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Anti-venom Activity of Medicinal Plants – A Mini Review

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Snake envenoming is a major public health issue in the rural tropics with large numbers of envenoming and deaths. The common poisonous snakes found in India are Cobra (*Naja naja*), Krait (*Bangarus Caeruleus*), Russell's viper (*Daboia russellii*) and Saw Scaled Viper (*Echis Carinatus*) (Bawaskar, 2004). About 35,000 to 50,000 people die of snakebite every year in India. Antivenom immunotherapy is the only specific treatment against snake venom envenomation. Antivenoms are usually hyper immune sera collected from animals which bind and inactivate venom components. Antiserum development in animals is time consuming, expensive and requires ideal storage condition. Over the years many attempts have been made for the development of snake venom antagonists especially from plant sources. The use of plants against the effects of snakes bite has been long recognized; more scientific attention has been given since last 20 years (Santosh *et al.*, 2004). Extracts from plants have been used among traditional healers, especially in tropical areas where there are plentiful sources, as therapy for snakebite for a long time. Several medicinal plants, which appear in old drug recipes or which have been passed on by oral tradition, are believed to be snakebite antidotes. In modern science, there have been many attempts to study these plants to clarify their effectiveness. India has a rich tradition of the usage of medicinal plants. Many Indian medicinal plants are recommended for the treatment of snakebite. The methanolic root extracts of *Vitex negundo* Linn. and *Embllica officinalis* Gaertn. were tested for antisnake venom activity. Both plant extracts were significantly neutralized the *Vipera russellii* and *Naja kaouthia* venom induced lethal activity both in vitro and in vivo studies. *V. russellii* venom-induced haemorrhage, coagulant, defibrinogenating and inflammatory activity was significantly neutralized by both plant extracts (Alam *et al.*, 2003). *Hemidesmus indicus* root extracts effectively neutralized Viper venom-induced lethal, haemorrhagic, coagulant, anticoagulant and inflammatory activity (Alam *et al.*, 1994). The butanolic extract of *Eclipta prostrata* plant was partially inhibited the hemorrhagic activity but displayed very low anti-phospholipase A2 activity and did not inhibit proteolytic activity of Malayan pit viper venom (Pithayanukul *et al.*, 2004). Lupeol acetate isolated from the root extract of Indian sarsaparilla *Hemidesmus indicus* R.Br. could significantly neutralize lethality, haemorrhage, defibrinogenation, edema, PLA2 activity induced by *Daboia russellii* venom. It also neutralized *Naja kaouthia* venom induced lethality, cardiotoxicity, neurotoxicity and respiratory changes in experimental animals (Chatterjee *et al.*, 2006). Beta-sitosterol and stigmasterol isolated from the root extract of *Pluchea indica* Less. (Asteraceae) may play an important role, along with antiserum, in neutralizing snake venom-induced actions. Several plant constituents like flavonoids, quinonoid, xanthene, polyphenols and terpenoids possessed protein binding and enzyme inhibiting properties and also inhibit snake venom phospholipase A2 (PLA2)

activities of both Viper and Cobra venom (Selvanayagam *et al.*, 1996). Triterpenoids present in *V. negundo* and *E. officinalis* may involve in venom inactivation processes. The pentacyclic triterpenes (free or as glycosides) are found widely in several antsnake venom plants (*Aegle marmelos*, *Centipeda minima*, *Aloe vera*, *Phyllanthus niruri*, *Alstonia scholaris*, *Phyllanthus emblica*, *Elephantopus scaber*, etc.) and provide nearly 20% protection against snake venom (Mors *et al.*, 2000). *Eclipta prostrata* L. (Asteraceae) is a pantropical and subtropical plant used as an anti-venom against snakebite in China and in Brazil (Mors, 1991). Ticli *et al.* (2005) reported that the methanolic extract from *Cordia verbenacea* significantly inhibited paw edema induced by *Bothrops jararacussu* snake venom. Chatterjee *et al.* (2004) reported that an active compound from the *Strychnus nux vomica* seed extract, inhibited viper venom induced lipid peroxidation in experimental animals. It may be concluded that evidence are now available to establish the scientific background of the traditional use of plants against snakebite. The antsnake venom plants contain more than one compound (secondary metabolites) that are responsible for venom neutralization. Thus Medicinal plants with antivenom activity could be considered as an effective alternative to mammalian antibody production for the treatment of snakebite envenomation.

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