Bicarbonate Recommendations for Apple Scab in Quebec

100% bicarbonate can be used alone, but this approach is riskier than mixing equal parts of bicarbonate + sulfur. The mixture of bicarbonate and sulfur (Kumulus, Microthiol, wettable powder) is very often more effective than bicarbonate alone and allows more leeway when treating. Bicarbonate “alone” is rarely recommended in Europe. No other mixing is recommended due to the high pH of the bicarbonate.

100% bicarbonate is registered at 4 kg / ha. IRDA tests have shown that lower dose treatments can lead to an increase in the number of scab spots. Lower rate treatments will be effective on very small trees, but the registered rate is really at the lower limit of effectiveness for large trees and leaves no room for maneuver. We strongly recommend not to adjust this dose downwards on semi-dwarf or standard trees. No test was performed by varying the sulfur dose. The standard recommendation is therefore 4 kg / ha of bicarbonate + 4 kg of sulfur.

Bicarbonate is a **post-infection** (kickback) material. Bicarbonate + sulfur should be applied at the end of rain, in a window until 450 degree hours base 32 (F) after the **onset of the infection period** (about a day if the average temp is 50 degrees; 12 hrs if the average temp is 68). It is ok to apply in a very light rain.

Bicarbonate applied alone or with sulfur is effective in killing spores that have already germinated up to around 250 DH (Celsius; equal to 450 DH Fahrenheit) after the onset of infection. Sulfur will kill spores that have not germinated yet. The baking soda + sulfur mixture should be applied in this window for maximum effectiveness but will still be partially effective up to DH 300-400 after the onset of infection.

The 100% bicarbonate used ONLY has no "stickiness", it quickly disappears as soon as it rains again. Since nighttime spore ejections are marginal, baking soda is usually not applied more than once per day.

From an article:

With the Pest Management Regulatory Agency (PMRA) recently withdrawing the registration of some fungicides (Polyram) and changing the use of a few others (captan), apple growers will have to change their habits. Potassium bicarbonate could be an interesting solution. In addition to being very effective against scab, it is minimally toxic to health and the environment, and it is also inexpensive. However, to ensure its full effectiveness, it is necessary to rethink the control strategy used against scab and adapt its methods. Here are some tips on this.

Potassium bicarbonate is used successfully by many apple growers in organic management and integrated fruit production, especially those participating in the showcase orchard project. Some apple growers have replaced up to eight conventional fungicide treatments with potassium bicarbonate in lower risk plots, without negative impacts on the percentage of crop damage.

To increase efficiency, it is recommended to combine baking soda with an equal proportion of 4 kg of sulfur per hectare. Even with the sulfur-bicarbonate combination, the cost of treatment is still very reasonable at less than $ 25 per hectare.

First of all, you should know that, unlike the usual fungicides, there is no need to apply it as a protection before the rain. Instead, wait until the **infection is confirmed** and apply it during the scab spore germination period when they are present on apple leaves. The RIMpro model, available free online, is

particularly useful in determining the right time for treatment. The length of the optimal period for treatment varies depending on the temperature: the hotter it is, the faster it is necessary to act. This is why there is talk of a period of 250 degree-hours to intervene (i.e. 250 divided by the temperature in degrees Celsius). For example, if it's 10 ◦C, we have 25 hours to apply the baking soda, but if it is 20 ◦C, we only have 12 hours 30 minutes. After this period, the treatment gradually loses its effectiveness until 400 degree-hours after the onset of infection.

Thus, treatment can be started on varieties most susceptible to scab or in sections of orchards where the disease was more severe the previous year. The bicarbonate treatment can be applied even if it is raining, as long as it is not too intense (maximum of 3 mm per hour). It is even recommended to apply it to wet foliage since this results in a better distribution of the product on the leaves. When the rainfall intensifies, treatment can be stopped and resumed when the intensity of the precipitation decreases.

If you do not have access to the RIMpro model, you can rely on the time of the onset of rain. Scab infection is generally considered to occur when the foliage remains wet for 140 degree-hours (or 14 hours at 10 ◦C). You can then begin the baking soda treatment from this point on and continue until approximately 300 degree-hours after the onset of rain.

If you are concerned that you will not be able to apply the product to the entire orchard within the optimum 250 degree-hour period, you can limit its use to certain plots, while you gradually become familiar with the product and to master its use. In addition, when the risks of infection are very high, that is to say that a maximum of scab spores are mature, it is preferable to opt for a “belt and suspenders” type strategy, which consists of to use a fungicide for protection before the rain (sulfur or other conventional fungicide) and to intervene by means of bicarbonate during the period of spore germination (period of 250 degree-hours). However, apart from sulfur, which increases the effectiveness of bicarbonate, it should not be mixed with other treatments as this may reduce its effectiveness.

This information has been summarized by Brian Caldwell, primarily from forum posts contributed by Peter Drevniok and his own personal experience. Brian also had a good back and forth with Vincent Philion, the Quebec fruit disease guy, in confirming certain details.