

FSIS DIRECTIVE

7120.1
Revision 13

11/21/12

SAFE AND SUITABLE INGREDIENTS USED IN THE PRODUCTION OF MEAT, POULTRY, AND EGG PRODUCTS

I. PURPOSE

This directive provides inspection program personnel (IPP) with an up-to-date list of substances that may be used in the production of meat, poultry, and egg products. FSIS will continue to update this directive quarterly by issuing revisions to this directive as opposed to issuing amendments to the directive.

II. CANCELLATION

FSIS Directive 7120.1, Safe and Suitable Ingredients Used in The Production of Meat, Poultry, and Egg Products, Revision 12, dated July 5, 2012.

III. REASON FOR REISSUANCE

This revision includes updates to the list of substances added since the July 5, 2012 issuance of the directive. Updates to this directive appear in Table 1. Changes are in **bold** in Table 2.

Table 1: Summary of Updates to list of substances

Substance	Page Number	Category	Type of Update
An aqueous solution of sulfuric acid, citric acid, and phosphoric acid	3	Acidifiers/Alkalizers	New
An aqueous solution of hydrochloric, citric and phosphoric acid	4	Acidifiers/Alkalizers	New
An aqueous solution of hydrochloric and citric acid	4	Acidifiers/Alkalizers	New
Encapsulated sodium diacetate	5	Acidifiers/Alkalizers	New
Potassium carbonate or potassium bicarbonate	5	Acidifiers/Alkalizers	Revised
Sodium carbonate or sodium bicarbonate	5	Acidifiers/Alkalizers	New
Citric acid Up to a 3 percent solution is applied to the casing just prior to removal	16	Antimicrobial	Revised
Cultured Sugar and Vinegar (derived from corn, cane, or beets)	18	Antimicrobial	Revised
Lauramide arginine ethyl ester (LAE)	27	Antimicrobial	Revised
Plum extract, plum puree, plum fiber, plum powder	39	Binders	New
Sugar beet fiber	42	Binders	New
Encapsulated sodium diacetate	46	Flavoring Agents	New

IV. REFERENCES

9 CFR Chapter III

V. BACKGROUND

A. The Table of Safe and Suitable Ingredients identifies the food grade substances that have been approved in 21 Code of Federal Regulations (CFR) for use in meat, poultry, and egg products as food additives, generally recognized as safe (GRAS) notices and pre-market notifications, and approved in letters conveying acceptability determinations. Users of this table should be aware that some of the ingredient mixtures listed in the table may be considered to be proprietary even though the components are either approved food additives or GRAS. This information is also available on the USDA websites at:

http://www.fsis.usda.gov/Regulations_&Policies/Ingredients_Guidance/index.asp

http://www.fsis.usda.gov/About_Fsis/labeling_&consumer_protection/index.asp

NOTE: This directive does not include the use of substances in On-Line Reprocessing (OLR) and Off-Line Reprocessing (OFLR) operations that operate under an experimental exemption listed in 9 CFR 381.3. Establishments operating under this exemption should follow the conditions of use that are specific to their FSIS approved OLR and OFLR protocol.

B. The questions and answers that follow the table address the use of antimicrobial agents in the production of meat, poultry, and egg products.



Assistant Administrator
Office of Policy and Program Development

Table 2: Table of Safe and Suitable Ingredients

SUBSTANCE	PRODUCT	AMOUNT	REFERENCE	LABELING REQUIREMENTS
<i>Acidifiers/Alkalizers</i>				
A combination of sulfuric acid, ammonium sulfate, copper sulfate, and water	Used as an acidifier in poultry processing water	Sufficient for purpose	Acceptability determination	None under the accepted conditions of use (1)
Ammonium hydroxide	pH control agent in brine solutions for meat products	Sufficient for purpose to achieve a brine solution with a pH of 11.6	Acceptability determination	None under the accepted conditions of use (1)
An aqueous solution of acidic calcium sulfate	pH control agent in water used in meat and poultry processing	Sufficient for purpose	Acceptability determination	None under the accepted conditions of use (3)
An aqueous solution of hydrochloric and acetic acid	pH control agent in water used in poultry processing	Sufficient for purpose	Acceptability determination	None under the accepted conditions of use (3)
An aqueous solution of citric and hydrochloric acids	pH control agent in water used in poultry processing	Sufficient for purpose	Acceptability determination	None under the accepted conditions of use (1)
An aqueous solution of citric acid, hydrochloric acid, and phosphoric acid	To adjust the pH in processing water in meat and poultry plants	Sufficient for purpose	Acceptability determination	None under the accepted conditions of use (1)
An aqueous solution of peroxyacetic acid, hydrogen peroxide, acetic acid, and 1-hydroxyethylidene-1, 1-diphosphonic acid (HEDP)	As an acidifier in poultry scald tanks	The level of peroxyacetic acid will not exceed 220 ppm, hydrogen peroxide will not exceed 110 ppm, and HEDP will not exceed 13 ppm	21 CFR 173.370	None under the accepted conditions of use (3)
An aqueous solution of sodium bisulfate and sulfuric acid	pH control agent in water used in poultry processing	Sufficient for purpose	Acceptability determination	None under the accepted conditions of use (1)
An aqueous solution of sulfuric acid, citric acid, and phosphoric acid	To adjust the pH of PAA for use on poultry carcasses as a spray or dip.	A blend of sulfuric (35%), citric (1%) and phosphoric acid (1%) solution that is injected into a diluted water	Sufficient for Purpose	None under the accepted conditions of use (1), (2), and (6)

		stream of peroxyacetic acid (PAA) [100 PPM or less], hydrogen peroxide , acetic acid, and 1-hydroxyethylidene-1,1-diphosphonic acid (FCN 993) - to lower the pH of the PAA water stream from approximately 4.5 to under 2.5.		
An aqueous solution of hydrochloric, citric and phosphoric acid	To adjust the pH of PAA for use on poultry carcasses as a spray or dip.	A blend of hydrochloric (13%), citric (14%) and phosphoric acid (1.6%) solution that is injected into a diluted water stream of peroxyacetic acid (PAA) [100 PPM or less], hydrogen peroxide , acetic acid, and 1-hydroxyethylidene-1,1-diphosphonic acid (FCN 993) - to lower the pH of the PAA water stream from approximately 4.5 to under 2.5.	Sufficient for Purpose	None under the accepted conditions of use (1), (2), and (6)
An aqueous solution of hydrochloric and citric acid	To adjust the pH of PAA for use on poultry carcasses as a spray or dip.	A blend of hydrochloric (14.6%) and citric acid (5.5%) solution that is injected into a diluted water stream of peroxyacetic acid (PAA) [100 PPM or less], hydrogen peroxide , acetic	Sufficient for Purpose	None under the accepted conditions of use (1), (2), and (6)

		acid, and 1-hydroxyethylidene-1,1-diphosphonic acid (FCN 993) - to lower the pH of the PAA water stream from approximately 4.5 to under 2.5.		
Encapsulated sodium diacetate	pH control agent in fresh and ready-to-eat (RTE) comminuted and whole muscle meat and fresh and RTE whole muscle poultry applied as a component in seasoning blends and meat sauces	At a level not to exceed 1.0 percent (total formula weight) in combination with other GRAS acids at a level sufficient to achieve a pH of 4.8 – 5.5	Acceptability determination	Listed by common or usual name in the ingredients statement. Comminuted product must be descriptively labeled. (2)
Citric acid	To adjust pH in egg products	Sufficient for purpose	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Potassium carbonate or potassium bicarbonate	To adjust pH in egg products	Sufficient for purpose	21 CFR 184.1619	None under the accepted conditions of use (1)
Potassium hydroxide	pH control agent in water used in poultry processing	Sufficient for purpose	21CFR 184.1631	None under the accepted conditions of use (1)
Potassium hydroxide and sodium hydroxide	To adjust pH in egg products	Sufficient for purpose	Acceptability determination	None under the accepted conditions of use (1)
Sodium carbonate or sodium bicarbonate	To adjust pH in egg products	Sufficient for purpose	21 CFR 184.1736	None under the accepted conditions of use (1)
Sodium hydroxide	pH control agent in water used in poultry processing	Sufficient for purpose	21 CFR 184.1763	None under the accepted conditions of use (1)
Sodium hydroxide and potassium hydroxide	pH control agent in water used in poultry processing	Sufficient for purpose	21 CFR 184.1763; 21CFR	None under the accepted conditions of use

