

FOOD PRESERVATION

PROBLEMS AND SOLUTIONS

KAREN BLAKESLEE
KANSAS STATE UNIVERSITY

Sources:

So Easy To Preserve, Univ. of Georgia

Ball Blue Book

USDA Complete Guide to Home Canning



April 2017

Kansas State University Agricultural Experiment Station and Cooperative Extension Service, Manhattan, Kansas

It is the policy of Kansas State University Agricultural Experiment Station and Cooperative Extension Service that all persons shall have equal opportunity and access to its educational programs, service, activities, and materials without regard to race, color, religion, national origin, sex, age, or disability. Kansas State University is an equal opportunity organization. These materials may be available in alternative formats. Issued in furtherance of Cooperative Extension Work, acts of May 8 and June 30, 1914, as amended. Kansas State University, County Extension Councils, Extension Districts, and United States Department of Agriculture Cooperating, John D. Floros, Director

CANNING PROBLEMS AND SOLUTIONS – FOOD AND JUICE

PROBLEM	CAUSE	SOLUTION
Loss of liquid during processing	<p>Lowering pressure in canner suddenly after processing.</p> <p>Fluctuating pressure during processing in pressure canner.</p> <p>Failure to work out air bubbles.</p> <p>Improper seal.</p> <p>Jars not covered with water in water bath canner.</p> <p>Starchy foods absorbed liquid.</p> <p>Food packed too tightly can cause boil over during processing and siphoning.</p> <p>Food not heated prior to packing.</p>	<p>Let pressure drop to zero naturally and wait 2 minutes before opening.</p> <p>Maintain constant temperature during processing.</p> <p>Run a spatula between food and jar to remove bubbles.</p> <p>Check jar rims and clean edges, follow manufacturers directions for lids.</p> <p>Jars should be covered with 1-2 inches of water during processing.</p> <p>No solution.</p> <p>Leave proper headspace.</p> <p>Use hot pack method.</p>
Imperfect seal	<p>Chips or cracks in jars.</p> <p>Failure to follow manufacturer’s directions.</p> <p>Particles left on mouth of jar.</p> <p>Using old closures.</p> <p>Lifting jars by tops or inverting while hot.</p> <p>Fat on jar rim.</p>	<p>Examine jars carefully by rubbing finger around the mouth of the jar.</p> <p>Follow directions.</p> <p>Wipe with clean, damp cloth to remove particles that prevent a good seal.</p> <p>Do not reuse lids or rusty bands.</p> <p>Use a jar lifter and grasp below lip. Leave jar upright.</p> <p>Trim fat from meat. Don’t add fat. Wipe jar rim well.</p>
Product dark at top of jar	<p>Air left in jars permits oxidation.</p> <p>Insufficient amount of liquid or syrup.</p> <p>Food not processed long enough to destroy enzymes.</p>	<p>Remove air bubbles before sealing jars. Use proper headspace.</p> <p>Cover product with water or syrup.</p> <p>Process recommended length of time</p>
Cloudy liquid	<p>Starch in vegetables.</p> <p>Minerals in water.</p> <p>Fillers in table salt.</p> <p>Spoilage</p>	<p>Select products at good maturity. Don’t use overmature products.</p> <p>Use soft water.</p> <p>Use canning salt.</p> <p>Process at recommended times and method.</p>

