

What you  
should know  
about

# Maple syrup



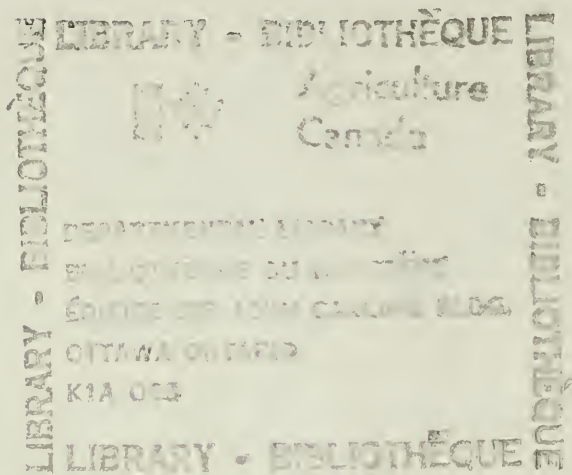
630.4

0212 P-1711

**PUBLICATION 1711/E**, available from  
Information Services, Agriculture Canada, Ottawa K1A 0C7

© Minister of Supply and Services Canada 1980  
Cat. No. A53-1711/1981E ISBN: 0-662-11372-1  
Printed 1981 15M-3:81

Aussi disponible en français



# What you should know about maple syrup

Maple syrup is a distinctly Canadian product. About 70% of the world's production of this delicious natural commodity comes from Canada. Quebec accounts for 90% of Canada's production, with New Brunswick, Nova Scotia and Ontario producing the remainder. The industry is fairly small in the United States, where sugar maples are found only in a few northern states such as Maine and Vermont.

## HISTORY

Long before white settlers came to North America, Indians were making a dark sugar from the sap of maple trees. Their methods were primitive. In the spring, a diagonal incision was made in the bark and a chip of wood was inserted at the lower end of the cut to serve as a spout. The sap was collected in birch bark containers and then poured into a hollowed-out log. Hot rocks were added to start the evaporation process. Time did the rest; through natural evaporation, the sap slowly became syrup and then sugar.

The early settlers, learning from the Indians, turned in increasing numbers to the production of maple syrup as a means of supplementing their diet. They used wooden spiles (spouts) and pails to collect the sap, which was boiled in the open in iron cauldrons.

The art of making maple syrup has been handed down from generation to generation. Over the years, improvements have been made to the methods of production and the equipment used. Today, the production of maple syrup is a flourishing industry — maple farming — and a far cry from the cottage industry that it was originally.



## VARIETIES OF MAPLE

There are several varieties of maple trees in North America, eastern Asia and China, but none matches the sugar maple (*Acer saccharum*) in the amount and quality of sap yielded. The sugar maple, which may grow as high as 30 m, is found only in the north eastern region of Canada and the United States. Its wood is very hard and its bark is gray and rough.

Producers also tap black, red and silver maples, but the sap from these varieties is generally lower in quantity and in sugar content. Additional boiling is required, resulting in a darker and more-opaque syrup and in greater fuel consumption.

## SAP FORMATION

Through the phenomenon of photosynthesis, carbohydrates are produced in the leaves and used by the trees for food. In the maple, some of this compound is retained in the tree to assist in the creation of new leaves and cells. When this happens, the tree is said to be 'laden'. Spring thaws gradually change the starch to invert sugar. Once the sugary sap begins to flow in the sapwood of the tree, it is time for tapping.

