,PaschimMedinipur-721 102,West Bengal, India
[2]Centre for Life Science, Vidyasagar University, Paschim, Medinipur-721 102,West Bengal, India

Received 30 January 2024; revised: 28 March 2024

Envenomation by Russell's viper [*Daboia russelii* (Shaw & Nodder, 1797)] is a major medical emergency in tropical countries. The antivenom therapy is a conventional remedy for such medical emergency, but it has limitations and side effects. Nanomedicine and nanotechnology are the most prospective areas of research in the current scenario. In the present study, sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) analysis of crude*Daboia russelli venom* (VRV) was performed. Alginic acid-based silver nanoparticles (AgNP-ALG) were synthesized and characterized using UV-Visible spectroscopy, Dynamic Light Scattering (DLS), Scanning electron microscope (SEM), and X-ray diffraction analysis (XRD). SNPs have average hydrodynamic size of 80.30 nm with 0.271 PDI. X-ray diffraction analysis of AgNP-ALG, which confirmed the cubic crystal shape of silver. SEM studies of AgNP-ALG showed particle sizes ranging from 10 to 50 nm. Spectroscopic analysis showed a decrease in the absorbance intensity of venom upon interaction with AgNP-ALG, indicating interaction with venom proteins. From the data available from fluorescence spectroscopy, it is evident that viper venom preincubated with AgNP-ALG causes quenching of fluorescence intensity. The results obtained by direct hemolytic assay,proteolytic activity and blood clotting test revealed venom action inhibition due to silver nanoparticles. Thus, in the present study we have emphasized that silver nanoparticles inhibit the action of *Daboia russelli* venom *in vitro*.

Keywords: Alginic acid, Direct hemolytic assay, Proteolytic activity, Russell's viper, Silver nanoparticle, Snakebite envenoming