



## Formic Acid:

65% formic acid is effective against both varroa mites and tracheal mites. It has shown minimal effects on brood and adult bee population when properly applied to honey bee colonies. The use of formic acid in an Integrated Pest Management Program can help in maintaining colony health by controlling varroa and tracheal mites.

The single application formic acid pad can be used in the spring and fall to control varroa and tracheal mites. This method requires 21 days for a full treatment.

### Materials required to prepare pad:

- 8" x 9.6" x 0.5" new Tentest board (Homasote) for the absorption pads
- Large Ziploc<sup>®</sup> Fresh Produce plastic resealable bags with moisture vents
- Large Ziploc<sup>®</sup> Freezer plastic resealable bags
- 65% formic acid
- tongs
- chemical resistant gloves
- safety goggles
- plastic tub or pail with airtight lid
- measuring cup with spout

# Preparation Guidelines

## Soaking the Pads Individually:

\*\* make sure that you are in a well-ventilated area, wearing closed-toed shoes, protective eyewear and chemical resistant gloves. Have wash water nearby in case of spills. Formic acid and acid fumes will burn skin and mucous membranes.

1. Place 1 Tentest pad in 1 large Ziploc<sup>®</sup> Fresh Produce bag.
2. Place the contents made in step 1 into a 1 large Ziploc<sup>®</sup> Freezer bag with bag openings together at one end.
3. Stand the pad and bags on their end with the bags opening upwards and pour 250mL of 65% formic acid into the Fresh Produce bag using the measuring cup with spout.
4. Close the Fresh Produce Bag and then close the Freezer bag. Place the entire package into the tub or pail with an airtight lid. Lay the pad flat to soak, fold the opening seam of the Freezer bag up, so that formic acid does not drip out of the bag.
5. To ensure that the formic acid is absorbed completely, use tongs to flip individual pads and bags onto the other side to distribute the formic acid evenly. Again, ensure that the opening seam is folded up so that the acid does not leak.



## Soaking Multiple Pads at Once:

\*\* the Tentest pad will absorb more than 250mL of formic acid, and therefore needs to be placed in the airtight tub on their ENDS so that each pad has equal surface area in the formic acid solution. Important! Use a respirator when making multiple pads.

1. Place 1 Tentest pad in 1 large Ziploc Fresh Produce bag and repeat until you have the number of pads required.
2. Place the contents made in step 1 into the tub or pail with an airtight lid that will accommodate the pads standing on their ends.
3. Pour the required amount of 65% formic acid into the tub and replace the lid. e.g. 10 pads = 2.5L of formic acid
4. Allow the pads to soak for 1 day on their ends. Flip the pads, using tongs, onto their opposite end to for 1 more day to ensure full absorption.
5. Once the pads have completely absorbed the formic acid, use tongs to gently transfer each pad into individual Freezer bags for storage/transportation. If using the pads right away, freezer bags can be omitted, but ensure that pads remain in the airtight tub with the lid in place. Note: pads are very soft and crumbly when wet. Take care in transferring the pads to Freezer bags or directly on to colonies.

## MONITOR, MONITOR, MONITOR!!!

Monitor after treating to ensure that your treatments were effective. Refer to the current Ontario Treatment Recommendations for Honey Bee Disease and Mite Control for more information about treatments for honey bee pests and diseases.

# Application Guidelines

Equipment required for application:

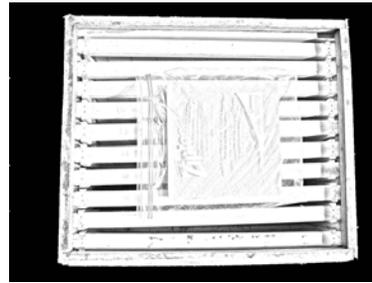
- 1" 4-sided rim or deep inner cover to accommodate the pad
- Two 4"x½"x½" spacer sticks to raise pad off the top bars
- chemical resistant gloves
- tongs
- duct tape



Spacer sticks, prepared pad and rim

\* wear protective gear at all times when handling formic acid

1. Leave front entrance open. Seal all holes and other openings with duct tape. Remove entrance reducers.
2. Place the 1" spacer rim above the top brood chamber. Place the 2 spacer sticks, on the top bars of the top brood chamber, above the brood nest.
3. If applicable, remove the Tentest pad and Fresh Produce bag from within the Freezer bag. Lay the formic acid soaked Tentest pad, still within the Fresh Produce bag, on top of the spacer sticks.
4. Replace inner cover and seal all holes and cracks but leave the front entrance wide open. Replace the lid and do not disturb for 21 days.



Pad applied, with rim in place

## Precautions!

- \* If using a 250mL pad on a nucleus colony, place the pad near the side of a full sized brood chamber, away from the bee cluster.
- \* Formic acid should be applied during average daytime temperatures of 12-25°C for optimal evaporation.
- \* If the average daytime temperatures drop and remain below 15°C or the holes get propolized, cut a 6-7" slit in the Fresh Produce bag on top of the pad to allow for better formic acid fumigation.
- \* Only prepare the number of pads needed for a spring or fall treatment.
- \* Store soaked pads in a sealed container in a well ventilated cool place.
- \* Do not treat colonies when honey supers are in place.
- \* Use caution when opening the formic acid container, especially in warm weather. Have water readily available for use if eye or skin contact should occur.
- \* It is highly recommended to remove the pad from the hive if temperatures above 30°C occur within the first 7 days of treatment. Resume treatment when ambient temperatures are within the treatment range.

## A GUIDE FOR THE SINGLE APPLICATION FORMIC ACID PAD (Slow Release Method)

### Ontario Beekeepers' Association Technology Transfer Program



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**Adapted from the pamphlet titled "An Alternative Single Application of Formic Acid to Control Honey Bee Parasitic Mites" produced by Dr. Medhat Nasr, Alison Skinner and Barry Davies of the OBA and Doug McRory of OMAFRA in the late 1990's.**