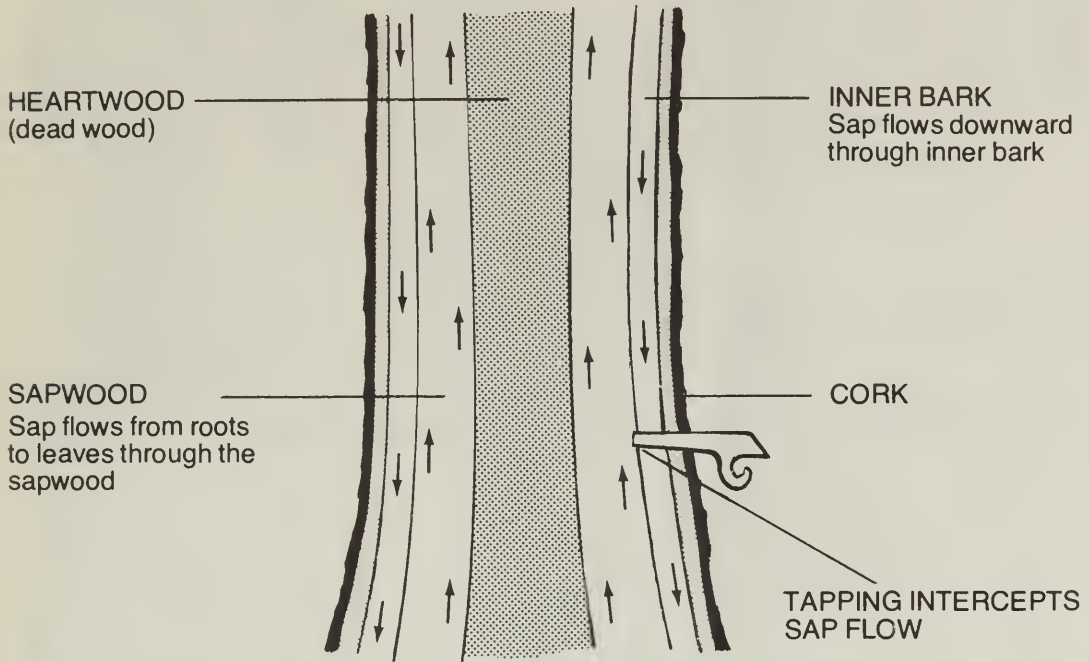


Fig. 2 Sap flow in a maple tree.

The rate of flow and the sugar content of the sap are affected by a number of factors other than the variety of the tree. They are:

## 1. Weather conditions

- A hot and sunny summer with good rainfall promotes the formation of plentiful reserves of sap.
- A winter in which the ground is not frozen too deeply and is gradually warmed with the approach of spring contributes to a good flow of sap.
- Weather conditions in the spring have an even greater impact on sap production. Nights with temperatures at or below the freezing point must be followed by days with thawing temperatures (up to 8°C) so that sufficient pressure develops to make the sap flow.

## 2. Condition of trees

- Healthy trees with many branches and dense foliage yield more sap.

### 3. Tree height and trunk diameter

— A maple grove in which the trees are well spaced will produce very large maples. The sap from these trees is generally more plentiful and sweeter, especially when they have protection from the wind and good exposure to the sun.

### 4. Proper tapping

— The spile, or spout, must be sloped downward slightly from the trunk and must fit the hole snugly to prevent loss of sap.



Fig. 3 Several taps can be made in a large maple



Fig. 4 Daily collection will ensure freshness of sap.

## TAPPING

The trees should be tapped when the snow begins to melt in the spring. Depending on the year and the region, this may vary from mid-March to early April.

Tapping should be done without delay, to obtain the maximum yield from each tree. For this operation, use a brace and bit to bore holes about 1 m above the ground in the bark of the trees. The holes should be about 4 cm deep and 11 mm in diameter. Large maples may be tapped in several places, but it is recommended that trees with a trunk diameter of less than 25 cm not be tapped.

Equipment must be clean to ensure that the sap remains clear, and pails should be covered to protect the sap from dirt.

## COLLECTING

The traditional method of collecting by hand is a task that requires a great deal of time and labor. Nevertheless, because sap deteriorates rapidly in the pails and may sour if boiling is delayed, producers must make an effort to collect the sap once a day, if possible.

