PROCTOR MAPLE RESEARCH CENTER UPDATE: INVESTIGATING THE EFFECTS OF SAP PROCESSING EQUIPMENT AND TECHNIQUES ON MAPLE SYRUP CHEMISTRY & QUALITY

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Maple syrup is produced and marketed as a pure and wholesome food product, free from contamination, and produced to the highest available standards. Although the basic process of evaporation to remove excess water has remained the same, the equipment and techniques used to transform maple sap into syrup have changed greatly over the past several decades, and continues to evolve as newer technology is introduced into the maple industry. While the focus of the maple industry has always been on producing a great product, other objectives sometimes overlap with, or may even conflict with the primary goals of making pure, great tasting maple syrup. For example, many of the evaporator advances were a result of high fuel costs. Also, the switch from soldered to welded pans, and accompanying manufacturing techniques, were made to limit lead and other contaminant exposure. More recently, air injection units were developed and are sold as a means to produce lighter syrup. It is well established that evaporation involves tremendous chemical and physical changes in the maple syrup. Further, the focus on production of very light colored and flavored syrup seems to have led to more (or at least more noticeable) off-flavors. Although the objectives of changes in processing in all cases listed above were quite reasonable, and in some cases very necessary, a comprehensive examination of the effect of new sap processing equipment and techniques on the chemistry and quality (especially flavor) has not been attempted for at least the past half-century.

A new research facility designed and dedicated to the study of the effects of sap processing equipment and techniques on the chemistry and quality of maple syrup is being constructed at the UVM Proctor Maple Research Center. This facility will allow researchers to evaluate the differences in maple syrup due to changes in sap processing equipment, including reverse osmosis, evaporators, and other evaporation equipment (steam-away, air injection units, etc.). The new facility is designed to allow up to four evaporators to be run simultaneously from a common source of sap. In this way, both major and minor changes in equipment and production techniques can be compared for the effect they have on maple syrup. There are no other comparable facilities existing for maple research in the U.S. or Canada.

Funds to conduct this research in this facility have been secured through grants from the U.S.D.A., with preliminary lab-based experiments underway. Research in the first two years of operation will focus primarily on the impact of air-injection units on syrup chemistry and quality. We have recently acquired identical two 3' x 10' CDL evaporators, with one equipped with air injection for experimentation. An advisory committee composed of a people representing a cross-section of the maple industry will help to decide on research projects to pursue in the future.

Funds for the actual construction of the building are derived from the proceeds of the UVM PMRC Endowment Fund, and from donations from a number of individuals, county, State, and Provincial maple associations, maple equipment companies, and from the North American Maple Syrup Council Grant Fund. All donors to the project will be acknowledged on a plaque mounted inside the new research facility. We still have some funds to raise to finish construction, so contact us if you are interested in making a donation.

Construction of the building started in mid-December 2005, with an anticipated completion date of February 1, 2006. The building itself is 28' x 44', with a small heated office area and space for an R/O. An elevated mezzanine will

Pictured above are photos of construction progress at the new research facility located at the UVM Proctor Maple Research Center in Underhill, Vermont.

provide storage for up to 5,000 gallons, enough to feed four evaporators simultaneously. The interior of the building will be lined with metal paneling for ease in keeping the area clean to avoid contamination of the research area. Glass piping will be used to feed the evaporators. A custom-designed powered ventilation system will exhaust steam (no cupola!). In addition, a 2 kW solar system, funded by a grant from the State and funds from the UVM College of Agriculture & Life Sciences, will be used to generate electricity that will be fed back into the power grid to reduce building operating costs. We also anticipate experimenting with using biodisel (B20) to fuel the evaporator. You can keep track of the progress of construction by visiting http://www.uvm.edu/~pmrc and clicking on "The Maple Production Research Facility Construction".

Our sincere thanks to all of the individuals, associations and companies who have donated funds for this project. We look forward to conducting and reporting on a number of interesting and exciting experiments in the facility over the next several years.