# CHEMISTRY, FARMACOLOGY AND THERAPEUTIC EFFECT OF BEE VENOM*

*K.A. FORSTER*

*FEDERAL REPUBLIC OF GERMANY*

Ever since human beings exist on earth, they have got into touch with bees, as the latter are older, historically. Thus people knew also their venom. Therefore, it is but natural that in the oldest documents as for instance of Egyptians and the Babilonians, bee venom is mentioned for its therapeutic value, as against the toxicity of the snake poison.

Of course, at the beginning bee venom was used primitively, for instance under the form of ointment or tea. Also the indications were not very much differentiated, as bee venom was recommended for healing almost all diseases; worth mentioning is the fact that rheumatic affections have since the beginning been treated with it.

I recall, as a peculiarity, that bees were used for acknowledging the apparent death, as they refuse to sting corpses; when nevertheless forced to do it, there is no reaction of skin.

People suffering of rheumatism have since long accepted to be stung by bees, with quite successful results. But this therapy could not fully assert itself as long as only bee sting was made use of. Bee stings are not available in any place and in any season.

Setting out from this knowledge, I have for seven years studied bee venom at the Farmacology Institute of the Würtzburg University. I extracted great quantities of bee venom and marked it under the form of injections, ointments and liniment. At present, the therapy with bee venom is applied more easily, without pain and with good results. The therapy effect and compatibility of bee venom, under the form of Foramin, with rheumatic affections of muscles, nerves and articulations were fully confirmed by publications of clinics in many parts of the world.

Very favourable conditions are at hand in Germany, for extraction of bee venom. In Lüneburg plain, bees are kept in baskets. Only 1/3 of the bee colonies belonging to apiarists who kept their bees in baskets are set to winter, the rest of 2/3 being put at our disposal for extracting venom. The removed bees are carried by the Federal railway system, as fast as possible, to Illertissen, by night, when it is cooler.

We have also achieved a very rational method for automatic extraction. The bees are made to sting a plate, previously treated on purpose. The venom is extracted from this plate and then liophilized. The powder venom can be preserved only for a limited period of time.

Concomitantly, studies have been undertaken for elucidating the chemical structure of bee venom. A great contribution this respect was made by the studies of Prof. Habermann and of his co-workers, after the introduction of gel chromatography. As many as seven component elements have been separated.

Those who have thought that bee venom had something particular chemically, were disappointed. None of the seven component elements belonged, from the chemical point of view, to any completely new category of substances. Almost all component parts can be obtained from the aminoacids the human organism receives daily under the form of natural albumins. They are the following:

1. *Melitine* is the main factor of bee venom, due to its quantity (about 50% of the dry substance) and to its pharmacological effect. It is a polypeptide with a linear chain of 26 aminoacids and has an intensive surface activity.

2. *Apamine* is also a polypeptide. It represents 3% of the whole venom quantity and is made up of 18 aminoacids.

3 and 4. The two basic polypeptides Ante FO and Post FO are not interesting from the pharmacological point of view.

5. *Phospholipase A*. This enzyme accounts for 14% of the dry substance. It removes the fast B fatty acids from lecithine and from cephalin. According to the knowledge acquired up to now, its pharmacological and biochemical effects are the disappearance of phospholipoids, which are important, functionally.

6. *Hyaluronidase*. This enzyme represents 2% of the dry substance. Nevertheless, bee venom is one of the biological substances with a high hyaluronidase content. It separates very well and differs from the other hyaluronidases by its action and reaction products.

7. *Hystamine* was previously considered as the most important component element of the bee venom. According to data available nowadays, it accounts for possibly less 1‰ of the dry substance, its importance being thus substantially diminished.

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The pharmacological effects of bee venom are based on the relations existing between the above mentioned component elements. Owing to the fact that their number is very great and especially to the broad sphere of action of melitine and of lysolecithine, almost all organisms and biological processes are affected by bee venom. Interesting, both theoretically and practically, are its effects on the irrigation with blood of tissues and on the permeability and metabolism of biological membranes.

The parts of vessels responsible for preserving peripherical strength dilate themselves and thus the melitine, phospholipase A, lysolecithine and histamine cause a drop in blood pressure. When applied locally, a sideline phenomenon appears concomitantly with the dilatation of blood vessels, namely increase of permeability. This phenomenon is due, according to latest research, to the release of histamine and serotonine from the tissues. Very interesting is also the effect of bee venom upon the nervous system.

As to its therapeutic effect, it was ascertained, among others, in case of inflammations of joints of animals.

As proved by practice, the rheumatic people had a different behaviour to bee venom than healthy people or those suffering of other illnesses. We can affirm, with good reason, that there exist certain relations between rheumatism and bee venom. The therapy with bee venom may be called causal therapy, as the reaction manner of the organism changes due to it.

I wish to mention here the treatment of hypersensitiveness to bee venom. I have received the following letter from a beekeeper:

“I married and noticed that my wife falls ill very seriously whenever stung by bees. I am in a dilemma; to renounce my wife or my bees”

He should renounce nobody, because in most cases the allergy to bee venom can be healed by cutaneous injection of very diluted solutions of natural venom, the concentration of which is gradually increased.

Studies have been undertaken lately of bee venom and of its protection capacity against radiations. Such an effect, of radiation protection, was noticed but it is too weak to be used in practice.

According to statistics, there is a low death rate among beekeepers, because of cancer. The so called cytostatic effect of bee venom has for a long time been studied, and also the discontinuation on cell division, but definitive results are not yet available.