			184.1631	(1)
An aqueous solution of sulfuric acid, citric acid, and phosphoric acid	To adjust the pH in poultry chiller water and the processing water in meat and poultry plants	Sufficient for purpose	Acceptability determination	None under the accepted conditions of use (1)
Sodium bisulfate	pH control agent in water used in meat and poultry processing	Sufficient for purpose	Acceptability determination	None under the accepted conditions of use (1)
Sodium bisulfate	pH control agent in meat and poultry soups	Not to exceed 0.8 percent of product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Sodium bisulfate	Added to sauces used as separable components in the formulation of various meat products	Sufficient for purpose	GRAS Notice No. 000003	Listed by common or usual name in the ingredients statement (2)
Sulfuric acid	pH control agent in water used in poultry processing	Sufficient for purpose	Acceptability determination	None under the accepted conditions of use (3)
An aqueous solution of sulfuric acid and sodium sulfate	As an acidifier agent on meat and poultry products in the form of a spray, wash, or dip.	At concentrations sufficient to achieve a targeted pH range of 1.0 to 2.2 for use directly on meat and poultry surfaces as a spray, wash, or dip.	21 CFR 170.36	None under the accepted conditions of use (1)
<i>Sulfuric acid, phosphoric acid, citric acid, and hydrochloric acid</i>	To adjust the pH in poultry chiller water	Sufficient for purpose	Acceptability determination; 21 CFR 184.1095; 21 CFR 182.1073; 21 CFR 184.1033; 21 CFR 182.1057	None under the accepted conditions of use (1)
Anticoagulants				
Sodium tripolyphosphate	Sequestrant/anti-coagulant for use in recovered livestock blood which is subsequently used in food products	Not to exceed 0.5 percent of recovered blood	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Antimicrobials				
Acetic acid	Dried and fermented	Use of up to 4	Acceptability	None under the

	sausages	percent solution applied as a spray measured prior to application	determination	accepted conditions of use (1)
An aqueous solution of sodium diacetate (4%), lactic acid (4%), pectin (2%), and acetic acid (0.5%)	Cooked meat products	Not to exceed 0.5 percent of finished product formulation.	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
An aqueous solution of sodium octanoate or octanoic acid and either glycerin and/or propylene glycol and/or a Polysorbate surface active agent (quantity sufficient to achieve the intended technical effect of octanoic acid emulsification) adjusted to a final solution pH of 1.5 to 4.0 using sodium hydroxide, potassium hydroxide, or an acceptable GRAS acid	Various non-standardized RTE meat and poultry products and standardized meat and poultry products that permit the use of any safe and suitable antimicrobial agent	Applied to the surface of the product at a rate not to exceed 400 ppm octanoic acid by weight of the finished food product	Acceptability determination	None under the accepted conditions of use (3)
An aqueous solution of sodium octanoate, potassium octanoate, or octanoic acid and either glycerin and/or propylene glycol and/or a Polysorbate surface active agent (quantity sufficient to achieve the intended technical effect of octanoic acid emulsification) adjusted to a final solution pH of 1.5 to 6.0 using sodium hydroxide, potassium hydroxide, or an acceptable GRAS	Fresh meat primals and subprimals and cuts	Applied to the surface of the product at a rate not to exceed 400 ppm octanoic acid by weight of the final product	Acceptability determination	None under the accepted conditions of use (3)

acid				
An aqueous solution of sulfuric acid and sodium sulfate	In the form of a spray, wash, or dip on the surface of meat and poultry products	At concentrations sufficient to achieve a targeted pH range of 1.0 – 2.2 on the surface of meat and poultry	GRAS Notice No. 000408	None under the accepted conditions of use (2)
A blend of citric acid and sorbic acid in a 2:1 ratio	To reduce the microbial load of purge trapped inside soaker pads in packages of raw whole muscle cuts of meat and poultry	Incorporated into soaker pads at a level not to exceed 1 to 3 grams per pad	Acceptability determination	None under the accepted conditions of use (1)
A blend of lactic acid (45-60%), citric acid (20-35%), and potassium hydroxide (>1%)	Beef, pork, and lamb carcasses, heads, and organs including unskinned livers, tongues, tails, primal cuts, sub-primal cuts, cuts, and trimmings	Applied as a spray at a level not to exceed 2.5% solution by weight. Organ meat products must be drained for a minimum of 1-2 minutes after application before packaging.	Acceptability determination	None under the accepted conditions of use (1)
A blend of salt, sodium acetate, lemon extract, and grapefruit extract	Ground beef, cooked, cured, comminuted sausages (e.g., bologna), and RTE whole muscle meat products	Not to exceed 0.5 percent of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement for the RTE whole muscle meat products, and cooked, cured, comminuted sausages. Ground beef must be descriptively labeled (4)
A blend of salt, sodium acetate, lemon extract, and grapefruit extract	Beef steaks	Steaks that are sliced, scored and dipped in a solution containing 2.5 percent of the blend	Acceptability determination	Product must be descriptively labeled (4)
A blend of salt, lemon extract, and grapefruit extract	Ground beef	Not to exceed 0.5 percent of the product formulation	Acceptability determination	Product must be descriptively labeled (4)
A blend of salt, lactic acid, sodium diacetate, and mono-	Various non-standardized RTE meat and poultry	Not to exceed 0.2 percent of product formulation	Acceptability determination	All ingredients, except for the mono- and

and diglycerides	products and standardized meat and poultry products that permit the use of any safe and suitable antimicrobial agent			diglycerides, must be listed by common or usual name in the ingredients statement (4)
A mixture of hops beta acids, egg white lysozyme, and cultured skim milk	In a salad dressing used in refrigerated meat and poultry deli salads	Not to exceed 1.5 percent of the finished salad	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
A mixture of maltodextrin (DE of 5 or greater), cultured dextrose, sodium diacetate, egg white lysozyme, and nisin preparation	In salads, sauces, and dressings to which fully cooked meat or poultry will be added	Not to exceed 1.5 percent by weight of the finished product	Acceptability determination	Listed by common or usual name in the ingredients statement (4)
Acidified sodium chlorite	Poultry carcasses and parts; meat carcasses, parts, and organs; processed, comminuted, or formed meat food products (including RTE)	500 to 1200 ppm in combination with any GRAS acid at a level sufficient to achieve a pH of 2.3 to 2.9 in accordance with 21 CFR 173.325 (<i>Note: The pH depends on the type of meat or poultry product.</i>)	21 CFR 173.325	None under the accepted conditions of use (3)
Acidified sodium chlorite	Processed, comminuted or formed poultry products (including RTE)	500 to 1200 ppm in combination with any GRAS acid at a level sufficient to achieve a pH of 2.3 to 2.9 in accordance with 21 CFR 173.325 (<i>Note: The pH depends on the type of meat or poultry product.</i>)	Acceptability determination	None under the accepted conditions of use (3)
Acidified sodium chlorite	Poultry carcasses, parts, trim, and organs	Mixing an aqueous solution of sodium chlorite with any GRAS acid to achieve a pH of 2.2 to 3.0 then further diluting this solution with a pH elevating	Food Contact Substance Notification No. FCN 739	None under the accepted conditions of use (6)