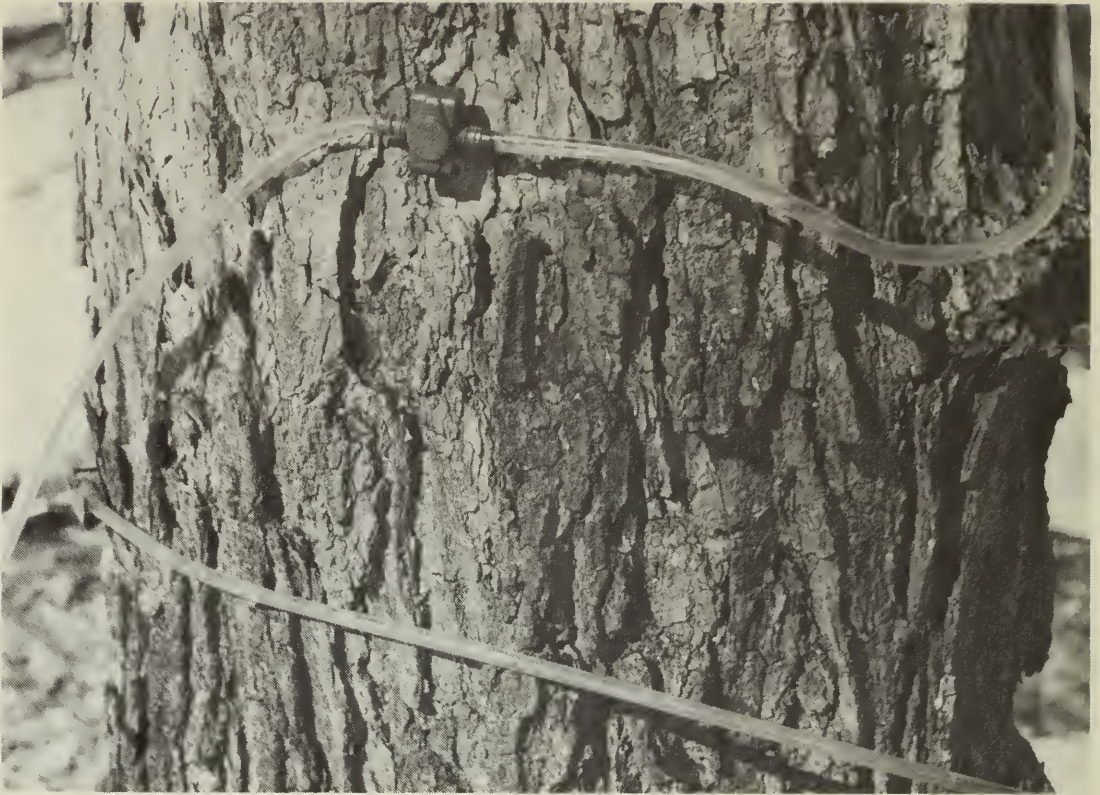


Fig. 5 Plastic pipes, connected to the trees, carry sap to sugar house. This method offers time- and labor-saving advantages over the old method of collecting sap in pails.