CANNING PROBLEMS AND SOLUTIONS – FOOD AND JUICE

PROBLEM	CAUSE	SOLUTION
Undesirable color change	<p>Contact with minerals such as iron, zinc, or copper in utensils or water.</p> <p>Over processing.</p> <p>Immature or overmature product.</p> <p>Exposure to light.</p> <p>May be a distinct spoilage.</p> <p>Natural and harmless substances in fruits and vegetables (pink, purple or blue in apples, cauliflower, peaches, or pears).</p>	<p>Avoid these utensils and use soft water.</p> <p>Follow proper processing times.</p> <p>Select fruits and vegetables at optimum stage of maturity.</p> <p>Store in cool, dark, dry place.</p> <p>Process with proper method and time.</p> <p>No solution.</p>
Sediment in jars	<p>Starch in vegetables.</p> <p>Minerals in water.</p> <p>Fillers in table salt.</p> <p>Yellow sediment in green vegetables or onions.</p> <p>White crystals in spinach.</p> <p>Spoilage</p>	<p>Select produce with good maturity.</p> <p>Use soft water.</p> <p>Use canning salt.</p> <p>This is natural, from glucosides.</p> <p>This is natural, from calcium oxalate.</p> <p>Process with proper method and time.</p>
Spoilage	<p>Incorrect pressure.</p> <p>Incorrect timing.</p> <p>Incorrect method used.</p> <p>Poor selection of fruits and vegetables.</p> <p>Poor seal on jar.</p>	<p>Check gauge every year.</p> <p>Follow directions for timing.</p> <p>Low acid foods must be pressure canned.</p> <p>Select product of suitable variety and maturity. Can immediately after gathering.</p> <p>Check jars and lids for defects. Wipe jar rim, don't overfill jars.</p>
Floating	<p>Over processing fruits and tomatoes destroys pectin.</p> <p>Fruit is lighter than syrup.</p> <p>Improper packing.</p>	<p>Follow proper processing times.</p> <p>Use firm, ripe fruit. Heat before packing. Use a light to medium syrup.</p> <p>Pack fruit as closely as possible without crushing.</p>
Corn is brown	<p>Corn too mature for canning.</p> <p>Liquid did not cover corn.</p>	<p>Use freshly picked corn with plum, shiny kernels filled with milk.</p> <p>Cover corn with liquid before sealing.</p>

CANNING PROBLEMS AND SOLUTIONS – FOOD AND JUICE

PROBLEM	CAUSE	SOLUTION
	Jars processed at too high a temperature.	Keep pressure in canner at proper pounds, have dial gauge calibrated.
	Variety not for canning.	Use variety for canning.
Green vegetables lose color or turn brown	Heat breaks down chlorophyll.	No solution.
	Overcooked	Use proper time and processing method.
	Overmature	Use ripe product, asparagus should be tight and tender, green beans meaty with tiny seeds, shelled beans should be green.
Fruit darkens after removed from jar	Not processed long enough to inactivate enzymes.	Use recommended methods and times for each product, start counting time when water is at rolling boil.
Canned beets turning pink	Wrong variety.	Use variety recommended for canning.
	Beets are too old.	Should be young and tender about 1-2 inches in diameter.
	Beet roots too large.	Use beets with small roots.
	No root left on during boiling.	Leave 1-2 inches of root on while boiling.
	Overprocessed or overboiled.	Only boil until skin slips off. Use proper processing times and methods.
	Exposed to light.	Store in cool, dry dark place.
JUICE		
Spoilage or fermentation	Failure to process adequately.	Use boiling water bath.
	Imperfect seal.	Use perfect jars and seals, use proper method and time.
	Air left in jars.	Use proper processing to remove air from jar.
Cloudy sediment in jar bottom	Solids in juice settle.	Juice may be strained and made into jelly. Shake juices if used as a beverage.
Separation of juice (tomato)	Enzymatic change during handling (after cutting).	Heat tomatoes quickly to simmering temperature.
Poor flavor	Immature, overripe, or inferior fruit used.	Use good quality, firm, ripe fruit or tomatoes.
	Used too much water to extract juice.	Use only amount of water required, no water is added to tomatoes.
	Improper storage.	Store in cool, dry, dark place.