		<p>agent (i.e., sodium bicarbonate, sodium carbonate, or an unacidified sodium chlorite solution) to a final pH of 5.0 to 7.5. When used in a spray or dip the final sodium chlorite concentration does not exceed 1200 mg/kg and the chlorine dioxide concentration does not exceed 30 mg/kg. When used in a pre-chiller or chiller solution on poultry carcasses and parts the additive is used at a level that results in sodium chlorite concentrations between 50 and 150 ppm. Contact times may be up to several minutes at temperatures between 0 and 15 degrees C.</p>		
Acidified sodium chlorite	Red meat, red meat parts and organs, and on processed, comminuted, formed meat products (including RTE)	Applied as a spray or dip, the additive is produced by mixing an aqueous solution of sodium chlorite with any GRAS acid to achieve a pH in the range of 2.2 to 3.0, then further diluting this solution with a pH elevating agent such that the resultant sodium chlorite concentration does not exceed 1200 ppm, and the	Food Contact Substance Notification No. FCN 450	None under the accepted conditions of use (6)

		chlorine dioxide concentration does not exceed 30 ppm. The pH of the use solution is between 5.0 and 7.5		
Ammonium hydroxide	Beef carcasses (in hot boxes and holding coolers) and boneless beef trimmings	In accordance with current industry standards of good manufacturing practice	Acceptability determination	None under the accepted conditions of use (1)
Anhydrous ammonia	Lean finely textured beef which is subsequently quick chilled to 28 degrees Fahrenheit and mechanically "stressed"	In accordance with current industry standards of good manufacturing practice	Acceptability determination	None under the accepted conditions of use (1)
Anhydrous ammonia	Ground beef	Followed with carbon dioxide treatment in accordance with current industry standards of good manufacturing practice	Acceptability determination	None under the accepted conditions of use (1)
Bacteriophage preparation (<i>Salmonella</i> targeted)	On the hides of live animals in the holding pens prior to slaughter	Applied as a spray mist or wash	Acceptability determination	None under the accepted conditions of use (1)
Bacteriophage preparation (<i>E. coli</i> O157:H7 targeted)	On the hides of live animals (cattle) in the holding pens prior to slaughter and hide removal	Applied as a spray, mist, rinse or wash to the hides of live animals (cattle) within lairage, restraining areas, stunning areas, and other stations immediately prior to hide removal.	Acceptability determination	None under the accepted conditions of use (1)
Bacteriophage preparation (<i>Salmonella</i> targeted)	On the feathers of live poultry prior to slaughter	Applied as a spray mist or wash	Acceptability determination	None under the accepted conditions of use (1)
Bacteriophage preparation (a	Various RTE meat and poultry products	Applied as a spray at a level not to	21 CFR 172.785	Listed by common or usual name (i.e.,

<p>mixture of equal proportions of six different individually purified lytic-type bacteriophages specific against <i>Listeria monocytogenes</i>)</p>		<p>exceed 1 ml of the additive per 500 cm² product surface area</p>		<p>bacteriophage preparation) in the ingredients statement of non-standardized meat and poultry products and standardized meat and poultry products that permit the use of any safe and suitable antimicrobial agent. Standardized meat and poultry products that do not permit the use of any safe and suitable antimicrobial agent must be descriptively labeled. (4)</p>
<p>Bacteriophage preparation</p>	<p>Various RTE meat and poultry products</p>	<p>Applied to the surface of the product to achieve a level of 1 x 10⁷ to 1 x 10⁹ plaque forming units (pfu) per gram of product</p>	<p>GRAS Notice No. 000218</p>	<p>None under the accepted conditions of use (1). Standardized meat and poultry products that do not permit the use of any safe and suitable antimicrobial agent must be descriptively labeled. (4)</p>
<p>Bacteriophage preparation</p>	<p>Red meat parts and trim prior to grinding</p>	<p>Applied as a mixture diluted with water at a ratio of 1:10. Application rate of approximately 2 ml diluted solution per 500 cm² of surface area may be used</p>	<p>FCN No. 1018</p>	<p>None under the accepted conditions of use. (1)</p>
<p>Calcium hypochlorite</p>	<p>Red meat carcasses down to a quarter of</p>	<p>Applied as a spray at a level not to</p>	<p>Acceptability determination</p>	<p>None under the accepted</p>

	a carcass	exceed 50 ppm calculated as free available chlorine measured prior to application		conditions of use (1)
Calcium hypochlorite	On whole or eviscerated poultry carcasses	Applied as a spray at a level not to exceed 50 ppm calculated as free available chlorine measured prior to application	Acceptability determination	None under the accepted conditions of use (1)
Calcium hypochlorite	In water used in meat processing	Not to exceed 5 ppm calculated as free available chlorine	Acceptability determination	None under the accepted conditions of use (1)
Calcium hypochlorite	In water used in poultry processing (except for product formulation)	Not to exceed 50 ppm calculated as free available chlorine	Acceptability determination	None under the accepted conditions of use (1)
Calcium hypochlorite	Poultry chiller water	Not to exceed 50 ppm calculated as free available chlorine (measured in the incoming potable water)	Acceptability determination	None under the accepted conditions of use (1)
Calcium hypochlorite	Poultry chiller red water (i.e., poultry chiller water re-circulated, usually through heat exchangers, and reused back in the chiller)	Not to exceed 5 ppm calculated as free available chlorine (measured at influent to chiller)	Acceptability determination	None under the accepted conditions of use (1)
Calcium hypochlorite	Reprocessing contaminated poultry carcasses	20 ppm calculated as free available chlorine Note: Agency guidance has allowed the use of up to 50 ppm calculated as free available chlorine	9 CFR 381.91	None under the accepted conditions of use (1)
Calcium hypochlorite	On giblets (e.g., livers, hearts, gizzards, and necks) and salvage parts	Not to exceed 50 ppm calculated as free available chlorine in the influent to a	Acceptability determination	None under the accepted conditions of use (1)

		container for chilling.		
Calcium hypochlorite	Beef primals	20 ppm calculated as free available chlorine	Acceptability determination	None under the accepted conditions of use (1)
<i>Carnobacterium maltaromaticum</i> strain CB1	Ready-to-eat comminuted meat products (e.g., hot dogs)	Applied as a spray to meat products at a maximum concentration of at inoculation of 1×10^4 colony forming units per gram (cfu/g)	GRAS Notice No. 000159	Listed as " <i>Carnobacterium maltaromaticum</i> " or "bacterial culture" in the ingredients statement (2)
<i>Carnobacterium maltaromaticum</i> strain CB1 (viable and heat-treated)	Ready-to-eat meat products; meat and poultry products	Viable CB1 applied at levels up to 1×10^9 colony forming units per gram (cfu/g). Heat-treated CB1 applied at levels up to 5000 (typically between 1000-5000) parts per million (ppm)	GRAS Notice No. 000305	Listed as " <i>Carnobacterium maltaromaticum</i> " or "bacterial culture" in the ingredients statement (2)
Cetylpyridinium chloride (NOTE: 2 previous entries for this substance were consolidated into 1)	To treat the surface of raw poultry carcasses or giblets either prior to or after chilling	Not to exceed 5 gallons of solution per carcass provided that the additive is used in systems that recapture at least 99 percent of the solution that is applied to the poultry carcasses. The concentration of cetylpyridinium chloride in the solution applied to the carcasses shall not exceed 0.8 percent by weight. The aqueous solution shall also contain propylene glycol complying with 21 CFR 184.1666 at a concentration of 1.5 times that of	21 CFR 173.375	None under the accepted conditions of use (3)

		cetylpyridinium chloride. When application of the additive is not followed by immersion in a chiller, the treatment will be followed by a potable water rinse of the carcass.		
Chlorine gas	Red meat carcasses down to a quarter of a carcass	Applied as a spray at a level not to exceed 50 ppm calculated as free available chlorine measured prior to application	Acceptability determination	None under the accepted conditions of use (1)
Chlorine gas	On whole or eviscerated poultry carcasses	Applied as a spray at a level not to exceed 50 ppm calculated as free available chlorine measured prior to application	Acceptability determination	None under the accepted conditions of use (1)
Chlorine gas	In water used in meat processing	Not to exceed 5 ppm calculated as free available chlorine	Acceptability determination	None under the accepted conditions of use (1)
Chlorine gas	In water used in poultry processing (except for product formulation)	Not to exceed 50 ppm calculated as free available chlorine	Acceptability determination	None under the accepted conditions of use (1)
Chlorine gas	Poultry chiller water	Not to exceed 50 ppm calculated as free available chlorine (measured in the incoming potable water)	Acceptability determination	None under the accepted conditions of use (1)
Chlorine gas	Poultry chiller red water (i.e., poultry chiller water re-circulated, usually through heat exchangers, and reused back in the chiller)	Not to exceed 5 ppm calculated as free available chlorine (measured at influent to chiller)	Acceptability determination	None under the accepted conditions of use (1)
Chlorine gas	Reprocessing contaminated poultry	20 ppm calculated as free available	9 CFR 381.91	None under the accepted