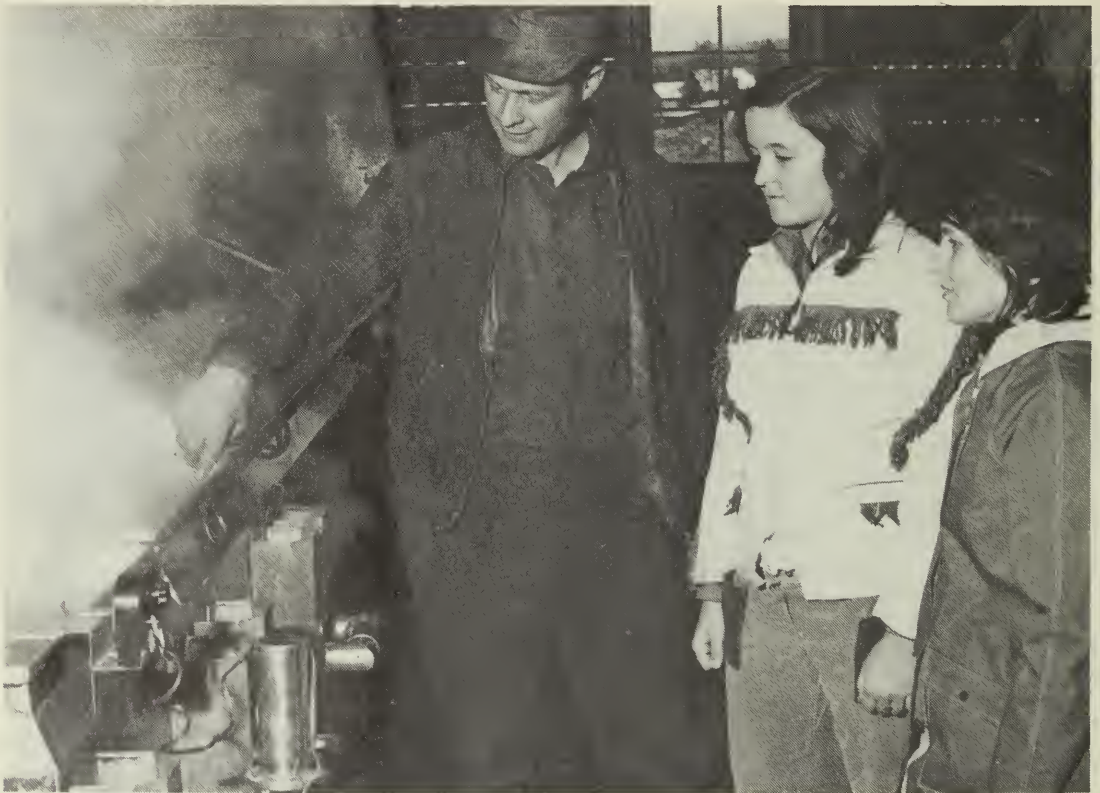


Fig. 6 Sap is transformed into syrup by evaporation, a process requiring close attention — and patience.



Maple farming, like other sectors of the economy, has benefited from modern technology. In the past few years, increasing use has been made of a sap-collecting system in which plastic spiles, inserted in the trees, are connected to a network of plastic pipes. The pipes are laid on a slope, and the sap flows by gravity to the sugar house. This system ensures that the sap is always fresh and clear when it reaches the reservoir. Although this system represents a substantial investment, it is more hygienic and requires about 30% less labor than the traditional method of collecting the sap in pails.

Vacuum pumps can be used to draw the sap through the pipes if the gravity-flow system is not feasible. Because they exert additional pressure on the sapwood of the trees, vacuum pumps increase the sap yield without affecting tree growth. Moreover, this technique makes it possible to start tapping a little earlier in the season, thus increasing the profitability of the maple grove and stabilizing production.

## EVAPORATION

Although improved evaporation equipment has appeared over the years, the basic principle behind the procedure remains unchanged. The amateur who taps a few maples in his backyard can, with a minimum of equipment and in his own kitchen, process the sap as successfully as the experienced producer, provided evaporation procedures are followed carefully. Sap is transformed into syrup through evaporation, which involves bringing the liquid to a boil rapidly and keeping the temperature steady as the sap gradually acquires the consistency of syrup. Too-slow or too-fast evaporation will affect the color, flavor and texture of the syrup.

Where the atmospheric pressure is normal (sea level), the correct temperature for the evaporation process is 104°C. However, since the boiling point varies according to altitude, a thermometer must be used to adjust the cooking temperature. For example, in a region located above sea level and where the boiling point of water is 98°C (or 2°C below normal), the cooking temperature of the sap must also be reduced by 2° (to 102°C).

Boiling leads to the formation of foam on the surface of the liquid, an indication that the syrup is nearly ready. The foam must be removed regularly with a ladle, to prevent the accumulation of any impurities. A densimeter can also be used to determine when the liquid has reached the desired consistency and cooking should be stopped. Depending on the sugar content, 30 to 45 L of sap are needed to make 1 L of syrup.

