Ask Proctor

The University of Vermont
Proctor Maple Research Center

Filtering syrup in small batches is a huge pain. Any advice on how to make it easier?

You are not alone. Filtering small batches of syrup is often mentioned as one of the most frustrating aspects of sugaring. While not all syrup is created equal when it comes to filtering, it is important to recognize that not all filters available for syrup are created equal, either. Most small producers rely on cone or flat filters made of fabric (wool or synthetic). Producers whose daily production outgrows fabric filters overwhelmingly use pressure filters, primarily filter presses. Pressure filters use diatomaceous earth (or DE, also known as filter-aid) and are able to consistently achieve the greatest level of filtering. The cost of filter presses is often the largest barrier to adopting this technology. Very good results can be reached with fabric filters most of the time. Gravity filters, as they are also known, rely on the weight of syrup to drive the filtering process. While it's difficult to say with any precision how much syrup can be filtered in any given batch, producers should not expect to get much more than three gallons of syrup through a gravity filter before needing to change it.

Before talking about the filters themselves it's important to talk about what is being removed in the process. Filtering removes the suspended solids (commonly called sugar sand) that form during the boiling of sap into syrup. Sugar sand is a broad term used that is used to describe anything suspended in syrup and needs to be filtered out. Sugar sand is made of calcium salts of malic acid although there are many other minerals present in lower concentrations. The volume of sugar sand is variable from location to location as well as within a season. Sugar sand forms when the concentration of minerals reaches a saturation point in the syrup and precipitates out of solution.

Cone filters focus most of the syrup weight on the bottom of the cone. This results in syrup filtering rapidly at first and then slowing down as the weight of syrup left in the cone decreases. Cone filters have less total surface area than flat filters but enjoy greater head pressure than flat filters. It is generally producer preference as to which filter type is used but cone filters are probably the best solution for the smallest batches.

Gravity filter performance is impacted by several things: sugar sand form, syrup temperature and syrup density. Sugar sand can range from hard and gritty to a more soft or paste-type material. The type of sugar sand suspended in syrup has a direct impact on how well a filter will work. There are some days when the sugar sand particles are fairly large and uniform and filtering is easy. There are also days when the particles are so fine that they will not be removed by a gravity filter. When this happens the syrup will have a slight haze. It is possible that some of the sugar sand could settle to the bottom over time. However, it is more likely that the viscosity of the syrup will be

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high enough to keep that from happening. Typically the hardest syrup to filter is at the end of the season, when the sugar sand has taken on a soft, oily type consistency.

Syrup temperature is critically important to successful filtering. Syrup must be hot if it is to have a chance at moving through a cloth filter. For this reason, filtering syrup directly from the evaporator or some other heated container is very important. It also means that keeping syrup in the filter from cooling off rapidly is also important. Commercial or homemade filter tanks with covers can help to retain syrup heat and extend the time needed before cleaning a given filter. Anything that can be done to keep syrup from cooling rapidly will help.

Syrup that is above legal density will often have a tough time passing through the filter. Syrup that is below legal density may pass through the filter more easily, but will need to be boiled again afterwards and this will likely cause more sugar sand to form. The best practice is to double-check that syrup density is correct directly before filtering.

Producers can maximize the amount of syrup that will go through a given filter by using pre-filter material. This synthetic material is available as flat sheets or cones and is designed to catch large particles and debris that would otherwise clog the main filter prematurely. Many producers will use a stack of multiple pre-filters (3-4) and remove them individually as they become clogged with sugar sand. The syrup that remains in the filter can be then poured into the next pre-filter. It is important to moisten the pre-filters

before use.

Properly cleaning and caring for cloth filters will help prolong filter life and produce the highest filtering quality possible. Filters must be cleaned when hot syrup refuses to pass through. Only clean filters by rinsing with clean hot water. Avoid the temptation to twist or wring out the filters to dry since this can cause the fabric fibers to break and create an easy path for unfiltered syrup to travel. Pre-filters can also be cleaned and used many times. It's best to use the clarity of filtered syrup to judge when the time has come to replace a given filter.

Making sure syrup density is correct and that syrup is kept warm as it filters will produce the best results. Don't expect gravity filters to last forever. Eventually they will wear out and need replacement. Producers should also be careful about reheating syrup after its been filtered. This can lead to the formation of additional sugar sand and another round of filtering being needed. For pictures and more information about filtering check out the narrated slideshow "Fundamentals of filtering maple syrup" at the UVM Extension website www.uvm.edu/extension/maple/.

Ask Proctor is a feature in the Maple Syrup Digest, where researchers from the University of Vermont's Proctor Maple Research Center will answer questions about sugaring. If you have questions you'd like to submit for consideration for use in this column, please send them to editor@maplesyrupdigest.org.

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