Honey Bee Venom

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Production and Components

Bee venom is a colorless thickened liquid with a pungent odor and bitter-hot taste. (10) It is produced at the moment of stinging when the secretion from the small venom gland comes in contact with that of the large venom gland. The length of the venom glands depends on the breed of the bee. The breed also determines the age at which the bee starts producing venom.

Usually, the bee workers can start producing venom after 1 week of age. They are most active between 2 and 3 weeks of age. The bee venom is composed of the following (1):

- mellitin - 40-50%
- apamin – 3.4-5.1 %
- other peptides up to 16%
- hyaluronidase – 20%
- phospholipase A – 14%
- amino acids – up to 1%
- histamine - 0.5% -1.7%
- fats and sterols – up to 5%
- glucose - 0.5%
- fructose – 0.9%
- organic acid – 0.04% - 0.14%
- other components - 4% -10%

Elements that have therapeutic properties: the histamine (1% content in venom), magnesium phosphate (about 0.4% of dry venom’s weight), acetylcholine, copper, phosphor, calcium, proteins and sulfur.

The venom is an acidic substance as it has pH between 4.5 and 5.5.
Collecting Bee Venom

The venom can be collected without harm to the bees just by using the secretion from the small and large venom glands. Collecting venom regularly by stimulating the bees to sting can lead to the bees producing twice the amount of venom that they would have normally produced. During its lifespan a bee can produce up to 0.3mg of venom.

The methods of venom collection are based on the principle of introducing an irritant that makes the bee sting. Currently the most common method for collecting venom is by using an electric charge that stimulates the bee to sting. In the past, people were using an electric charge but it wasn’t possible to control its magnitude and thus preserve the wellbeing of the bees. Today, the most advanced devices for stimulation via electric charge, such as the Collector – BVC, have a microprocessor that controls the electric charge so it doesn’t harm the bees and keeps them alive. The bee death rate has been reduced to zero.

Bee venom can be collected inside or outside of the beehive. In order to avoid stressing the bees and preserve the wellbeing of the bee colony as well as its ability to produce honey and other apian products, we need to use the method of collecting venom outside of the beehive. The electronic microprocessor device Bee Venom Collector – BVC, can be used outside of the beehive. However, some beekeepers still choose to remove the roof of the beehive and put the electronic device above the honeycomb. This is still the better option as compared to putting the device inside the beehive in the place of the honeycomb. If the venom collector is placed between the honeycombs, this will shock the bees. It will make them hyperactive and will cause them to cluster around the device, increasing the temperature in the beehive significantly. In the hot summer days, this can easily result in heat strokes and eventually in the death of the bees.

When we use the Collector – BVC, the venom dries out on the glass panel while the venom is still being collected. In most cases when the air outside is dry, it is not necessary to place the collector under a shade and wait for the venom to dry out before scraping it off the glass panel. If the air humidity is more than 70%, then the glass panels with the venom need to be placed under a shade for 20-30 minutes in order for the venom to dry out. When it’s dry, the venom can be easily scraped off with the special scraper included in the kit.

During the process of drying, the loss of venom weight should be no more than 12%. The part insoluble in water should be no more than 13%. (2) The glass panels should be sterilized with 70-90% ethyl alcohol.

When the air humidity is too high – after rain or when it’s foggy outside, it is not recommended to use electric charge to stimulate the bees. When the air is humid, the bees become much better conductors of electricity and therefore an electric charge can harm them easily. The Collector – BVC, www.beewhisper.com, detects the level of air humidity and automatically adjusts the magnitude of the electric charge or suspends the electric charge until it’s safe to resume it. The Collector – BVC has LED indicators for humidity. In this way, Bee Venom Collector – BVC, www.beewhisper.com, takes good care of the wellbeing of the bee colony.

Storage

Bee venom [(5),(6)] is soluble in water and vegetable oils. It can be disintegrated by oxidants, concentrated acids, alkalis, and direct sunlight. When aired, the venom quickly dries and turns into amorphous crystals. During the drying process, in addition to water vapor, the bee venom also emits
volatile fractions of venom. This includes 12 different substances. Therefore the bee venom must be stored in airtight containers. Well dried venom, stored in airtight tinted glass container can preserve its qualities for a couple of years even at room temperature.

Bee venom is soluble in acids, saline, and water, however, its biological activity decreases in a couple of hours.

Venom is not easily soluble in alcohol, but it can form emulsions in oils.

Venom is not affected by temperature – it preserves its qualities in freezing temperatures as well as in temperatures as high as 115°C equivalent to 239°F.

Well dried bee venom must be kept out of direct sunlight or humid spaces.

Bee venom can preserve its qualities for 7-8 years when it is stored in tinted glass bottles or jars that have been sealed with paraffin.

This information is of prime importance for the collection and storage of bee venom and drugs made of it.

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