VarroxSan – Frequently Asked Questions and Tips for Use

1. Q: What is VarroxSan®?
A: Varroxsan is Oxalic acid solution in slow-release strips used to control varroa mites in honeybee colonies. VarroxSan is a product suitable for use in organic beekeeping.

2. Q: How do I apply VarroxSan?
A: See Vita's instructions on or with the product. Use 4 VarroxSan strips per brood chamber (i.e., one strip per 2.5 Frames of Bees - FoB).

Frames of Bees	1 – 2.5	3 - 5	6 – 7.5	8-10
Strips	1	2	3	4

Take the appropriate number of strips from the pack, fold in half and hang each strip over one comb frame inside the brood area or the bee cluster, with a minimum distance of 2 frames between strips. For example, one strip each over frames 2, 4, 6 and 8. Hang VarroxSan strips in the brood chamber in such a way that the bees can walk on the strips, slightly away from the surface of the frames. Leave the strips inside the hive for 42 to 56 days, and then remove. If, after 42 days bees are not in contact with the strips, reposition the strips closer to the cluster. Strips must be removed after a maximum of 56 days. DO NOT re-use the strips.

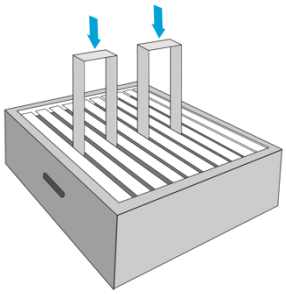
Tips:
- It is important to locate the brood area and place the strips over frames with brood, guaranteeing that the strips will be within the bee cluster.
- When treating nucs or expanding colonies, increase in frames of bees should be anticipated and additional strips added during the treatment period to account for the increase in colony size (see also Question 16).
- For end of season treatment (decreasing amount of brood), it is preferable to wait up to two weeks for the brood and bee cluster to settle in their winter position before starting treatment. This ensures that the strips are correctly positioned. With double brood hives or colonies where the population is still decreasing at the start of the treatment, the strips should be checked after two weeks and repositioned if necessary, to ensure they are within the bee cluster. (see also Question 12)

3. Q: What is the best time of day to apply VarroxSan?
A: VarroxSan can be applied at any time of day.

4. Q: Can I use VarroxSan with a brood and a half or a double brood?
A: Yes, but bear in mind that as the number of bees that need to receive treatment is higher, a higher dose should be applied.

VarroxSan's dose is related to the number of frames covered by bees. In a double brood hive, most bees, brood and varroa will usually be in the lower brood chamber, so place 4 VarroxSan strips in the lower chamber and put the second brood chamber on top. Add up to a maximum of 2 additional strips in the top brood box if it is full of bees (20 frames covered by bees). If there is brood in the second box, be sure to place the strips in these frames.

5. Q: I use medium-frame brood chambers, how should I apply VarroxSan
A: Double-medium boxes (two stacked together) should be treated as a single deep brood box and VarroxSan applied according to the product label and instructions in Q2, above.



When treating single-medium boxes, the dose should be reduced by half to 1 strip for every 5 frames of bees. Additionally, due to their length, the strips may be placed over two frames (see pictogram to the right) to ensure a better fit and more surface area available to the bees.

6. Q: At what time of the year should I use VarroxSan?
A: There is no temperature restriction, but VarroxSan acts by contact, so is most effective when the external temperature is above approximately 15°C (60°F) and the colony is active. Distribution of the oxalic acid depends on the bees transporting it around the hive during the process of hive cleaning and this activity increases as the external temperature rises. **Application during intense nectar flows should be avoided but is permitted if required.**

7. Q: Can VarroxSan be used in springtime?
A: VarroxSan can be used in springtime, if necessary, provided the daily temperature is high enough to ensure there is internal activity. Application during intense nectar flows should be avoided, due to faster removal of the strips, which could lead to a lower efficacy. See Q8 for tips on use of VarroxSan during a honey flow.

8. Q: Should I use VarroxSan when supers are on the hive / during a honey production period?
A: It is preferable to remove supers before treating with VarroxSan. Nevertheless, in the USA and Canada it is approved to be used with supers on and it is totally safe. Studies have shown that even at 1.5 times the dose, the level of oxalic acid in honey does not increase. At the recommended dose oxalic acid levels in honey are below the detection limit. Honey collected during VarroxSan treatment can be sold for human composition.

<u>Situations requiring a knock-down of varroa levels during a honey flow:</u>
When a rapid reduction (“knock-down”) of the varroa population is required during a period of honey flow, a follow-up treatment strategy should be used, rather than a single application of VarroxSan: apply 2 strips per brood box and repeat the application after 15 – 20 days. This approach ensures sufficient exposure over multiple brood cycles and improves overall efficacy.

<u>Situations where the objective is maintenance of low varroa load:</u>
When the objective is to maintain low varroa levels, a single application of VarroxSan is sufficient, even during periods of high honey flow. Increased hygienic activity among the bees might lead to faster strip removal, but this removal promotes the distribution of oxalic acid throughout the hive, contributing to additional mite mortality.

<u>Important caution:</u>
If VarroxSan is applied during a period of high activity and the strips are removed after just a few days, there is a risk of lower than expected efficacy. In this case, a follow up application is required.

9. Q: I have heard that VarroxSan should only be used to keep mite levels down, not to treat with high mite counts, is that true?
A: Multiple studies have shown that VarroxSan is highly efficacious in reducing high mite counts and can be used as a 'traditional' treatment at times when varroa load is high.