	carcasses	chlorine Note: Agency guidance has allowed the use of up to 50 ppm calculated as free available chlorine		conditions of use (1)
Chlorine gas	On giblets (e.g., livers, hearts, gizzards, and necks) and salvage parts	Not to exceed 50 ppm calculated as free available chlorine in the influent to a container for chilling.	Acceptability determination	None under the accepted conditions of use (1)
Chlorine gas	Beef primals	20 ppm calculated as free available chlorine	Acceptability determination	None under the accepted conditions of use (1)
Citric acid	Bologna in an edible casing	Up to a 10 percent solution applied prior to slicing	Acceptability determination	Listed by common or usual name in the ingredients statement (4)
Citric acid	Bologna in an inedible casing	Up to a 10 percent solution applied prior to slicing	Acceptability determination	None under the accepted conditions of use (1)
Citric acid	Fully cooked meat and poultry products in impermeable and permeable pre-stuck casings.	Up to a 3 percent solution is applied to the casing just prior to removal.	Acceptability determination	None under the accepted conditions of use (1)
Citric acid	Separated beef heads and associated offal products (e.g., hearts, livers, tails, tongues)	A 2.5 percent solution applied as a spray prior to chilling	Acceptability determination	None under the accepted conditions of use (1)
Citric acid	In brine to cool fully-cooked RTE meat products (a) sausages and similar products in natural casings (including permeable casings), (b) hams in permeable casings/netting prior to the removal of the	Up to 3 percent of the brine solution	Acceptability determination	None under the accepted conditions of use (1)

	casing/netting			
Chlorine dioxide	In water used in poultry processing	Not to exceed 3 ppm residual chlorine dioxide as determined by Method 4500-ClO ₂ E in the "Standard Methods for the Examination of Water and Wastewater," 18 th ed., 1992, or an equivalent method	21 CFR 173.300	None under the accepted conditions of use (3)
Chlorine dioxide	In water used in poultry processing	Not to exceed 3 ppm residual chlorine dioxide as determined by Method 4500-ClO ₂ -D, modified for use with the Hach Spectrophotometer, or UV absorbance at 360 nm. (2) Chlorine dioxide produced through the "CLOSURE" process produces a concentrated solution that contains at least 600 ppm chlorine dioxide, and no greater than 10 ppm chlorite and 90 ppm chlorate	Food Contact Substance Notification No. FCN 644	None under the accepted conditions of use (6)
Chlorine dioxide	In water used in poultry processing	Not to exceed 3 ppm residual chlorine dioxide as determined by Method 4500-ClO ₂ E in the "Standard Methods for the Examination of Water and Wastewater," 20 th ed., 1998, or an equivalent method	Food Contact Substance Notification No. FCN 1011	None under the accepted conditions of use (6)
Chlorine dioxide	Red meat, red meat	Applied as a spray	Food Contact	None under the

	parts and organs; processed, comminuted, or formed meat food products	or dip at a level not to exceed 3 ppm residual chlorine dioxide as determined by Method 4500-ClO ₂ E in the "Standard Methods for the Examination of Water and Wastewater," 18 th ed., 1992, or an equivalent method	Substance Notification No. FCN 668	accepted conditions of use (6)
Chlorine dioxide	Red meat, red meat parts and organs; processed, comminuted, or formed meat food products	Applied as a spray or dip at a level not to exceed 3 ppm residual chlorine dioxide as determined by Method 4500-ClO ₂ E in the "Standard Methods for the Examination of Water and Wastewater," 20 th ed., 1998, or an equivalent method	Food Contact Substance Notification No. FCN 1052	None under the accepted conditions of use (6)
Cultured Sugar (derived from corn, cane, or beets)	In enhanced meat and poultry products (e.g., beef or pork injected with a solution) and RTE meat and poultry products (e.g., hot dogs and cooked turkey breast)	At up to 4.8 percent of the product formula	GRAS Notice No. 000240	Cultured cane and beet sugar listed by common or usual name (e.g., "cultured cane sugar") Cultured corn sugar listed as "cultured corn sugar" or "cultured dextrose."
Cultured Sugar and Vinegar (derived from corn, cane, or beets)	In enhanced meat and poultry products (e.g., beef or pork injected with a solution) and RTE meat and poultry products (e.g., hot dogs and cooked turkey breast)	At up to 4.8 percent of the product formula	Acceptability determination	Cultured cane and beet sugar listed by common or usual name and vinegar (e.g., "cultured cane sugar, vinegar" or "cultured sugar, vinegar")

DBDMH (1,3-dibromo-5,5-dimethylhydantoin)	For use in poultry chiller water and in water applied to poultry via an Inside-Outside Bird Washer (IOBW) and in water used in poultry processing for poultry carcasses, parts, and organs	At a level not to exceed that needed to provide the equivalent of 100 ppm active bromine	Food Contact Substance Notification No. FCN 334 and FCN 453	None under the accepted conditions of use (6)
DBDMH (1,3-dibromo-5,5-dimethylhydantoin)	For use in water supplied to ice machines to make ice intended for general use in poultry processing	At a level not to exceed that needed to provide the equivalent of 100 ppm of available bromine (corresponding to a maximum level of 90 mg DBDMH/kg water)	Food Contact Substance Notification No. FCN 775	None under the accepted conditions of use (6)
DBDMH (1,3-dibromo-5,5-dimethylhydantoin)	For use in water applied to beef hides, carcasses, heads, trim, parts, and organs.	At a level not to exceed that needed to provide the equivalent of 300 ppm active bromine.	Food Contact Substance Notification No. FCN 792	None under the accepted conditions of use (6)
DBDMH (1,3-dibromo-5,5-dimethylhydantoin)	For use in water applied to swine, goat, and sheep carcasses and their parts and organs	At a level not to exceed that needed to provide the equivalent of 500 ppm of available bromine	Food Contact Substance Notification No. FCN 1102	None under the accepted conditions of use (6)
Egg white lysozyme	In casings and on cooked (RTE) meat and poultry products	2.5 mg per pound in the finished product when used in casings; 2.0 mg per pound on cooked meat and poultry products	GRAS Notice No. 000064	Listed by common or usual name in the ingredients statement (2)
Electrolytically generated hypochlorous acid	Red meat carcasses down to a quarter of a carcass	Applied as a spray at a level not to exceed 50 ppm calculated as free available chlorine	Acceptability determination	None under the accepted conditions of use (1)
Electrolytically generated hypochlorous acid	On whole or eviscerated poultry carcasses	Applied as a spray at a level not to exceed 50 ppm	Acceptability determination	None under the accepted conditions of use

		calculated as free available chlorine measured prior to application		(1)
Electrolytically generated hypochlorous acid	In water used in meat processing	Not to exceed 5 ppm calculated as free available chlorine measured prior to application	Acceptability determination	None under the accepted conditions of use (1)
Electrolytically generated hypochlorous acid	In water used in poultry processing (except for product formulation)	Not to exceed 50 ppm calculated as free available chlorine	Acceptability determination	None under the accepted conditions of use (1)
Electrolytically generated hypochlorous acid	Poultry chiller water	Not to exceed 50 ppm calculated as free available chlorine (measured in the incoming potable water)	Acceptability determination	None under the accepted conditions of use (1)
Electrolytically generated hypochlorous acid	Poultry chiller red water (i.e., poultry chiller water re-circulated, usually through heat exchangers, and reused back in the chiller)	Not to exceed 5 ppm calculated as free available chlorine (measured at influent to chiller)	Acceptability determination	None under the accepted conditions of use (1)
Electrolytically generated hypochlorous acid	Reprocessing contaminated poultry carcasses	20 ppm calculated as free available chlorine Note: Agency guidance has allowed the use of up to 50 ppm calculated as free available chlorine	9 CFR 381.91	None under the accepted conditions of use (1)
Electrolytically generated hypochlorous acid	On giblets (e.g., livers, hearts, gizzards, and necks) and salvage parts	Not to exceed 50 ppm calculated as free available chlorine in the influent to a container for chilling.	Acceptability determination	None under the accepted conditions of use (1)
Electrolytically generated hypochlorous acid	Beef primals	20 ppm calculated as free available chlorine	Acceptability determination	None under the accepted conditions of use (1)
An aqueous solution of citric and	Poultry carcasses, parts, trim, and	Applied as a spray or dip with a	Acceptability determination	None under the accepted