DRYING PROBLEMS AND SOLUTIONS

PROBLEM	CAUSE	SOLUTION
Moisture in container	<p>Incomplete drying.</p> <p>Food cut unevenly.</p> <p>Dried food left at room temperature too long after cooling and moisture re-entered the food.</p>	<p>Test several pieces for dryness.</p> <p>Cut food evenly.</p> <p>Cool quickly and package.</p>
Mold on food	<p>Incomplete drying.</p> <p>Food not checked for moisture within a week.</p> <p>Container not airtight.</p> <p>Storage temperature too warm plus moisture in food.</p> <p>Case hardening. Food dried at too high temperature and food cooked on outside before inside gets dry.</p>	<p>Test several pieces for dryness.</p> <p>Check container after 1 week for moisture. Redry at 140°F until dry.</p> <p>Use airtight container.</p> <p>Store in coolest area, below 70°F or freeze.</p> <p>Dry food at 140°F.</p>
Brown spots on vegetables	<p>Too high drying temperature used.</p> <p>Vegetables overdried.</p>	<p>Dry at 140°F.</p> <p>Check periodically for dryness.</p>
Insects in jars	<p>Lids do not completely fit jar.</p> <p>Food dried out-of-doors but not pasteurized.</p>	<p>Use new lid.</p> <p>Pasteurize food in oven at 160°F for 30 minutes or freeze for 48 hours.</p>
Holes in plastic bags	<p>Insects or rodents eat through plastic bags.</p>	<p>Don't use plastic bags except when storing in refrigerator or freezer. Use glass jars, rigid freezer containers or clean metal cans.</p>

FREEZING PROBLEMS AND SOLUTIONS

PROBLEM	CAUSE	SOLUTION
Freezer burn	Torn or unsealed package.	Make sure package is sealed tight to prevent air getting in. Handle carefully.
	Package not moisture-vapor resistant.	Use approved packaging.
	Too much air in package.	Always press out all air, use proper sized packaging and amount of food, use proper headspace.
Gummy liquid in fruit	Fruits frozen too slowly.	Freeze immediately after packaging. Do not freeze more than 2-3 pounds per cubic foot at one time.
	Freezer temperature too warm.	Keep temperature at 0°F or below.
	Fluctuating temperature.	Maintain constant temperature, keep door closed.
Rancid flavors	Spoilage in fat of product.	Blanch all vegetables as directed. Package correctly and remove air. Don't store longer than recommended.
"Grassy" flavors in vegetables	Freezing unblanched vegetables.	Blanch all vegetables as directed before freezing.
Mushy food	Large ice crystals for in food breaking down cell structure.	Freeze food immediately after packaging and maintain 0°F throughout storage. Don't freeze more than 2-3 pounds per cubic foot at one time.
Maroon-colored bones or pink meat in frozen poultry after cooked	Hemoglobin in bones.	Natural occurrence. Meat is safe.
Green vegetables turn olive-brown color	Did not blanch.	Blanch vegetables as directed.

