

Recommended Standards for Converting Maple Sap into Pure Syrup and Pure Maple Sugar

Indiana Maple Syrup Association
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Stage in Process	Hazard to Food Safety	Recommended Standards	Challenges to Meet those Standards
1. RAW SAP	<p>No microbiological hazard. Sap will be boiled for an extended time. All microorganisms will be destroyed</p> <p>Adulteration from residue from cleaning agents or contamination from contact with other foreign chemicals</p> <p>Adulteration from leachate from storage in containers fabricated with lead solder.</p>	<p>Collect sap in buckets made of galvanized metal or food grade plastic, plastic bags, or plastic tubing</p> <p>Use equipment made for transfer and storage of sap.</p> <p>Use storage containers or transfer equipment only for sap.</p> <p>Protect equipment from any contact with chemical adulterants during the off season.</p>	<p>Standards are easily met.</p> <p>Experience shows that even equipment fabricated with lead solder can be used to store sap and produce syrup of acceptable purity if sap is processed quickly and the syrup is filtered immediately.</p>
2. SAP BEING EVAPORATED	<p>No microbiological hazard. Sap is at sterile temperatures throughout the process.</p> <p>Harmful chemical adulterants must be avoided since all materials are concentrated at a ratio of about 40:1 during the course of converting sap into syrup.</p>	<p>Boil sap in equipment made for that purpose.</p> <p>Use only food grade anti-foaming agents.</p> <p>Keep area where sap is being boiled clear of all chemicals that could splash, spill or fall into the sap.</p> <p>Protect equipment from any contact with chemical adulterants during the off season.</p> <p>Rinse equipment with liberal amounts of clean water at the beginning of the season - especially so if any cleaning agents were used</p>	<p>Standards are easily met.</p> <p>Temperature of boiling sap is high enough to automatically prevent microbial contamination.</p> <p>Chemical contamination can be prevented with proper storage, operation and rinsing.</p>

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3. FINISHED, PURE MAPLE SYRUP	<p>No microbiological hazard. Syrup is hot and therefore sterile when it comes from the evaporator or finishing pan.</p> <p>Harmful chemical adulterants must be avoided.</p> <p>Niter remaining in syrup for extended periods (days) can permit any lead present to leach back into solution.</p>	<p>Concentrate syrup to a minimum concentration of 66 Brix (boiling temperature of 219F) Measure the concentration with an accurately calibrated hydrometer or thermometer.</p> <p>Filter syrup immediately as it comes from the evaporator or finishing pan.</p> <p>Use gravity filters or pressure filters specifically designed for filtering maple syrup.</p> <p>Keep area where syrup is being drawn off free of all chemicals that could splash, spill or fall into the syrup.</p> <p>All equipment and containers must be food grade.</p> <p>Protect equipment from any contact with chemical adulterants during the off season.</p> <p>Rinse equipment with liberal amounts of clean water at the beginning of the season - especially so if any cleaning agents were used</p>	<p>Standards are easily met.</p> <p>Temperature of finished syrup is high enough to automatically prevent microbial contamination.</p> <p>Equipment for measuring density and temperature is inexpensive and easily used</p> <p>Filtering is an integral part of the usual sugaring operation.</p> <p>Chemical contamination can be prevented with proper storage, operation and rinsing.</p>

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4. FILTERED PURE MAPLE SYRUP	<p>Potential for bacterial contamination is minimal because of the high osmotic concentration of finished syrup.</p> <p>Fungi can grow on the surface of the finished syrup. This could pose a problem for those highly sensitive to mold.</p> <p>Harmful chemical adulterants must be avoided.</p>	<p>Store filtered syrup in food grade containers.</p> <p>Containers must be clean and thoroughly rinsed so as to be free of any chemical residue (including cleaning agents) or microbial contamination.</p> <p>Keep area where syrup is being handled clear of all chemicals that could splash, spill or fall into the syrup.</p> <p>Protect filtered syrup from contamination by foreign material.</p> <p>Filtered syrup to be stored must be hot packed in containers with proper closures.</p>	<p>Standards are easily met.</p> <p>Chemical contamination can be prevented by using clean, food grade containers.</p> <p>Microbial contamination can be prevented by properly sealing and hot packing containers.</p> <p>Protection from foreign material can be accomplished with proper lighting equipment, suitable walls and ceiling, and approved floors.</p>