Until about 15 years ago, wood was the only fuel used in the sugar house to heat the evaporator, but many producers are now using oil or natural gas to save time.

## FILTERING

Maple syrup must be filtered to remove any impurities that could affect its appearance and flavor. A soft, clean cloth is used for this purpose. After filtering, the syrup is bottled or put in galvanized metal cans while it is still very hot (87°C or hotter). The heat sterilizes the containers and prevents the formation of mold.

## OTHER MAPLE PRODUCTS

Several products can be made from maple syrup.

When the syrup is boiled for a longer period, it becomes slightly thicker and forms maple toffee, which is delicious when served on snow. In addition, certain procedures can be used at the end of the normal cooking period to convert the syrup into maple butter or into soft or hard sugar. Depending on the texture desired, the temperature of the liquid is raised or lowered at various rates, or the syrup is churned at varying speeds. A high-quality syrup that has been well filtered should be used in making any of these products. Preferably, the syrup should also be slightly 'aged' or have been made in the previous year.



Fig. 7 Biscuits and other treats can be made from maple products.

Of the various maple products, it is the syrup itself that is the first choice of consumers since it can be served on pancakes, waffles or french toast, or included in recipes for pies, cakes and biscuits, etc.

## Soft toffee

Coat the inside of the pot with a thin layer of cream to prevent foaming. Pour in maple syrup that has been filtered and cook without stirring until a temperature of 114° or 115°C (depending on the consistency desired) is reached, then remove from heat and allow to settle. Do not cover pot during cooking. After it has settled, pour the toffee into containers, using a single movement to prevent crystals from forming. Seal containers and cool rapidly by placing them in ice-cold water. Toffee to be served on snow must have a thinner consistency. For this, remove syrup from the heat when its temperature has reached 113.8°C.

## Maple butter

Coat the inside of a pot with a thin layer of cream. Pour in maple syrup and cook until the syrup reaches a temperature of 111° or 111.5°C, depending on the consistency desired. Remove from heat and cool to 10°C by placing the pot in ice-cold water or in the freezer. When it has cooled, whip the syrup vigorously until it becomes creamy. For faster cooling and to reduce crystallization, it is recommended that maple sugar be made in small quantities.

## Soft sugar

Coat the inside of a pot with a thin layer of cream and pour in maple syrup that has been filtered. Cook without stirring until temperature reaches 114.5°C, then remove from heat and cool to 38°C by placing the pot in ice-cold water. (Cooling improves texture by preventing the formation of large crystals.) When it has cooled, beat the syrup vigorously with wooden spoon until it is creamy, then pour into molds. Allow to set and remove from molds. Wrap when surfaces are dry.

## Hard sugar

Proceed as for soft sugar, but cook at a slightly higher temperature (119°C). Cool rapidly and beat gently until a dough-like consistency is reached. Shape into loaves, using molds. Allow to harden and dry sufficiently before wrapping.

## GRADING AND MARKETING

Maple syrup destined for interprovincial or export markets is graded into three categories according to color, clarity and flavor. Since the syrup must contain at least 65% solid matter, the water content cannot exceed 35%.

