

Use of Medicines such as basic Thymol against of Varroa mite in Iran

Dr Reza SHAHROUZI

International Counsellor for Agriculture & beekeeping reza.shahrouzi@hotmail.com

Abbas Gerami Sadeghian

Departement of Parasitology Veterinary Medicine Faculty of Tehran. abbasgsadeghian@yahoo.com

Amir Mohammad ELMI

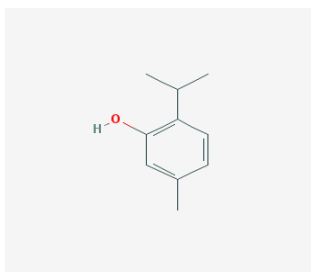
Department of Environment Wildlife Bureau Tehran.I.R.Iran

Introduction

Researchers throughout the world still consider Varroa destructor to be one of the most important stresses on honey bee colonies around the world, it continues to have its biology examined by researchers from many places.

There are three anti-varroa treatments containing thymol that have a marketing authorization for the treatment of colonies against varroa in Iran: Apiguard[®] and Apilife Var[®]. Thymovar[®].

Since 2000 use has been made of Thymol, which is the component of Apilife Var[®] and Apiguard[®] as well as Thymovar[®], and it has also been studied in many publications from around the world.



You can see from the figure against this organic molecule of formula C₁₀H₁₄O includes a phenol group (aromatic molecule, alkyl groups, methyl and isopropyl). Its chemical name is: 5-Methyl-2-isopropyl phenol.

Under atmospheric pressure, the pure molecule is in the form of colorless crystals with a strong smell (aromatic molecule). It goes from a solid to a liquid state (fusion) between 49 and 51 ° C and to the gaseous state at 233 ° C.

It is soluble in fatty substances, moderately soluble in alcohol and slightly soluble in water.

In pharmacology, it is recognized as having anti-infectious and anti-fungal action.

For our part we will focus on its action against the varroa mite. We will seek to understand its effects on parasites of bees and eventually we will show how to use it.



Apiguard®:

Product of the British firm Vita (Europe) Ltd is in the form of a poly-acrylic acid gel ensuring regular dissemination of 25% thymol present in the gel.

Three packages are available:

- a sachet of 25 g for warm areas or hives,
- a tray of 50 g for the treatment of a colony
- or a 3 kg bucket for large apiaries

The tray is placed on the head of the frames for 10 to 14 days (depending on what is left in the tray).

A second tray is then placed for 2 to 4 weeks. It is advisable to treat more than 15 °C.

If the temperature is lower, the duration of treatment should be increased



Apilife Var®:

A product of Chemicals Laif S.P.A. The Italian firm's product is in the form of vermiculite platelets impregnated with a mixture containing:

8 g (74.08%) of thymol

1.72 g (16%) of eucalyptus oil,

0.39 g (3.7%) of camphor,

0.39 g (3.7%) of menthol.

The temperatures of use are similar to those of Thymovar®, that is to say from 20 to 25 ° C (up to 15° C. - Increased bee and brood mortality beyond 30 ° C

Pieces of wafer(cut into 3 or 4 parts) are placed on top of the frames and updated every week 4 times.



Thymovar®:

A product of the Swiss company **Andermatt BioVet AG** in which 15 g of thymol are impregnated sponge pads on viscose. Two applications are required and each application lasts 3 weeks.

The treatment is conveniently carried out by an average maximum temperature of 20 to 25 °C (15 - 30 °C)



Efficacy tests

Several tests were conducted in different countries on these veterinary drugs. The ideal is to compare data carried out in parallel on different products. We consider only the tests that compare the two thymol based drugs. Many studies have already been carried out for several years.

Efficacy loss problems may have changed the level of efficacy. The hive model and climate of the country in which the tests are carried out must be considered. Here they take the data from three trials in 2004 in the north, center and south of Italy in 2004 in two German cities and the last conducted in 2010 in Alsace (France) and in Iran in 2004, We can draw several conclusions from these trials. The Apiguard® presents the most variable and the lowest efficacy results. There are big differences depending on achievement tests venues and effectiveness varies greatly according to the settlements. The differences are less marked between Thymovar® and Apilife Var® in trials in Italy, Germany and France, the most recent tests show better efficacy of Apilife Var®. This may be related to a loss of effectiveness of thymol.

We take the data from several trials between 2000 to 2015 in the north, center and south of Iran and Aghanistan considered Thymovar® show better efficacy than Apiguard®

Advantages of Thymol :

- Thymol is a natural substance.
- Thymol has low toxicity to humans.
- Thymol has not been reported as resistant to Varroa destructor

Disadvantages of Thymol:

- Colonies must be given a double dose, and the treatment repeated in the autumn. Mites that survive the two treatments reproduce during the bees' active season. So it is necessary to use another acaricide, (according to J.P. Faucon and Reza Shahrouzi 2003).
- When colonies infested with varroa were treated with only Thymol, they showed abnormally high winter losses, with clear evidence of mites.
- A strong odour is apparent during the first week following the treatment, which disturbs the colony and stimulates the bees to clean their hive.
- It is necessary to provide a space between the top of the frames in a hive and the hive roof, for instance by inserting an empty super; this reduces the temperature of the bees and increases their honey consumption.
- Temperature variations during the treatment with Thymol are important, if the temperature is above 30°C, the treatment is more effective (<70 %) but causes a higher larval mortality. If the temperature is less 12°C the treatment is less effective (>50 %), and leads to a higher mortality of adult bees.

Conclusion

We take the data from several trials between 2000 to 2015 in the north, center and south of Iran and Aghanistan showed efficacy against Varroa destructor with:

- Apiguard® between 50% to 80%
- Apilife Var® between 75 % to 92%
- Thymovar® between 80% to 94%

Although we are in 21st century, Varroa mite will undoubtedly remain for several years one of the principal agents of the weakening of apiarian livestock. V. destructor is a serious disease. It is necessary to learn how to live with Varroa destructor. This can be done:

- By preserving only strong colonies in the apiaries
- By systematically changing the queens every two years, by developing queens selected for resistance to the diseases.
- The first treatment can be carried out in April and May by Thymol, the second treatment must be carried out in late september or early October in Iran and Afghanistan by chemical acaricide, or oxalic acid.
- If colonies were treated only with base Thymol and fomic-acid, they showed abnormally high winter losses, with clear evidence of mites. So it is necessary to use another acaricide chemical, (according to J.P. Faucon and Reza Shahrouzi 2003).
- If an apiary colonies are located in an area conducive to the rearing of brood (potential source of development for the parasite), the second treatment must be carried out in early Spring.



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