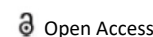




## COMMENTARY



## Characteristics and Uses of Apitoxin

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### Description

Apitoxin or Bee venom is produced by worker bees in two specialized abdominal glands and is used as a defence weapon of bees' colony. Bee product has been used since the ancient times to relieve pain and to treat chronic inflammatory diseases such as rheumatoid arthritis, tendinitis, bursitis, skin conditions and even neurologic disorders.

Apitoxin is a light-yellow liquid, characterized by a bitter taste, pungent smell and a pH ranging from 4.5 to 5.5. Studies have described that 88% of apitoxin is water, yet its specific composition varies depending on bee species and season. Indeed, apitoxin has been reported to contain a complex of biologically active compounds among which enzymes such as Phospholipase A2 (PLA2), lysophospholipase, hyaluronidase, Acid phosphomonoesterase,  $\alpha$ -glucosidase, dipeptidyl peptidase IV and vitellogenin), peptides (Melittin (MLT), Apamin, Mast Cell Degranulating (MCD), mastocytolytic peptide, scapin, adolapin, minimine; apidaecin; tertiapin; melittin F; cadiopep; procamine A, B, pamine, and protease-inhibitors), biogenic amines (histamine, dopamine, noradrenaline, norepinephrine, neurotransmitters) and other compounds such as amino acids (mainly  $\gamma$ -aminobutyric acid,  $\alpha$ -amino acids), carbohydrates such as glucose and fructose, pheromones like Iso-pentyl acetate, n-butyl acetate, iso-pentanol, n-hexyl acetate, n-octyl acetate, 2-nonanol, n-decyl acetate, benzyl acetate, benzyl alcohol and (2)-11-eicosen-1-ol) and minerals. Among these compounds, MLT is the main therapeutic ingredient of apitoxin. However, it is important to take into account that some BV constituents (such as PLA2, lysophospholipase, hyaluronidase, MLT, apamin and MCD) can exert toxic effects, leading to clinical signs and symptoms of envenomation. There are some nontoxic products/compounds like phosphatase and  $\alpha$ -glucosidase. Electric

stunning devices are also used to extract toxins from the beehives. Later, contaminations and deposits are taken out and the excess cleaned compound is lyophilized. In nature, honey bee toxin might be infused into the victims through honey bees' sting and the amount of venom per sting ranges between 50  $\mu$ g and 140  $\mu$ g. The responses of the human organism include local and limited or systemic and extensive inflammatory reactions, immune responses and anticoagulant effects. The best medications created by the pharmaceutical industry have been segregated from plants, microorganisms and marine creature. However, about 900 drug items for human use have been segregated from bugs. With respect to this, the majority of the published works are preliminary studies developed *in vitro* and *in vivo* using animal models, mostly mice, while little evidence comes from studies performed directly to prove BV therapeutic activities in humans.

The main component of bee venom responsible for pain in vertebrates is the toxin melittin; histamine and other biogenic amines may also contribute to pain and itching. In one of the alternative medical uses of honey bee products, apitherapy, bee venom has been used to treat arthritis and other painful conditions. All currently available evidence supporting this practice is either anecdotal, animal studies, or preliminary evidence, most of which has poor methodology. Apitherapy is not currently accepted as a viable medical treatment for any condition or disease; the risk of allergic reaction and anaphylaxis outweighs any benefits. According to the American Cancer Society, there is no scientific evidence that apitherapy or bee venom therapy can treat or change the course of cancer or any other disease. Clinical trials have shown that apitherapy is ineffective in treating multiple sclerosis or any other disease, and can exacerbate multiple sclerosis symptoms.