Using Oxalic Acid

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The organic acids, Oxalic Acid, Formic Acid, and Lactic Acid are NOT LICENSED for use in the United Kingdom as treatments for bees for varroa control. No mention of any of the alternatives to the approved product or their method of use should be taken as an endorsement or recommendation to treat. The dribble or trickle method referred to for oxalic acid is commonly used in the UK and throughout Europe, and should you decide to use it you should ensure that you apply it in a safe and informed manner.

Remember that oxalic acid is a poisonous chemical and so should be treated with some care and caution. See [here](http://www.ehow.co.uk/list_6581677_oxalic-acid-symptoms.html) for more information (also information on extracting oxalic acid from rhubarb).

This short article is something that has been put together from reading about oxalic acid, listening to the experiences of others and also from my own experience of using it in my hives for the last few years. First we have to remember that oxalic acid is a dangerous chemical and should be treated with care. When mixing solutions gloves, goggles, overalls and ideally a breathing mask should be worn. Some methods are more dangerous than others and will be mentioned briefly below. Second we need to remember why we are using it. Legally in the UK as far as the Veterinary Medicines Directive is concerned it is just used as a ‘hive cleanser’ in beehives. However, as we all know it has the side effect whilst doing this of killing off varroa mites. General understanding is that it does this by burning the mouthparts, feet and other parts of the carapace, so damaging the mite that it can no longer function.

The acid treatment has greatest efficacy when the colony is broodless as the acid does not get into sealed brood and so cannot kill off any mites reproducing there. Having said that, with a small area of brood in the colony it will still have a reasonable effect on the mite population. Hence the best time for treatment is usually recommended as December and the first half of January.

There are 3 ways of treating with oxalic acid that are described here. The first is spraying, where the oxalic crystals are mixed with water and applied to the face of the frames and bees using a hand held sprayer like those used for indoor plants. The disadvantages of this method are the great disturbance to the bees and also, as the solution is just water and acid, it does not ‘stick’ to the bees very well.

The second method is sublimation where the oxalic acid crystals are heated on a small tray or in an open-ended pipe and the gases permeate through the hive. With this method the hive has to be sealed (no open mesh floor or holes in the crown board) with foam or something similar along the entrance to stop the gases escaping. Also inhalation by humans of the gas is very dangerous. Getting this application correct and carrying it out safely is very difficult and is not recommended for the average beekeeper.

The third method is to mix the crystals with a sugar solution and apply it using the trickle method. This means using a syringe or some other small applicator with a measured quantity of solution and dribbling 5 ml per seam of bees (a seam is the gap between two brood frames where you can see the bees clustering). About 30-40 ml is needed for most colonies, as this would be sufficient for six to eight full seams of bees in a National hive. Adjustments need to be made for other frame sizes. As this is a sugar solution it sticks to the bees and is spread around more effectively and affects more mites. Most hobbyist beekeepers tend to buy in the oxalic acid in a pre-mixed sugar solution that is ready to apply. This is not very expensive but the downside is that we do not know how long ago it was made. Marion Ellis from the US related at the Somerset special lecture in 2007 that the HMF (Hydroxymethylfurfural, previously known as hydroxymethylfurfuraldehyde) level in the solution increases over time and so should not be stored. The general recommendation is to make up the solution with sugar and use immediately or store in the fridge for up to one month. With just a water and acid solution no HMF can be formed (it requires a reaction between the acid and the sugar) so the solution can be kept for a long time like this and sugar added when required..

It is not difficult to make up the solution and this can be done when needed using the following proportions, which give a 3.5% treatment: -

1:1 Water to Sugar (weight to volume) made into 1 litre of syrup
Oxalic acid crystals 35g

Mix up the syrup first with hot water to dissolve the sugar more easily, allow it to cool and then weigh the oxalic crystals on electronic kitchen scales and add them to the syrup. If you put it all in a large bottle with a lid and give it a good shake it should all mix nicely and be contained and so safer. When you make up a larger quantity like this the margin of error when weighing the oxalic acid becomes smaller (2g out on 3.5g is more than a 50% increase in the dose whereas 2g out on 35g is only about 6% out on the dose). Once made, this solution can be stored in the fridge and what is needed for treatment can be decanted into a smaller bottle. Warming this like a baby’s milk bottle - standing it in a jug of hot water – before treating the bees will mean they will not be so chilled and fewer bees will die.

Like all treatments it is a good idea to carry them out at the same time as your neighbouring beekeepers. There is a U Tube video of oxalic treatment by our **SBI**, John Beavan, [here](http://www.youtube.com/watch?v=Mj_FV40DEwk).

**Adapted from an article by Megan Seymour courtesy Warwickshire Beekeeper**