

Green pit vipers, a name that can refer to several unrelated species, comprise a large group of venomous snakes found across the humid areas of tropical and sub-tropical Asia, and are responsible for most of the bite cases across this region. In India, green pit vipers belonging to several genera are prevalent in the northern and north-eastern hilly region, unrelated to species present in the peninsular region. In the present study, crude venom of representative species of green pit vipers present in the north and north-eastern hilly region of India (*Trimeresurus erythrurus*, *T. septentrionalis*, *Viridovipera medoensis*, and *Popiea popieorum*) were characterized to elucidate venom composition and venom variation. Profiling of crude venoms using SDS-PAGE and RP-HPLC methods revealed quantitative differences among the species. Further, *in vitro* biochemical assays reveal variable levels of phospholipase activity, coagulation activity, thrombin-like activity, fibrinogenolytic and haemolytic activity. This correlates with the pseudo-procoagulant effects on the haemostatic system of victims, which causes consumptive coagulopathy, frequently observed in patients bitten by green pit vipers. The immunoreactivity of Indian polyvalent antivenom and Thai green pit viper antivenom towards crude venoms were also evaluated by western blotting and inhibition of biochemical activities. The results exhibited poor efficacy of Indian polyvalent antivenom in neutralizing the venom toxins of crude venoms; however, Thai green pit viper antivenin (raised against the venom of *Trimeresurus allbolabris*, not present in India) showed higher immunoreactivity towards congeneric venoms tested. Analysis of green pit viper bite patients records from a community health centre in Assam, India, further revealed the inability of Indian polyvalent antivenom to reverse the extended coagulopathy featured.