

# User instructions for **VARROX®-Vaporizer**

EN



Production and distribution:  
Andermatt BioVet AG

Information stand:  
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## 1. Appliance

The VARROX®-Vaporiser consists of a heater, a metallic support and 3 m of cable with 2 battery-clips. It has an output of 150 W. The power source can be an accumulator (car battery, 12 volt, 12 ampere, capacity > 40 Ah).

## 2. Mode of action

Oxalic acid dihydrate is added to the pan, then the appliance is inserted through the entrance of the hive. As a result of the heating action of the pan, the oxalic acid liquefies and vaporises. Oxalic acid vapour fills the hive and all the bees and surfaces are then covered with a very thin layer of oxalic acid crystals. These fine crystals are tolerated well by the bees, but have a deadly effect on varroa mites.

## 3. Treatment

### 3.1 Time

The use of the VARROX®-Vaporiser is particularly suitable for the follow up treatment in **broodless colonies** (see 5. Concept of control).

The treatment should not be made during heavy bee flight. **The temperature should not be below + 4 °C.** Especially in honeydew areas the last cleansing flight should not date back more than four weeks. A cleansing flight should then be awaited.

### 3.2 Dosage

Type of hive	Oxalic acid-dihydrate	Measuring spoon*
One-chamber-hive (warm way, one-storey)	1 g	1
Two-chamber-hive (two-storey/Dadant)	2 g	2

\*One spoon filled loose and without pressing, corresponds to one gram Oxalic acid-dihydrate. Each VARROX®-Vaporiser is supplied with a measuring spoon.

### 3.3 Placing the VARROX®-Vaporiser

The appropriate amount of oxalic acid-dihydrate is placed into the VARROX®-Vaporiser. Afterwards, the appliance is inserted **through the entrance of the hive right below the cluster of the bees** until the metallic support is fully inside. It must not be used at close range of wax or bees (minimum distance 2 cm).

If the insertion through the entrance is not possible because of the construction of the hive, use the opening of the diagnosis drawer where possible.

**Attention:** The VARROX®-Vaporiser reaches temperatures of up to 400°C. It can create patches of heat on the hive bottom and frames if used for too long or too close to the hive. This can be avoided by using a sheet metal or wooden board below the pan.

**Caution with synthetic hives and plastified varroa screens:** With hives or varroa screens made of synthetic material, an isolation platter (minimum 4 mm thick) must be put under the appliance.

**Hint:** Depending on the height of the entrance and the bottom of the hive, we recommend that the VARROX®-Vaporiser is fitted in evenly by bending down both sides of the metallic support a few millimetres. The distance between the bottom of the hive and the heating element can be increased and the source of the heat is taken off the bottom.

### 3.4 Sealing up the hive

Seal the whole entrance (or diagnosis drawer) around the handle of the VARROX®-Vaporiser using strips of foam or cloth. Open floors or other openings should be shut tightly over the whole surface.

### 3.5 Duration of the treatment

After the hive is sealed up, the vaporiser should be connected to a car battery (12 V) for **2<sup>1/2</sup> minutes**.

One of the battery-clips of the cable can be constantly connected with the source of power using the contact of the second clip to switch the appliance on and off. It makes no difference which clip is connected to the plus-terminal - the function of the heating is not reduced.

**After disconnecting** the VARROX®-Vaporiser, **wait for 2 minutes** before the appliance is pulled out, so that the oxalic acid-vapour can settle. Once removed, ensure that the entrance of the hive is shut tightly again and is **left shut for another 10 minutes**.

After taking out the VARROX®-Vaporiser, it should be cooled in a bucket of water, so that with the next use, no vaporisation begins before the appliance is inserted into the hive.

## 4. Oxalic acid-dihydrate (Oxalic acid-crystals)

Oxalic acid is an unhealthy, toxic and corrosive substance. When filling the VARROX®-Vaporiser and during the treatment, it is absolutely necessary to **wear protective glasses, a protective mask FFP3, gloves and long-sleeved clothes**.

### 4.1 Purchase of oxalic acid-dihydrate

For the treatment, oxalic acid-dihydrate (C<sub>2</sub>H<sub>2</sub>O<sub>4</sub> x 2 H<sub>2</sub>O) CAS-No. 6153-56-6, EG-No. 205-634-3 has to be used.

Normally available in pharmacies.

### 4.2 Purchase of oxalic acid-dihydrate/Handling of oxalic acid

Oxalic acid can cause damage to health with both skin contact and if swallowed. Avoid contact with eyes and skin. Vapours and dusts of the oxalic acid should not be inhaled. Keep oxalic acid out of the reach of children. Oxalic acid must be stored in its original container (with law-concurring labelling) in a safe place. In the case of eye contact, immediately wash the acid out with water. If ingested consult a physician immediately.