JELLY PROBLEMS AND SOLUTIONS

PROBLEM	CAUSE	SOLUTION
Formation of crystals	<p>Excess sugar.</p> <p>Undissolved sugar sticking to sides of pan.</p> <p>Tartrate crystals in grape juice.</p> <p>Mixture cooked too slow or too long.</p>	<p>Use tested recipes and measure ingredients precisely.</p> <p>Wipe all crystals from side of pan with damp cloth before filling jars.</p> <p>Extract grape juice and allow tartrate crystals to settle out by refrigerating juice overnight. Strain juice to remove any remaining crystals before making jelly.</p> <p>Cook at rapid boil. Remove from heat immediately when jelling point is reached.</p>
Bubbles	<p>Air became trapped in hot jelly.</p> <p>May denote spoilage. If bubble are moving do not use.</p>	<p>Remove foam from jelly or jam before filling jars. Ladle or pour jelly quickly into jar. Do not allow jelly or jam to start gelling before jars are filled.</p> <p>Follow recommended methods to get an airtight seal.</p>
Too Soft	<p>Overcooking fruit to extract juice</p> <p>Using too much water to extract the juice.</p> <p>Incorrect proportions of sugar and juice.</p> <p>Undercooking causing insufficient concentration</p> <p>Insufficient acid.</p> <p>Making too large a batch at one time.</p> <p>Moving product too soon.</p>	<p>Avoid overcooking as this lowers the jelling capacity of pectin.</p> <p>Use only the amount of water suggested in recipe.</p> <p>Follow recommended proportions.</p> <p>Cook rapidly to jelling point.</p> <p>Lemon juice sometimes added if the fruit is low in acid.</p> <p>Use on 4-6 cups of juice per batch of jelly.</p> <p>Do not move jellied products for 12-24 hours after they are made.</p>
Syneresis or "weeping"	<p>Excess acid in juice makes pectin unstable.</p> <p>Storage place too warm or storage temperature fluctuates too much.</p>	<p>Maintain proper acidity of juice.</p> <p>Store in a cool, dark, and dry place.</p>
Dark color (not normal)	<p>Overcooking sugar and juice.</p> <p>Stored too long or storage temperature fluctuated.</p>	<p>Avoid long boiling. Best to make small quantity of jelly and cook rapidly.</p> <p>Store in a cool place and use within one year.</p>
Fermentation (spoiled)	<p>Yeasts grow on jelly when seal is not airtight.</p>	<p>Process in a boiling water bath. Pre-sterilize jars when processing less than 10 minutes. Test seal before storing.</p>

Mold	Imperfect sealing	Sterilize jars and use recommended methods to get airtight seal
Cloudiness	Green fruit (starch). Imperfect straining. Juice allowed to stand before it was poured into jars or poured too slow.	Use firm, ripe fruit, or slightly underripe. Do not squeeze juice but let it drip through jelly bag. Pour into jars immediately upon reaching gelling point. Work quickly.
Too stiff or tough	Overcooking Too much pectin in fruit. Too little sugar which requires excessive cooking.	Cook jelly mixture to a temperature 8° higher than the boiling point of water or until it “sheets” from a spoon. Use ripe fruit. Decrease amount if using commercial pectin. When pectin is not added, use ¾ cup sugar to 1 cup juice for most fruits.
Excess foam	Using overripe fruit. Allowing fruit to stand after mashing. Stirring mixture too rapidly.	Use ripe or slightly underripe fruit. Work quickly. Stir gently, can add ¼ tsp butter or margarine to fruit and pectin mixture before boiling.

PRESERVES PROBLEMS AND SOLUTIONS

PROBLEM	CAUSE	SOLUTION
Shriveled product	Syrup is too heavy for the fruit.	Follow instructions for the type of fruit being preserved.
Not characteristic fruit flavor	Overcooked or scorched.	Stir frequently when mixture begins to thicken to prevent sticking. Cook only to jellifying point.
	Poor quality fruit used.	Select only sound, good flavored fruit.
Tough product	Starting fruit in too heavy a syrup.	Cook fruit according to directions; by evaporation the syrup concentration will gradually increase.
	Not plumping fruit properly.	Fruit should plump at least 24 hours covered in syrup before canning.
	Overcooking	Follow directions.
Sticky, gummy	Overcooking	Follow directions for each product. Cook only until syrup is quite thick and fruit is fairly translucent.
Darker than normal color	Cooking too large quantities at one time.	It is usually best to cook not more than 2-4 pounds of prepared fruit at a time.
	Cooked too slowly.	A better color is usually produced if cooked rapidly.
	Overcooked	Cook until syrup is quite thick and fruit is translucent.
Loss of color	Improper storage.	Store in cool, dry, dark place.
Mold or fermentation	Improper sealing.	Jars should be sealed airtight. Use new lids. Wipe jar rim before applying lid.
	Failure to process finished product.	Process in boiling water bath to prevent spoilage. Pre-sterilize jars when processing less than 10 minutes.
	Improper storage.	Store in cool, dry, dark place.
Fruit floats	Overripe fruit.	Use ripe fruit.
	Not thoroughly crushed.	Crush fruit uniformly.
	Undercooking.	Cook rapidly, follow directions.