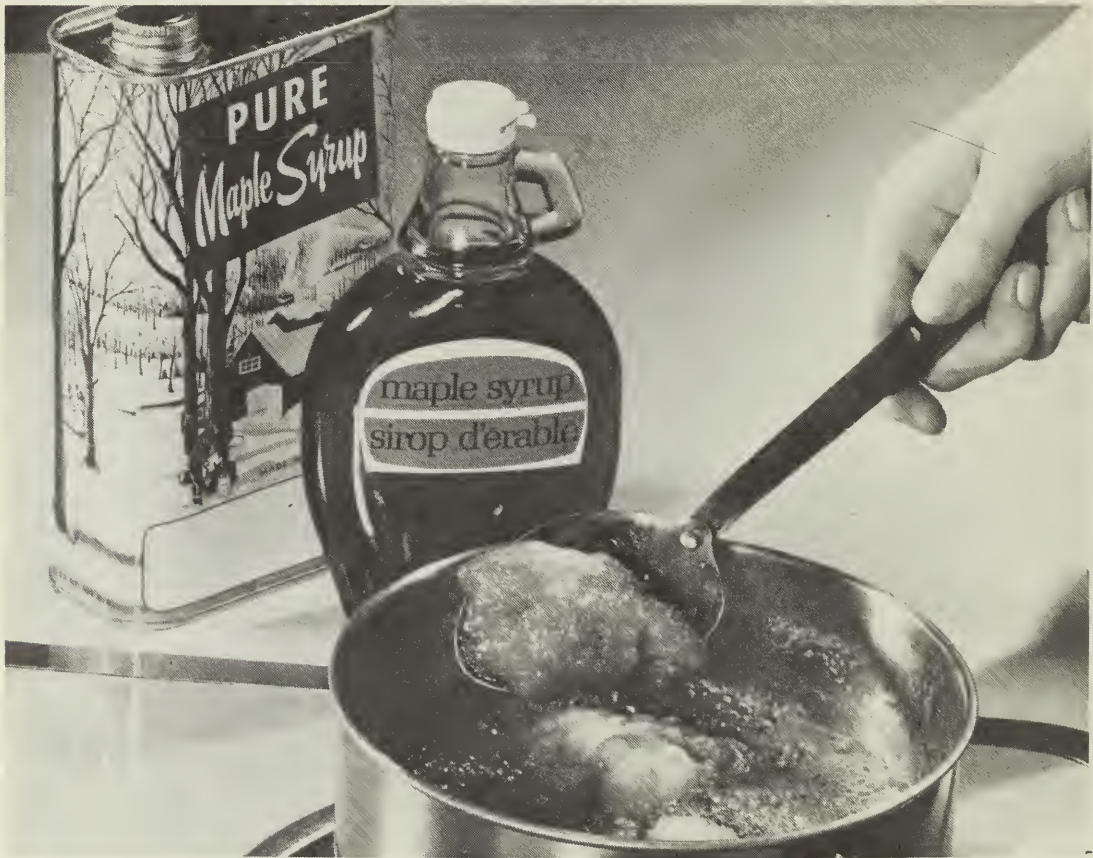


Fig. 8 Maple syrup containers come in many shapes and sizes, two of which are shown here.

Under federal regulations, only products that are 100% pure may be marked with the word 'maple'. The addition of coloring or other substances, regardless of quantity, precludes use of this designation. In such cases, the ingredients added must be listed clearly on the label.

In the area of retail sales, each province is empowered to impose further regulations on the grading, packaging and labeling of syrup and other maple products. Therefore, consumers will find a wide range of maple products on grocery store shelves, available in containers and packages of all shapes and sizes.

## SYMBOL OF QUALITY

To stimulate the supply of, and demand for, first-grade products, the International Maple Syrup Institute has designed a distinctive symbol of excellence. Its design depicts half a maple leaf, a pail, a spout and a droplet of sap. The symbol may appear only on products that meet the high standards set by the Institute, which represents more than 15 000 maple farmers in Canada and the United States.



Fig. 9 This distinctive symbol appears on containers of pure maple syrup, to indicate the high quality of the content.

Maple farming has grown considerably in recent years. Although the days are gone when a child could be seen drinking maple sap from a pail, or a horse seen pulling a sled carrying a keg full of sap, the finished product remains a unique treat. Current research and unexplored potential hold promise of a prosperous future for this industry.

LIBRARY / BIBLIOTHEQUE



AGRICULTURE CANADA OTTAWA K1A 0C5

3 9073 00021226 8

DUE DATE

OCT - 4	1989		
DEC 16	1991		
	201-6503		Printed in USA

