

FTR-019

Pancake and Table Syrup

With Aqualon™ cellulose gum

Consumer preference for thick, rich syrups and for low-calorie syrups has made it necessary for formulators to modify rheology while often reducing sugar solids levels at the same time. In such systems, cellulose gum is added to maintain the desired viscosity and to improve other finished product properties:

- Smooth flow
- Minimum penetration into food
- Ease of pouring
- Increased volume (yield)

Aqualon cellulose gum is well established for use in food products as a thickener, stabilizer, binder, and flow-control agent. This document highlights the results of laboratory studies to determine starting point levels for Aqualon 9M31F cellulose gum in full-sugar and low-sugar or reduced-calorie syrup formulations. The primary grades of cellulose gum for syrups are Aqualon 9M31F and 9M8F cellulose gum which have relatively high degrees of substitution (DS) produce smooth, non-thixotropic solutions. The three formulations made for this study are shown in Table 1.

Table 1. Test formulations made for this study

Formulation	Soluble solids, % ^(a)	Viscosity, mPa•s ^(b)	Cellulose gum, % ^(c)
Control (no CMC)	68.5	242	-
Syrup with increased yield and viscosity	63.1	300	0.300
Reduced-calorie syrup	35.0	290	0.875

^(a)Refers to sugar content.

^(b)All viscosities were measured at 77°F on a Brookfield LVT viscometer, No. 2 spindle, at 60 rpm.

^(c)Dry weight basis.

Formulations

The specific formulations with their mixing procedures are shown in Tables 2 through 4. The control formulation was developed by evaluating varying concentrations of sugar syrup to obtain a solids level and a viscosity similar to those of most maple syrups.

Table 2. Control syrup

Ingredients	Weight %
Corn syrup (42/43 DE)	99.550
Natural and artificial maple flavor**	0.272
Sodium benzoate (25% solution)	0.100
Caramel color (double-fold liquid)	0.078
	100.000

**Two different flavor compositions from the same supplier were used in all formulations

Procedure

1. Combine all ingredients.
2. Heat to 160°F (71°C)
3. Hot fill and cool to room temperature immediately

Table 3. Table syrup with increased yield and viscosity

Ingredients	Weight %
Water	26.310
Corn syrup (42/43 DE)	73.000
Aqualon™ 9M31F cellulose gum	0.300
Natural and artificial maple flavor	0.266
Caramel color (double-fold liquid)	0.074
Sodium benzoate	0.050
	100.000

Procedure

1. Dissolve the cellulose gum in the water.
2. Heat to 160°F (71°C)
3. Add the remaining ingredients.
4. Stir until evenly dispersed.
5. Hot fill and cool to room temperature immediately.

Table 4. Reduced-calorie syrup

Ingredients	Weight %
Water	58.720
High-fructose corn syrup (55 DE)	40.000
Aqualon 9M31F cellulose gum	0.875
Natural and artificial maple flavor	0.270
Caramel color (double-fold liquid)	0.075
Sodium benzoate	0.050
Artificial sweetener	0.010
	100.000

Procedure

1. Dissolve the cellulose gum in the water.
2. Add the corn syrup.
3. Heat to 160°F (71°C)
4. Add the remaining ingredients.
5. Stir until evenly dispersed.
6. Hot fill and cool to room temperature immediately.

Processing Table Syrups with Cellulose Gum

Aqualon 9M8F cellulose gum is also be used in syrup applications, especially in low sugar applications where a higher dose of cellulose gum is required. Aqualon 9M8F cellulose gum will give the smoothest flow with a higher dose. Care should be taken when processing low-calorie syrups with cellulose gum. These formulations have a low pH, 4.0–5.0, and exposure to elevated temperatures (122–167°F; 50–75°C) at this pH range should be minimized. Immediate cooling is recommended to minimize viscosity loss and maintain consistency in viscosity.