PICKLING PROBLEMS AND SOLUTIONS		
PROBLEM	CAUSE	SOLUTION
Soft or slippery pickles	<p>Brine too weak.</p> <p>Vinegar too weak.</p> <p>Cucumbers stored at too high a temperature during curing/brining.</p> <p>Insufficient amount of brine.</p> <p>Pickles not processed properly to destroy microorganisms.</p> <p>Moldy garlic or spices.</p> <p>Blossom ends not removed.</p> <p>Scum not removed from top of brine.</p>	<p>Maintain salt concentration specified in recipe.</p> <p>Use vinegar with 5% acid.</p> <p>Store between 70° and 75°F for optimum fermentation.</p> <p>Keep cucumbers immersed in brine.</p> <p>Use proper processing methods and times.</p> <p>Use fresh spices.</p> <p>Always remove blossom ends.</p> <p>Remove scum daily.</p>
Strong, bitter taste	<p>Spices cooked too long in vinegar or too many spices used.</p> <p>Vinegar too strong.</p> <p>Dry weather.</p> <p>Using salt substitutes.</p>	<p>Use proper amount of spices and proper boiling time.</p> <p>Use vinegar with 5% acid.</p> <p>No solution, bitter taste is usually in peel.</p> <p>Due to potassium chloride in these products, use canning salt.</p>
Hollow pickles	<p>Cucumbers too large for brining.</p> <p>Improper curing.</p> <p>Long lapse of time between gathering and brining.</p> <p>Faulty growth of cucumber.</p>	<p>Use smaller cucumbers for brining.</p> <p>Keep brine at proper strength and product is well covered. Cure until fermentation is complete.</p> <p>Pickling process should be started within 24 hours of gathering.</p> <p>No solution, during washing, hollow cucumbers usually float, use for relish.</p>
Shriveled pickles	<p>Use too strong brine, too heavy syrup or too strong vinegar.</p> <p>Long lapse between gathering and brining.</p> <p>Over-cooking or over processing.</p> <p>Dry weather.</p>	<p>Use a reliable recipe. Do not alter salt, sugar or vinegar.</p> <p>Brine within 24 hours of gathering.</p> <p>Follow reliable recipe.</p> <p>No solution.</p>
Scum on brine surface during curing	<p>Wild yeasts, molds and bacteria that feed on acid and will reduce the concentration if accumulates.</p>	<p>Remove scum daily or as often as needed.</p>

PICKLING PROBLEMS AND SOLUTIONS

PROBLEM	CAUSE	SOLUTION
Dark or discolored pickles	<p>Minerals in hard water.</p> <p>Ground spices used.</p> <p>Spices left in pickles.</p> <p>Brass, iron, copper or zinc utensils used (do not use the pickles).</p> <p>Iodized salt used.</p>	<p>Use soft water.</p> <p>Use whole spices.</p> <p>Place spices loosely in cheesecloth bag so they can be removed before canning.</p> <p>Use unchipped enamelware, glass, stainless steel, or stoneware.</p> <p>Use canning salt.</p>
Spotted, dull, or faded color	<p>Cucumber not well cured.</p> <p>Excessive exposure to light.</p> <p>Cucumber of poor quality.</p>	<p>Use brine with proper concentration. Complete fermentation process.</p> <p>Store in cool, dry, dark place.</p> <p>Use good quality produce.</p>
White sediment in crock or jar	<p>Bacteria cause this during fermentation.</p> <p>Salt contains an anti-caking agent.</p>	<p>No solution.</p> <p>Use canning salt.</p>
Black spots on underside of lid	<p>Natural compounds in some foods cause brown or black deposit, it is harmless and does not mean food is unsafe.</p>	<p>No solution.</p>