## Working safety during and after the treatment

- With treatments of apiaries in the open, take care that the wind blows any escaping oxalic acid away from the user. The whole length of the cable should be used and the user should stay away from the hive.
- The foam material used for sealing the hive must be handled with gloves. This avoids contact with the acid where it may have condensed on the inner side of the foam. The foam material must be washed out carefully with water before putting away.
- **Treatments on colonies in a beehouse must only be made from outside through the entrances of the hives.** During the treatment, the beehouse must be well ventilated. No person must be inside the beehouse.
- The VARROX®-Vaporiser is a powerful heater that generates high temperatures. The vaporiser must not be used near easily flammable materials. Always put the vaporiser on a sheet of non-flammable material (i.e. metal). Never touch the metallic part of the vaporiser when in use. Caution: metallic parts may be hot for a long time after use. The vaporiser must never be switched on without supervision.
- After the treatment in the winter, oxalic acid-crystals are found on the bottom of the hive. This can be due to the absence of bee cleaning activity as found in the summer. Caution is therefore needed if mite fall is controlled after a treatment in the winter. Gloves and a protective mask should be worn. The rest of the oxalic acid will break down to water and carbon dioxide and will be cleaned by the bees in spring.

## 5. Concept of control

Do not treat colonies with honey supers on.

### 5.1 Treatment in brood free colonies

The VARROX®-Vaporiser can be used in broodless colonies. With the VARROX®-Vaporiser a very good efficacy of > 96 % can be reached and thus it can decimate the varroa-mite-population reliably to a very low level. Thereby, optimal conditions for the new season are created for the bees.

If there is a mite fall of more than 1000 varroa mites caused by the treatment, or if it is uncertain whether there was brood in the colonies, a second treatment is recommended. The optimal time for it, is two weeks after the first treatment. If a second treatment is necessary only 1 gram of oxalic acid has to be used, independent on the size of the hive. Two or more treatments are very well tolerated by the bees.

### 5.2 Treatment of swarms / artificial swarms

Swarms and artificial swarms can be treated at any time.

### 5.3 Treatment of nucleus

Treatment of queenright nuclei should be carried out before the first brood is sealed, if possible. (No efficacy in sealed brood).

**Attention:** Queenless colonies react very conspicuously to the treatment with an increased activity in the hive and by leaving the hive.

## 6. Accessories (to order separately)

- Protective mask FFP3 (Acid / Gas respirator)
- Timer
- Gloves
- Glasses

## 7. Electrical supply

The VARROX®-vaporiser must be operated with 12 volts, 12 ampere and cannot be directly plugged into a socket of 110 V or 220 V. It runs on **alternating and direct current** (AC/DC). The following can be used as a source of power:

- **Car accumulator minimum 40 Ah** (the accumulator and battery charger can be bought in DIY super stores)
- With a transformer (12 V, 12 A)

If the vaporiser is connected to the car accumulator for prolonged periods the engine of the car may have to be run to avoid draining the battery.

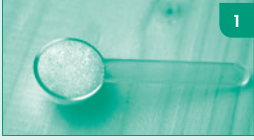
## 8. Source of troubles

- After the treatment there is still some acid left in the pan
  - Heating time is too short: Heat longer (plus about 1/2 minutes)!
  - Accumulator is weak and delivers not enough current: Charge accumulator!
- Possible burr-comb below the frames, has to be removed, so that it is not in the way of the VARROX®-vaporiser or too close.
- The treatment should only be used in hives normally occupied with bees. Very small colonies or even empty hives should not be treated.

## 9. Warranty

Please, follow the instructions for use carefully. We do not assume any warranty for incorrect application, reasons of unsatisfactory efficacy or possible damages that are beyond the control of Andermatt BioVet AG.

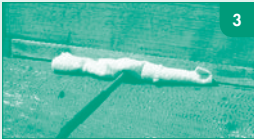
**EN** Brief instruction



EN: Fill the pan with 1 or 2 spoons of oxalic acid dihydrate



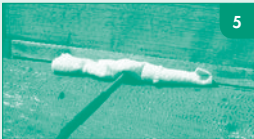
EN: Place the appliance through the entrance of the hive under the bees



EN: Seal the entrance of the hive using damp strips of foam or cloth



EN: Attach the battery-clips to a car battery (12 V, 12 A) for exactly 2½ minutes



EN: Disconnect and leave the appliance in the hive for another 2 minutes



EN: Take the appliance out of the hive and cool it rapidly in water



EN: Keep the hive shut for another 10 minutes