hydrochloric acids adjusted to a pH of 1.0 to 2.0	organs	minimum contact time of 2 to 5 seconds measured prior to application		conditions of use (1)
An aqueous solution of citric and hydrochloric acids adjusted to a pH of 0.5 to 2.0	Meat carcasses, parts, trim, and organs	Applied as a spray or dip for a contact time of 2 to 5 seconds measured prior to application	Acceptability determination	None under the accepted conditions of use (1)
A blend of citric acid (1.87%), phosphoric acid (1.72%), and hydrochloric acid (0.8%)	Poultry carcasses	Applied as a spray with a minimum contact time of 1 to 2 seconds and allowed to drip from the carcasses for 30 seconds	Acceptability determination	None under the accepted conditions of use (1)
A blend of citric acid, hydrochloric acid, and phosphoric acid	To adjust the acidity in various meat and poultry products	Sufficient for purpose	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Hops beta acids	In casings and on cooked (RTE) meat and poultry products	2.5 mg per pound in the finished product when used in casings; 2.0 mg per pound on cooked meat and poultry products	GRAS Notice No. 000063	Listed by common or usual name in the ingredients statement (2)
Hypobromous acid	In water or ice used for processing meat and poultry products	Generated on-site from an aqueous mixture of hydrogen bromide and sodium, potassium, or calcium hypochlorite for use at a level not to exceed that needed to provide 300 ppm available bromine (or 133 ppm available chlorine*) in water or ice applied to meat products, and 200 ppm available bromine (or 89 ppm available chlorine*) in water or ice applied to poultry	Food Contact Substance Notification No. FCN 000944	None under the accepted conditions of use (6)

		products. *(NOTE: Because there are a limited number of commercial test kits specific for bromine, chlorine kits may be used. The ppm levels between available bromine and chlorine is due to the difference in their molecular weight.)		
Hypobromous acid	In water or ice used for processing meat and poultry products	Generated on-site from an aqueous mixture of sodium bromide and sodium, potassium, or calcium hypochlorite for use at a level not to exceed that needed to provide 900 ppm available bromine (or 400 ppm available chlorine*) in water or ice applied to meat products, and 200 ppm available bromine (or 89 ppm available chlorine*) in water or ice applied to poultry products. *(NOTE: Because there are a limited number of commercial test kits specific for bromine, chlorine kits may be used. The ppm levels between available bromine and chlorine is due to the difference in their molecular weight.)	Food Contact Substance Notification No. FCN 001122	None under the accepted conditions of use (6)
Hypobromous acid	In water or ice used	Generated on-site	Food Contact	None under the

	for processing meat products	from an aqueous mixture of hydrogen bromide and sodium, potassium, or calcium hypochlorite for use at a level not to exceed that needed to provide 900 ppm available bromine (or 400 ppm available chlorine*) in water or ice applied to meat products. *(NOTE: Because there are a limited number of commercial test kits specific for bromine, chlorine kits may be used. The ppm levels between available bromine and chlorine is due to the difference in their molecular weight.)	Substance Notification No. FCN 0001036	accepted conditions of use (6)
Hypobromous acid	In water or ice used for processing poultry products	Generated on-site from an aqueous mixture of hydrogen bromide and sodium, potassium, or calcium hypochlorite for use at a level not to exceed that needed to provide 450 ppm available bromine or 200 ppm available chlorine	Food Contact Substance Notification No. FCN 0001098	None under the accepted conditions of use (6)
Hypobromous acid	In water or ice, used as either a spray or a dip, for meat (hides on or off) or poultry processing	Generated on-site from an aqueous mixture of hydrogen bromide and sodium, potassium, or calcium hypochlorite for use at a level not to	Food Contact Substance Notification No. FCN 0001106	None under the accepted conditions of use (6)

		exceed that needed to provide 300 ppm total bromine (182 ppm HOBr) (or 133 ppm total chlorine*) in water or ice applied to meat products. At a level not to exceed 200 ppm total bromine (121 ppm HOBr) (or 90 ppm total chlorine*) in water or ice applied to poultry products. *(NOTE: Because there are a limited number of commercial test kits specific for bromine, chlorine kits may be used. The ppm levels between available bromine and chlorine is due to the difference in their molecular weight.)		
Lactic acid	Livestock carcasses prior to fabrication (i.e., pre- and post-chill), offal, and variety meats	Up to a 5 percent lactic acid solution	Acceptability determination	None under the accepted conditions of use (1)
Lactic acid	Beef and pork sub-primals and trimmings	2 percent to 5 percent solution of lactic acid not to exceed 55°C	Acceptability determination	None under the accepted conditions of use (1)
Lactic acid	Poultry carcasses, meat, parts, trim and giblets	Up to 5% lactic acid solution on post chill poultry carcasses, meat, parts, trim and giblets.	Acceptability determination	None under the accepted conditions of use (1)
Lactic acid	Beef heads and tongues	A 2.0 to 2.8 percent solution applied to brushes in a washer cabinet system used to clean beef heads and tongues	Acceptability determination	None under the accepted conditions of use (1)
Lactic acid bacteria	RTE cooked	Applied by dipping	Acceptability	Listed by common

mixture consisting of <i>Lactobacillus acidophilus</i> (NP35, NP51), <i>Lactobacillus lactis</i> (NP7), and <i>Pediococcus acidilactici</i> (NP3)	sausages (e.g., frankfurters, bologna, etc.) and cooked, cured whole muscle products (e.g., ham)	product into a solution containing 10 ⁷ colony forming units lactobacilli per ml	determination	or usual name in the ingredients statement (2)
Lactic acid bacteria mixture consisting of <i>Lactobacillus acidophilus</i> (NP35, NP51), <i>Lactobacillus lactis</i> (NP7), and <i>Pediococcus acidilactici</i> (NP3)	Poultry carcasses and fresh whole muscle cuts and chopped/ground poultry	10 ⁵ to 10 ⁶ colony forming units of lactobacilli per gram of product	Acceptability determination	Listed by common or usual name in the ingredients statement of non-standardized products. Single ingredient raw products must be descriptively labeled (2)
Lactic acid bacteria mixture consisting of <i>Lactobacillus acidophilus</i> (NP35, NP51), <i>Lactobacillus lactis</i> (NP7), and <i>Pediococcus acidilactici</i> (NP3)	Non-standardized comminuted meat products (e.g., beef patties), ground beef, and raw whole muscle beef cuts	10 ⁶ to 10 ⁸ colony forming units of lactobacilli per gram of product	GRAS Notice No. 000171	Listed by common or usual name in the ingredients statement of non-standardized comminuted meat products. Ground beef and raw whole muscle beef cuts must be descriptively labeled (2)
Lactoferrin	Beef carcasses and parts	At up to 2 percent of a water-based antimicrobial spray	GRAS Notice No. 000067	Listed by common or usual name in ingredients statement (2)
Lactoferrin	Beef carcasses	As part of an antimicrobial spray that would deliver 1 gram of lactoferrin per dressed beef carcass, followed by a wash with tempered water and rinse with lactic acid	GRAS Notice No. 000130	None under the accepted conditions of use (1)
Lauramide arginine ethyl ester (LAE), silicon dioxide, and refined sea salt	Non-standardized RTE comminuted meat products and standardized RTE comminuted meat products that permit	Not to exceed 200 ppm LAE by weight of the finished product	Acceptability determination	Listed by common or usual name (i.e., lauric arginate, refined sea salt) in the ingredients statement (2)

