

# Varroa Control using Organic Acids

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Organic acids i.e. formic, oxalic and lactic acid are generic substances that are extensively used for varroa control within Europe. Their legal status varies according to country. These acids can be very caustic so safety precautions, such as wearing safety goggles, breathing mask, acid proof gloves etc., must be taken. Full risk data for each acid must be assessed and appropriate safety measures taken before use.

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### **Use of organic acids in the United Kingdom.**

Many beekeepers use these acids and they are extensively used within Europe, particularly in Denmark, Germany etc. The legality of application is unclear. The only registered approval is in respect of formic acid in Germany when used in conjunction with Illertisser plates or Nassenheider evaporators. Currently, in the U.K. the Veterinary Medicines Directorate (VMD) considers that the use of Organic Acids is permissible if prescribed by a Veterinary Surgeon under the Veterinary Cascade Scheme. This can be done when resistance is found to the registered Varroacides available. In changes to legislation which came into force in January 2007 the use of organic acids, listed in annex 2 of EC directive 2377/90, may be permitted subject to conditions. Maximum residue limits have been set in European Honey Standards as up to 50 milliequivalents of free acids. If used a honey and wax withdrawal period must be set and 'good practice' complied with, i.e. do not use with supers on a colony, during a nectar flow or when feeding. If a vet prescribes these products he does not have to apply them as he can delegate to the beekeeper. He can either supply the product or issue a written prescription. He should supply full instructions as to use and give a withdrawal date for honey and wax. The Vet is responsible for the effects on the stock but the beekeeper is liable for any residues found in honey or wax

### **Formic acid.**

***This substance is extremely hazardous.*** It is used as a treatment after removal of the honey crop. It can also be used as an 'emergency' treatment after the spring honey crop providing that no supers are on the hive. One or two treatments are used depending on mite levels. Formic acid is normally applied using commercial dispensers. The manufactures instructions must be followed. Doses vary according to temperature and if incorrect may become ineffective or cause adult bee and brood loss. If supers are left on the hive at the time of treatment the honey will be tainted. ***Due to the high risks when using formic acid, thymol or other essential oil treatments are often used in lieu. These treatments are available as commercial products i.e. 'Apiguard' and offer greater safety.***

### **Oxalic acid.**

***This acid is poisonous to humans.*** It is generally a winter treatment used when colonies are in a brood-less period. At this time efficacy will generally be in excess of 95% when used in solution, lower if sublimated. Bees have a low tolerance to oxalic acid so only one application should be made. It is normally applied in autumn during brood-less conditions when outside temperatures are above 0 C. It is applied in one of three ways.

### **Spraying oxalic acid.**

A solution of 30g. of oxalic acid dihydrate to 1litre of water is made up. Three to four ml. of the solution is sprayed on each side of a brood comb covered by bees using a hand sprayer. The bees should take on a grey appearance but will become black if too much is applied. It is well tolerated by bees though there may be some adult bee loss due to chilling. It is labour intensive.

**Trickling oxalic acid.**

Oxalic Acid solution for trickling is available commercially. A solution of 45g. oxalic acid dihydrate in 1 litre of sugar syrup 1:1 is made up and 5 ml. of this solution is trickled onto the bees in each occupied bee-way between brood combs.

**Sublimating oxalic acid.**

Oxalic acid crystals are placed on metal pads, which are heated to vaporise the acid. The pads are available commercially and the manufacturers instructions must be followed.

**Lactic acid.**

This acid is naturally found in honey, excess quantities tainting the flavour. An aqueous solution containing 15% lactic acid is made up. Five to six mls of the solution is sprayed on each side of a brood comb covered by bees with a hand sprayer. The bees will take on a grey appearance but will become black if too much is applied. An efficacy of 80% is claimed in a brood-less colony, which drops to 20-40% when significant brood is present. It is normally applied in autumn during brood-less conditions when outside temperatures are above 3 C. Two to three applications are made at three-day intervals, so it is labour intensive.

**Programme of use.**

In central Europe these treatments are used relative to natural mite drop. This is best ascertained using a mesh floor. Timings of the control methods used are set out in the following tables.

Month	Monitor	Formic acid treatment or bio-technical control	Formic acid or thymol treatment	Winter treatment in colonies with no brood
April				
May				
June				
July				
August				
September				
October				
November				

**Interpreting action relative to daily mite drop.**

Time	If mite drop per day is over	Action
Entire Season	30	Colony collapse is imminent so treatment without delay is imperative.
End of May	3	One long-term treatment with formic acid should be carried out immediately after removal of the spring honey crop.
End of July	10	Two long-term treatments with formic acid.
Beginning of September	1	A second treatment is necessary.

**Further information.**

Can be found in various textbooks, pamphlets or on the Internet.

*No mention of alternative products should be taken as an endorsement or a recommendation to treat. The method is referred to as it is commonly used in Europe.*

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