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5. SYRUP PACKED FOR WHOLESALE MARKET	<p>Potential for bacterial contamination is minimal because of the high osmotic concentration of finished syrup.</p> <p>Fungi can grow on the surface of the finished syrup. This could pose a problem for those highly sensitive to mold.</p> <p>Harmful chemical adulterants must be avoided.</p>	<p>Pack bulk syrup in food grade containers.</p> <p>Keep area where syrup is being handled clear of all chemicals that could splash, spill or fall into the syrup.</p> <p>Protect filtered syrup from contamination by foreign material.</p> <p>Containers must be clean and thoroughly rinsed so as to be free of any chemical residue (including cleaning agents) or microbial contamination.</p> <p>Bulk syrup must be properly hot packed (temperature of 180 F or higher with hot syrup in contact with all interior surfaces) in containers with proper closures.</p>	<p>Standards are easily met.</p> <p>Chemical contamination can be prevented by using clean, food grade containers.</p> <p>Microbial contamination can be prevented by properly sealing and hot packing containers.</p> <p>Contamination by food handlers is not a problem because the syrup is too hot for direct contact.</p> <p>Protection from foreign material can be accomplished with proper lighting equipment, suitable walls and ceiling, and approved floors.</p>
SYRUP PACKED FOR RETAIL MARKET	<p>Potential for bacterial contamination is minimal because of the high osmotic concentration of finished syrup.</p> <p>Fungi can grow on the surface of the finished syrup. This could pose a problem for those highly sensitive to mold.</p> <p>Harmful chemical adulterants must be avoided.</p>	<p>Pack retail syrup in food grade containers.</p> <p>Keep area where syrup is being handled clear of all chemicals that could splash, spill or fall into the syrup.</p> <p>Protect filtered syrup from contamination by foreign material.</p> <p>Containers must be clean and thoroughly rinsed so as to be free of any chemical residue (including cleaning agents) or microbial contamination.</p> <p>Bulk syrup must be properly hot packed (temperature of 180 F or higher with hot syrup in contact with all interior surfaces) in containers with proper closures.</p>	<p>Standards are easily met.</p> <p>Chemical contamination can be prevented by using clean, food grade containers.</p> <p>Microbial contamination can be prevented by properly sealing and hot packing containers.</p> <p>Contamination by food handlers is not a problem because the syrup is too hot for direct contact.</p> <p>Protection from foreign material can be accomplished with proper lighting equipment, suitable walls and ceiling, and approved floors.</p>

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MAPLE SUGAR, MAPLE CREAM	<p>Potential for microbial contamination is minimal because of the high osmotic concentration of the sugar.</p> <p>Some molds might grow on the surface. This could pose a problem for those highly sensitive to mold.</p> <p>Harmful chemical adulterants must be avoided.</p> <p>Since the final steps for making sugar and cream take place at temperatures below 180 F, it is possible for food handlers to contaminate the products.</p>	<p>Pack maple sugar and cream in clean, food grade containers or packages that can be properly sealed.</p> <p>Keep area where sugar and cream is being made clear of all chemicals that could splash, spill or fall into the syrup.</p> <p>Protect sugar and cream from contamination by foreign material.</p>	<p>Standards are easily met.</p> <p>Chemical contamination can be prevented by using clean, food grade containers and properly maintaining the packing facility.</p> <p>Microbial contamination can be prevented by use of standard sanitation procedures and properly sealed containers.</p> <p>Protection from foreign material can be accomplished with proper lighting equipment, suitable walls and ceiling, and approved floors.</p>

Summary

Because maple sap requires continuous boiling to convert it into syrup, microbial contamination is not an issue in the sugar house.

Contamination from leachates in equipment and chemicals in the sugar house are concerns since syrup is a concentrated form of maple sap.

Given the nature of the product, health and safety issues are largely concerned with avoiding contaminants that will be concentrated during the conversion of sap into syrup. That means using equipment free of harmful chemicals and food grade containers that are clean.

Inert particulates are not a health issue if the hot syrup is filtered according to industry standards.

Once the syrup is filtered and its temperature is below 180F, there is a limited possibility for microbial contamination. Once this stage is reached, standard practices for handling low risk foods will apply.

With the current concern about sensitivity to molds, it is important that syrup be properly packed (180 F minimum) to destroy all microorganisms.

REFERENCES

North American Maple Syrup Producers Manual, Bulletin 856

Produced by The Ohio State University Extension in Cooperation with The North American Maple Syrup Council

Available on line at <http://ohioline.osu.edu/b856/index.html>

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