	the use of any safe and suitable antimicrobial agent			
Lauramide arginine ethyl ester (LAE), silicon dioxide, and refined sea salt	Fresh cuts of meat and poultry; and, non-standardized, non-comminuted RTE meat and poultry products and standardized, non-comminuted RTE meat and poultry products that permit the use of any safe and suitable antimicrobial agent	Not to exceed 200 ppm LAE, 67 ppm silicon dioxide, and 1640 ppm refined sea salt by weight of the finished product	Acceptability determination	Listed by common or usual name (i.e., lauric arginate, silicon dioxide, refined sea salt) in the ingredients statement (2) When applied to the surface of fresh cuts of meat and poultry none under the accepted conditions of use (1)
Lauramide arginine ethyl ester (LAE) dissolved at specified concentrations in either propylene glycol, glycerin, or water to which may be added a Polysorbate surface active agent (quantity sufficient to achieve the intended technical effect of LAE emulsification)	Non-standardized RTE comminuted meat products and standardized RTE comminuted meat products that permit the use of any safe and suitable antimicrobial agent	Not to exceed 200 ppm LAE by weight of the finished product	Acceptability determination	Listed by common or usual name (i.e., lauric arginate) in the ingredients statement (2)
Lauramide arginine ethyl ester (LAE) dissolved at specified concentrations in either propylene glycol, glycerin, or water to which may be added a Polysorbate surface active agent (quantity sufficient to achieve the intended technical effect of LAE emulsification)	Fresh cuts of meat and poultry and various non-standardized RTE meat and poultry products and standardized RTE meat and poultry products that permit the use of any safe and suitable antimicrobial agent	Applied to the surface of the product at a rate not to exceed 200 ppm LAE by weight of the finished food product	GRAS Notice No. 000164	When applied to the surface of RTE products listed by common or usual name (i.e., lauric arginate) in the ingredients statement (2) When applied to the surface of fresh cuts of meat and poultry none under the accepted conditions of use (1)
Lauramide arginine ethyl ester (LAE)	RTE meat and poultry products; raw	Applied to the inside of the package or to	Acceptability determination	None under the accepted

	pork sausage	product surfaces at up to process at up to 44 ppm (with a process tolerance of 20 percent, allowing for an LAE concentration not to exceed 53 ppm) by weight of the finished food product		conditions of use (1)
Lauramide arginine ethyl ester (LAE) dissolved at specified concentrations in either propylene glycol, glycerin, or water to which may be added a Polysorbate surface active agent (quantity sufficient to achieve the intended technical effect of LAE emulsification)	Ground poultry	Applied in a mixer, blender, or tumbler designed to mix and/or blend other ingredients into ground poultry at a level not to exceed 200 ppm by weight in the finished product. The LAE is sprayed with a metered dose into the mixer, blender, or tumbler as the product is being mixed, blended, or tumbled	Acceptability determination	None under the accepted conditions of use (1)
Lauramide arginine ethyl ester (LAE)	Ground beef	Applied at a level not to exceed 200 ppm by weight in the finished product	Acceptability determination	None under the accepted conditions of use (1)
Nisin preparation	Cooked, RTE meat and poultry products containing sauces	Not to exceed 600 ppm nisin preparation in the finished product	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Nisin preparation	Meat and poultry soups	Not to exceed 200 ppm of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Nisin preparation	In casings and on cooked (RTE) meat and poultry products	3.15 mg per pound in the finished product when used in casings; 2.5 mg per pound on cooked meat and poultry products	GRAS Notice No. 000065	Listed by common or usual name in the ingredients statement (2)
Nisin preparation	Egg products	Not to exceed 250	Acceptability	Listed by common

		ppm in formulated product	determination	or usual name in the ingredients statement (2)
A blend of encapsulated nisin preparation (90.9 percent), rosemary extract (8.2 percent) and salt (0.9 percent)	Frankfurters and other similar cooked meat and poultry sausages	Not to exceed 550 ppm of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (4)
A blend of nisin preparation, rosemary extract, salt, maltodextrin, and cultured dextrose	Cooked (RTE) meat and poultry sausages and cured meat products	Not to exceed 0.55 percent of product formulation in cooked (RTE) meat and poultry sausages and 0.7 percent of product formulation in cured meat products (where the nisin preparation will not exceed 250 ppm)	Acceptability determination	Listed by common or usual name in the ingredients statement (4)
A blend of nisin preparation, rosemary extract, salt, and sodium diacetate	Cooked (RTE) meat and poultry sausages and cured meat products	Not to exceed 0.25 percent of product formulation (where the nisin preparation will not exceed 250 ppm)	Acceptability determination	Listed by common or usual name in the ingredients statement (4)
Organic Acids (i.e., lactic, acetic, and citric acid)	As part of a carcass wash applied pre-chill	At up to 2.5 percent of a solution	FSIS Notice 49-94	None under the accepted conditions of use (1)
Ozone	All meat and poultry products	In accordance with current industry standards of good manufacturing practice	21 CFR 173.368	None under the accepted conditions of use (3)
An aqueous solution of peroxyacetic acid, hydrogen peroxide, acetic acid, and 1-hydroxyethylidene-1, 1-diphosphonic acid (HEDP)	In poultry processing water, scalding, ice, spray applications, and as an acidifier in scald tanks as a scald additive	The level of peroxyacetic acid will not exceed 220 ppm, hydrogen peroxide will not exceed 110 ppm, and HEDP will not exceed 13 ppm	Acceptability determination	None under the accepted conditions of use (3)
Peroxyacetic acid, octanoic acid, acetic acid, hydrogen peroxide,	Meat and poultry carcasses, parts, trim and organs	Maximum concentrations for meat carcasses, parts, and organs:	21 CFR 173.370	None under the accepted conditions of use (3)

peroxyoctanoic acid, and 1-hydroxyethylidene-1, 1-diphosphonic acid (HEDP)		Peroxyacetic acids 220 ppm, hydrogen peroxide 75 ppm; Maximum concentrations for poultry carcasses, parts, and organs: Peroxyacetic acids 220 ppm, hydrogen peroxide 110 ppm, HEDP 13 ppm		
A mixture of peroxyacetic acid, hydrogen peroxide, acetic acid, and 1-hydroxyethylidene-1, 1-diphosphonic acid (HEDP)	(1) Process water for washing, rinsing, cooling, or otherwise for processing meat carcasses, parts, trim, and organs; and (2) process water applied to poultry parts, organs, and carcasses as a spray, wash, rinse, dip, chiller water, or scald water	In either application, the level of peroxyacetic acid will not exceed 230 ppm, hydrogen peroxide will not exceed 165 ppm, and HEDP will not exceed 14 ppm	Food Contact Substance Notification No. FCN 000323	None under the accepted conditions of use (6)
An aqueous mixture of peroxyacetic acid, hydrogen peroxide, acetic acid, and 1-hydroxyethylidene-1, 1-diphosphonic acid (HEDP)	Added to process water applied to poultry parts, organs, and carcasses as a spray, wash, rinse, dip, chiller water, low temperature (e.g., less than 40 degrees F) immersion baths, or scald water	At a level not to exceed 2,000 ppm peroxyacetic acid and 136 ppm HEDP	Food Contact Substance Notification No. FCN 000880	None under the accepted conditions of use (6)
An aqueous mixture of peroxyacetic acid, hydrogen peroxide, acetic acid, and 1-hydroxyethylidene-1, 1-diphosphonic acid (HEDP) and optionally sulfuric acid	(1) Water or ice for washing, rinsing, cooling, or otherwise processing whole or cut meat, including parts, trim, and organs; and, (2) water or ice applied to whole or cut poultry including parts, trim, and organs as a spray, wash, rinse, dip,	In either application, the level of peroxyacetic acid will not exceed 220 ppm, hydrogen peroxide will not exceed 85 ppm, and HEDP will not exceed 11 ppm measured prior to application.	Food Contact Substance Notification No. FCN 000887	None under the accepted conditions of use (6)

