

## **Kemptville Campus Agro-Forestry Centre: A Modern Approach to an Old Tradition**

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Each morning as I drive up Highway 416, I see the remains of an old sugar shack just south of the Ventnor Road overpass. Although it has obviously seen better days, on the cold winter mornings of January and February, it serves as a gentle reminder that soon the sap will be running in sugar bushes throughout the area and spring will be just around the corner.

Maple syrup is a Canadian tradition which we celebrate with festivals and pancake breakfasts. Even Shrove Tuesday, the day before the start of Lent, is better known to many as “Pancake Day”.

We have all seen old photos of large kettles of maple sap boiling over an open fire. Most people understand the traditional process and are well aware of the fact that it takes about 40 litres of sap to obtain one litre of syrup. In the “old days” before we went metric, it was 40 gallons of sap to get one gallon of syrup. Regardless of how you measure it, an awful lot of water has to be removed from the original sap in the maple syrup process. With today’s high energy costs, there has been a trend to embrace modern technology to reduce energy consumption, and maple syrup making is no exception.

The Agro-Forestry Centre on Bedell Road at the south end of the Kemptville Campus houses a state-of-the-art maple syrup process. The process is not operated as a commercial venture. Its purpose is for education and research to support Ontario’s maple syrup industry. Inside the rather modern “sugar shack”, there are none of the trappings of the old-style building that I pass on my way to work. The entire process from the sap leaving the trees to the finished product is efficient and highly sophisticated. This type of process is becoming more and more common throughout the area as small-scale producers adopt the technology.

Sap is drawn from the trees through a network of plastic vacuum tubes. Smaller diameter tubes from individual trees feed into larger and larger tubes as the sap makes its way to the collection tank in the building. At this point, its sugar content is around 2% by weight and there is only a faint trace of sweetness when you taste it. Considering that the desired endpoint sugar concentration is about 66% or more, there is a lot of water to be removed. If you have 1,000 litres of sap, removing half the water (about 500 litres) will only raise the sugar concentration to 4%. Instead of evaporating the water over an open fire, the sap is passed through a reverse osmosis (R.O.) membrane similar to that used to purify drinking water in homes or to desalinate seawater. A coarse filter ahead of the R.O. unit removes any particles that may be present in the sap, which in turn protects the delicate R.O. membrane from damage

and clogging. The amazing thing about reverse osmosis membranes is that they separate particles at the molecular level. The small water molecules are pushed through the membrane by a high pressure pump. Meanwhile, the sugar molecules which are too large to pass through the small pores of the membrane are concentrated in the solution that is left behind. Using the R.O. unit, the sap can be concentrated to about 10% sugar and almost 80% of the necessary water removal has been accomplished. The concentrated sap is collected in a stainless steel tank before being sent to the boiler where the remainder of the water will be removed by heating. This heating is also important in promoting reactions which create the rich flavours and colour we have come to associate with maple syrup.

Upon leaving the boiler, the syrup is filtered again and then sent to a filling tank while it is still hot. The hot syrup is filled into glass bottles which are then capped and set out to cool. After cooling, each bottle is labelled with a sticker identifying the production date etc. In this way, any bottle can be traced back to when it was produced, the production conditions, sap collection information, and even weather conditions at the time. Industry colour standards are used to grade the syrup. Even though lighter syrups are considered most desirable, I personally prefer the more fully developed flavour of the darker, amber syrups. If it is not bottled, the syrup is placed in large stainless steel drums.

During the maple syrup season, research studies pertaining to the process are conducted. Energy utilization is monitored in an effort to minimize consumption and maximize production. Even alternate fuels such as bio-diesel fuel are being investigated. Membrane technology studies have been completed and results have been communicated to the industry.

As stated above, one of the principal objectives of the Agro-Forestry Centre is to serve as an educational facility. Teachers who are interested in arranging tours for their classes can contact the Kemptville Campus Conference and Catering Services at 613-258-8336 ext. 61234 for details. They would be most happy to hear from you.



**A student places labels on a bottle of maple syrup during a visit to the Agro-Forestry Centre**

