National Bee Unit

The Food & Environment Research Agency

Varroa Control Using Organic Acids

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.

Use of organic acids in the United Kingdom.

Many beekeepers use organic acids and they are extensively used within Europe, particularly in Denmark, Germany etc. The only registered and approved product that contains an organic acid in the UK is Mite Away Quick Strip pads (MAQS) which contains formic acid and have no withdrawl period meaning that you can use these products during a honey flow. Currently, in the UK, 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 they do not have to apply them and will probably delegate it to the beekeeper. The vet can either supply the product or issue a written prescription, supplying full instructions as to use, along with 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.

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The application of MAQS

Formic acid.

With the registration of MAQS, formic acid pads provide a safe and reliable way to treat your honey bee colonies for *Varroa destructor*, ***if the manufactures instructions are followed.*** Unlike previous forms of formic acid application, these pads can be used during a honey flow, while supers are on the hive. Application involves placing1 sachet (*i.e.* 2 strips) per hive onto the top bars of your frames (on the bottom chamber if you use double brood). Ensure that the Varroa tray is in, if you use open mesh floors (OMF) but remove your entrance block if you have one in place; the hive entrance must be fully open when using the product. The registration of MAQS does not endorse the use of formic acid by use of other application methods and should you wish to do so, you must contact your local veterinary doctor.

Oxalic acid.

This acid is poisonous to humans. It is generally a winter treatment used when colonies are likely to have 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 when outside temperatures are above 0 C and applied in one of three ways:

- **Spraying oxalic acid.**

A solution of 30g. Of oxalic acid ı.e. hydrate 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

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bees though there may be some adult bee loss due to chilling. It can be labour intensive if you have a number of hives.

- **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 manufacturer's instructions must be followed.

The application of oxalic acid by trickling method

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 mils 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 winter 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	Formic acid or	Winter treatment

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		treatment or biotechnical control	thymol treatment	in colonies with no brood
April				
May				
June				
July				
August				
September				
October				
November				
December				
January				

Interpreting action relative to daily mite drop.

Time	If mite drop per day is over	Action
Entire Season	30	Colony collapse is imminent and so treat without delay.
End of May	3	1 long term treatment with MAQS (formic acid) should be carried out over 4 weeks.
End of July	10	2 long term treatments should be carried out with MAQS (formic acid)
Beginning of September	1	A second treatment is necessary

Further information.

Should you have any questions regarding honey bee health and bee medicaments then please do not hesitate to contact Jason Learner our technical advisor:

Email: Jason.learner@fera.gsi.gov.co.uk
Phone: 01904 462203

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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