	chiller water or scald water			
An aqueous mixture of peroxyacetic acid, hydrogen peroxide, acetic acid, and 1-hydroxyethylidene-1, 1-diphosphonic acid (HEDP) and sulfuric acid	Red meat carcasses, parts, and trim	The level of peroxyacetic acid will not exceed 230 ppm, hydrogen peroxide will not exceed 75 ppm, and HEDP will not exceed 13 ppm.	Food Contact Substance Notification No. FCN 000951	None under the accepted conditions of use (6)
A mixture of peroxyacetic acid, hydrogen peroxide, acetic acid, and 1-hydroxyethylidene-1, 1-diphosphonic acid (HEDP)	(1) Water or ice for washing, rinsing, cooling, or processing whole or cut meat including carcasses, parts, trim, and organs; and (2) water or ice applied to whole or cut poultry including parts, trim, and organs as a spray, wash, rinse, dip, chiller water, or scald water	In either application, the level of peroxyacetic acid will not exceed 220 ppm, hydrogen peroxide will not exceed 80 ppm, and HEDP will not exceed 1.5 ppm measured prior to application	Food Contact Substance Notification No. FCN 000993	None under the accepted conditions of use (6)
An aqueous mixture of peroxyacetic acid, hydrogen peroxide, acetic acid, and 1-hydroxyethylidene-1, 1-diphosphonic acid (HEDP)	In process water or ice for washing, rinsing, storing, or cooling of processed and preformed meat and poultry products	The level of peroxyacetic acid will not exceed 220 ppm, hydrogen peroxide will not exceed 85 ppm, and HEDP will not exceed 11 ppm.	Food Contact Substance Notification No. FCN 001082	None under the accepted conditions of use (6)
An aqueous mixture of peroxyacetic acid, hydrogen peroxide, acetic acid, and 1-hydroxyethylidene-1, 1-diphosphonic acid (HEDP)	In process water used for washing, rinsing, cooling or otherwise for processing meat carcasses, parts, trim, and organs; and in process water applied to poultry parts, organs, and carcasses as a spray, wash, rinse, dip, chiller water, or scald water	The level of peroxyacetic acid will not exceed 220 ppm, hydrogen peroxide will not exceed 160 ppm, and HEDP will not exceed 11 ppm.	Food Contact Substance Notification No. FCN 001089	None under the accepted conditions of use (6)
An aqueous mixture	In process water or	The level of	Food Contact	None under the

of peroxyacetic acid, hydrogen peroxide, 1-hydroxyethylidene-1, 1-diphosphonic acid (HEDP), and optionally sulfuric acid	ice used for washing, rinsing, cooling or processing whole or cut meat including parts, trim, and organs; and in process water or ice applied to whole or cut poultry including parts, trim and organs, and carcasses as a spray, wash, rinse, dip, chiller water, or scald water	peroxyacetic acid will not exceed 220 ppm, hydrogen peroxide will not exceed 80 ppm, and HEDP will not exceed 13 ppm measured prior to application.	Substance Notification No. FCN 001093	accepted conditions of use (6)
An aqueous mixture of peroxyacetic acid, hydrogen peroxide, acetic acid, 1-hydroxyethylidene-1, 1-diphosphonic acid (HEDP), dipicolinic acid, and sulfuric acid	Red meat carcasses, parts, trim, and organs	The level of peroxyacetic acid will not exceed 230 ppm, hydrogen peroxide will not exceed 75 ppm, and HEDP will not exceed 1 ppm, and dipicolinic acid will not exceed 0.5 ppm.	Food Contact Substance Notification No. FCN 001094	None under the accepted conditions of use (6)
Potassium diacetate	Various meat and poultry products which permit the addition of antimicrobial agents, e.g., hot dogs	Not to exceed 0.25 percent of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
A solution of water, lactic acid, propionic acid, and acidic calcium sulfate (solution with a pH range of 1.0-2.0)*	Various RTE meat products, e.g., hot dogs.	Applied as a spray for 20-30 seconds of continual application just prior to packaging <i>*Propionic acid may be removed from the solution; sodium phosphate may be added to the solution as a buffering agent (the amount of sodium phosphate on the finished product must not exceed 5000 ppm measured</i>	Acceptability determination	Listed by common or usual name in the ingredients statement (2)

		prior to application.		
A solution of water, acidic calcium sulfate and 85-95,000 ppm of lactic acid (solution with a pH range of 0.35 to 0.55)	Raw comminuted beef.	To treat raw beef during grinding to lower the pH of the product.	Acceptability determination	Product must be descriptively labeled (2)
A solution of water, acidic calcium sulfate, lactic acid, and sodium phosphate (solution with a pH range of 1.45 to 1.55)	Raw whole muscle beef cuts and cooked roast beef and similar cooked beef products (e.g., corned beef, pastrami, etc.).	Spray applied for up to 30 seconds of continual application <i>*sodium phosphate on the finished product must not exceed 5000 ppm.</i>	Acceptability determination	Listed by common or usual name in the ingredients statement of multi-ingredient products. Single ingredient roast beef products and raw whole muscle beef cuts must be descriptively labeled (2)
A solution of water, acidic calcium sulfate, lactic acid, and sodium phosphate (solution with a pH of 1.45 to 1.6)	Cooked poultry carcasses and parts.	Spray applied for 20 to 40 seconds of continual application <i>* sodium phosphate on the finished product must not exceed 5000 ppm.</i>	Acceptability determination	Listed by common or usual name in the ingredients statement of multi-ingredient products. Single ingredient whole muscle cuts of poultry must be descriptively labeled (2)
A solution of water, acidic calcium sulfate, lactic acid, and disodium phosphate (solution with a pH of 1.0 to 2.0)	Beef jerky	Applied to the surface of the product with a contact time not to exceed 30 seconds	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Skim milk or dextrose cultured with <i>propionibacterium freudenreichii</i> subsp. <i>Shermanii</i>	Meat and poultry sausages including those with standards of identity which permit the use of antimicrobial agents	Not to exceed 2 percent by weight of the finished product	GRAS Notice No. 000128	Listed by common or usual name in the ingredients statement (2)
Sodium citrate buffered with citric acid to a pH of 5.6	Non-standardized and standardized comminuted meat and poultry products which permit	Not to exceed 1.3 percent of the product formulation in accordance with 21 CFR 184.1751	Acceptability determination	Listed by common or usual name in the ingredients statement (2)

	ingredients of this type			
Sodium hypochlorite	Red meat carcasses down to a quarter of a carcass	Applied as a spray at a level not to exceed 50 ppm calculated as free available chlorine measured prior to application	Acceptability determination	None under the accepted conditions of use (1)
Sodium hypochlorite	On whole or eviscerated poultry carcasses	Applied as a spray at a level not to exceed 50 ppm calculated as free available chlorine measured prior to application	Acceptability determination	None under the accepted conditions of use (1)
Sodium hypochlorite	In water used in meat processing	Not to exceed 5 ppm calculated as free available chlorine	Acceptability determination	None under the accepted conditions of use (1)
Sodium hypochlorite	In water used in poultry processing (except for product formulation)	Not to exceed 50 ppm calculated as free available chlorine	Acceptability determination	None under the accepted conditions of use (1)
Sodium hypochlorite	Poultry chiller water	Not to exceed 50 ppm calculated as free available chlorine (measured in the incoming potable water)	Acceptability determination	None under the accepted conditions of use (1)
Sodium hypochlorite	Poultry chiller red water (i.e., poultry chiller water re-circulated, usually through heat exchangers, and reused back in the chiller)	Not to exceed 5 ppm calculated as free available chlorine (measured at influent to chiller)	Acceptability determination	None under the accepted conditions of use (1)
Sodium hypochlorite	Reprocessing contaminated poultry carcasses	20 ppm calculated as free available chlorine Note: Agency guidance has allowed the use of up to 50 ppm calculated as free available chlorine	9 CFR 381.91	None under the accepted conditions of use (1)
Sodium hypochlorite	On giblets (e.g.,	Not to exceed 50	Acceptability	None under the