10. Q: Can I feed my colonies whilst using VarroxSan?
A: Yes. Trials suggest that feeding with sugar (fondant) or protein patty increases their cleaning activities, improving contact with the strips and distribution of the active ingredient.
Using a liquid feed will have a similar benefit because the colony becomes more active and hygienic behavior is encouraged, increasing the spread of oxalic acid throughout the hive.

11. Q: Brood under the strips has been removed. What is happening and what should I do?
A: Due to the number of strips used and their flexibility, bees may remove the eggs or brood in direct contact with the strips. This is normal hygienic behavior and is observed with most varroa treatments based on strips.

It is recommended to ensure that the strips are placed correctly and well folded to ensure the best vertical position.

12. Q: The cluster has moved and the strips are not in contact with the bees?
A: Due to the type of strip, some bees tend to move the nest away from the strips. If this happens we recommend to move the strips and place them in middle of the cluster. It is recommended to check the position of the strips 2 weeks after the initial application. At the same time, it is important to observe the hive before placing the strips, to analyze the possible movement of the cluster, given the application date, so if the cluster contracts or expands, it will always be in contact with the strips.

13. Q: The strips have disappeared before the end of treatment. What is happening and what should I do?
A: Sometimes, due to the hygienic behavior of some bees or the time of the year, the strips are removed faster. This is normal, but VarroxSan was developed in a strong fiber strip to slow down this process even in colonies with higher hygienic behavior.

In cases where strips have disappeared, it is important to check varroa load to be sure that the product has had the desired effect or if a follow up treatment is needed.

A potential risk scenario exists only if VarroxSan is applied during high honey flow and the strips are removed after just a few days. This situation is uncommon but should be avoided, as shortened exposure may reduce treatment effectiveness.

14. Q: It's very hot where my hives are but the colonies need treating; is it safe to use VarroxSan in these conditions?
A: VarroxSan has no temperature restrictions for use. In winter or spring VarroxSan can be used provided the daily temperature is high enough to ensure there is internal bee activity. During summer there are no upper temperature limits.

15. Q: VarroxSan leaves no residue and most of the strips were already removed by the bees, what do I need to do with the remaining strips?
A: It is important to understand that to avoid development of resistance, after the treatment is over, the strips or any partially remaining strips must be removed. Follow the local guidelines of disposal facility or pesticide disposal program (often such programs are run by State or local governments or by industry).

16. Q: I want to treat nucleus colonies with VarroxSan. What dose should I use?
A: To treat nuclei or small/weak colonies follow the instructions in question 2. It is always recommended in case of weak hives to apply 1 strip and 2 weeks later a second strip.

When treating nuclei, keep in mind that they will be expanding, so a second application may be necessary.

17. Q: I used VarroxSan in the spring and my colony seems very small, why?
A: It could be that the queen stopped egg laying for a short time, or that some brood has been removed under the strips. This doesn't often happen but, if it does, it is a temporary effect only.

18. Q: What mite control level will I get by treating with VarroxSan?
A: VarroxSan often gives results as good as those obtained previously with "chemical" treatments somewhere between 92-98% varroa control. The average we have recorded is 96%. VarroxSan is an ideal rotation treatment for use in Integrated Pest Management.

19. Q: Are varroa mites resistant to Oxalic acid?
A: No. Pyrethroids, amidines (such as amitraz) and other "traditional" pesticides kill their targets by acting on specific nervous channels in the mite or insect and it is relatively simple for the mite or insect to change its physiology slightly (over several years) so that it is no longer affected by the nerve agent. Oxalic acid acts as a poison through direct contact. Once in contact with the mites, the acidity of Oxalic acid appears to be responsible for mite mortality.

Vita is monitoring mite populations and we have found no oxalic acid resistance yet. To reduce the risk of oxalic acid resistance arising, it is advisable to alternate the type of treatment used, season by season. Thymol-based treatments, such as Apiguard, are an ideal rotational partner for VarroxSan. It is also essential to remove VarroxSan strips at the end of the treatment period.

20. Q: Can I use VarroxSan with open mesh floors?
A: Yes. In winter or spring we advise beekeepers to close up open mesh floors or to insert the varroa-collecting tray during the VarroxSan treatment and open them again afterwards, but this is a matter of choice.

21. Q: Why is VarroxSan a strip? Can't I just use Oxalic acid?
A: Oxalic acid is an effective pesticide but when applied as liquid or vapor it can be difficult and hazardous to use. Furthermore, to achieve a good mite control level it must be used without brood, otherwise up to 4 follow up treatments are necessary (Rademacher and Harz 2006). In fact, the approved label for trickling or fumigating is a mono-dose without brood.

VarroxSan is an oxalic acid solution in slow-release strips, which allows beekeepers treat a colony for 6 to 8 weeks with a single application, covering 3 cycles of varroa, which ensures a high level of efficacy. This is why VarroxSan was developed in slow-release strips.

22. Q: How do I store VarroxSan?
A: VarroxSan should be kept out of direct sun and heat and ideally stored at temperatures lower than 30ºC (86ºF). Therefore, do not keep VarroxSan in the back of a beekeeping car or truck in hot conditions for any longer than is necessary. Keep the product below 30ºC (86°F) in transport where possible and in storage.

23. Q: Where can I find out more information?
A: For any more information about VarroxSan, please see www.vitabeehealth.com. You can also get in touch with your local distributor – their contact details are listed on the website.