	livers, hearts, gizzards, and necks) and salvage parts	ppm calculated as free available chlorine in the influent to a container for chilling.	determination	accepted conditions of use (1)
Sodium hypochlorite	Beef primals	20 ppm calculated as free available chlorine	Acceptability determination	None under the accepted conditions of use (1)
Sodium metasilicate	Component of marinades used for raw meat and poultry products	Not to exceed 2 percent by weight of the marinade	Acceptability determination	None under the accepted conditions of use (1)
Sodium metasilicate	Raw beef carcasses, subprimals, and trimmings	A 4 percent (plus or minus 2 percent) solution	Acceptability determination	None under the accepted conditions of use (1)
Sodium metasilicate	RTE meat and poultry products	Up to a 6 percent solution applied to the surface of the product at a rate not to exceed 300 ppm of the finished product	Acceptability determination	None under the accepted condition of use (1)
Sodium metasilicate and sodium carbonate blend	RTE poultry products	Up to 15 percent of a solution of sodium metasilicate and sodium carbonate (sodium metasilicate not to exceed 6 percent) applied as a surface application at a rate not to exceed 700 ppm by weight of the finished poultry product	Acceptability determination	None under the accepted condition of use (1)
Trisodium phosphate	Raw poultry carcasses, parts, and giblets	See Q&A #15 for permitted level uses.	Acceptability determination	None under the accepted conditions of use (1)
Antioxidants				
BHA (butylated hydroxyanisole)	“Brown N Serve” sausages	0.02 percent in combination with other antioxidants for use in meat, based on fat content	Acceptability determination	Listed by common or usual name in the ingredients statement (4)
BHT (butylated	“Brown N Serve”	0.02 percent in	Acceptability	Listed by common

hydroxytoluene)	sausages	combination with other antioxidants for use in meat, based on fat content	determination	or usual name in the ingredients statement (4)
A combination of canola oil, mono- and di-glycerides, the natural spice extract rosemary, and natural mixed tocopherols derived from sunflowers	Dried turkey broth powder	At a level not to exceed 0.12 percent during production of dried turkey broth powder	Acceptability determination	None under the accepted conditions of use (1) except for rosemary extract. Rosemary extract should be identified as "rosemary extract, flavoring, or natural flavoring" in the ingredients statement
Binders				
A combination of food starch (e.g., modified corn starch) and carrageenan	Turkey ham and water products and cured pork products where binders are permitted per 9 CFR 319.104	Combination not to exceed 3 percent of the product formulation with carrageenan not to exceed 1.5 percent (9 CFR 424.21(c))	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
A mixture of sodium alginate, calcium sulfate, glucono delta-lactone, and sodium pyrophosphate	Various meat and poultry products where binders are permitted	Mixture not to exceed 1.55 percent of product formulation with the sodium alginate not to exceed 1 percent of the product formulation and the sodium pyrophosphate not to exceed 0.5 percent of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (4)
A mixture of carrageenan, whey protein concentrate, and xanthan gum	Sausages where binders are permitted; cooked poultry products; beef and poultry patties; modified breakfast sausage, cooked sausages, and fermented sausages covered by FSIS	Not to exceed 3.5 percent by weight of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (4)

	Policy Memo 123; and modified substitute versions of fresh sausage, ground beef, or hamburger covered by FSIS Policy Memo 121B.			
Beef collagen	Various meat and poultry products where binders are permitted	Not to exceed 3.5 percent of product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (4)
Beef protein	As a coating or marinade or addition to beef pattie mix when the beef protein is used as (a) a water binding agent to retain moisture and/or (b) used to block fat in cooked product	Beef protein is only used in beef food products where binders are permitted and the ingredient "Beef Protein" is appropriately declared on the label of raw "Beef with Beef Protein" product per 9 CFR Section 317.2(c)(2). When used as a marinade or coating, beef protein does not exceed 0.8% by weight of the final product formulation. When used in the batter only, beef protein does not exceed 0.14% by weight of the final product formulation. When used as both coating and in the batter, beef protein does not to exceed 0.89% by weight of the final product formulation	GRAS Notice No. 000313	"Beef Protein" used when the protein concentration is 18% or less; "Concentrated Beef Protein" used when protein concentration is greater than 18%. Final determination will be made by FSIS when label is submitted for approval (2)
Binders listed in 9 CFR 424.21(c) for use in cured pork	"Turkey ham and water products"	In accordance with 9 CFR 319.104(d) and 424.21(c)	Acceptability determination	Listed by common or usual name in the ingredients

products and poultry products				statement (2)
Canola Protein (CPI) and Hydrolized Canola Protein (HCPI)	Used as a binder in ground meat (beef and pork patties) and whole muscle poultry products where binders are permitted	Up to 2% of product formulation	GRN 000386	Listed by the common or usual name in the ingredient statement (2)
Carboxymethyl cellulose (cellulose gum)	Poultry franks	Not to exceed 3.5 percent of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (4)
Carboxymethyl cellulose	Cured pork products	Not to exceed 3 percent of product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (4)
Carrot Fiber	Various comminuted meat and poultry products where binders are permitted	Not to exceed 3.5 percent of the product formulation	GRAS Notice No. 000116	List as "isolated carrot product" (2)
Cellulose, powdered conforming to the specifications in the Food Chemicals Codex 5 th Edition	Various comminuted poultry products where binders are permitted	Not to exceed 3.5 percent of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Guar powder, micronized	Various meat and poultry products where binders are permitted	Not to exceed 3.0 percent of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (4)
Hydroxypropyl methylcellulose	Seasoning mixtures added to sauces and gravies produced under FDA jurisdiction that will be used in meat and poultry products	Sufficient for purpose	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Hydroxypropyl methylcellulose	Thickener in meat and poultry pot pie fillings, sauces, soups, and gravies	Not to exceed 1 percent of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Inulin	Various meat and poultry products (e.g., frankfurters, sausage, patties, loaves, pates) where binders are permitted	2 to 5 percent of the product formulation	Acceptability determination and GRAS Notice No. 000118	Listed by common or usual name in the ingredients statement (2)

Konjac flour	Meat and poultry products in which starchy vegetable flours are permitted	No to exceed 3.5 percent of the product formulation individually or collectively with other binders	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Methylcellulose	Various comminuted meat and poultry products where binders are permitted	Not to exceed 3.5 percent of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Methylcellulose	Thickener in meat and poultry pot pie fillings, sauces, soups, and gravies; a binder in poultry patties, loaves, and nuggets; a binder in meat patties, loaves, and nuggets; texturizer in Policy Memo 121B and 123 products.	Not to exceed 1 percent of the product formulation as a thickener in meat and poultry pot pie fillings, sauces, soups, and gravies; 1.6 percent as a binder in poultry patties, loaves, and nuggets; 0.25 percent as a binder in meat patties, loaves, and nuggets; 0.6 percent as a texturizer in Policy Memo 121B and 123 products	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
MPEs (Meat Protein Extracts) (poultry protein, beef protein, and pork protein). Produced through the use of Flavourzyme enzyme up to 0.5% by weight of raw meat and poultry products or the combination of Flavourzyme and Protamex enzymes up to 0.5% each by weight of raw meat and poultry products	As binding agents and coatings (flavorings) in meat and poultry products of the same species	In nonstandardized meat and poultry products that permit binders at levels not to exceed 0.89% by weight and in standardized meat and poultry products where standards of identity permit at levels not to exceed 0.89% by weight	Acceptability determination	Listed as “partially hydrolyzed (source of protein) in the ingredients statement (2)
Oat Hull Fiber	Various non-standardized comminuted meat products	Not to exceed 3.5 percent of the product formulation	GRAS Notice No. 000261	Listed as “isolated oat product” in the ingredients statement (2)

Oat Hull Fiber	Whole muscle and comminuted poultry products where binders are permitted	Not to exceed 3.5 percent of the product formulation	GRAS Notice No. 000342	Listed as "isolated oat product" in the ingredients statement (2)
Oat Fiber	Various meat products (e.g., frankfurters, sausage patties, loaves) where binders are permitted and whole muscle meat products	Not to exceed 3.5 percent of the product formulation	Acceptability determination	Listed as "isolated oat product" or "modified oat product" in the ingredients statement. Whole muscle meat products must be descriptively labeled (4)
Orange pulp, dried	Non-standardized whole muscle meat and poultry products where binders are permitted and standardized whole muscle meat and poultry products where standards of identity permit the use of binders	Not to exceed 3.5 percent of the product formulation	Acceptability determination	List as "citrus flour" or "dried orange pulp" (2)
Orange pulp, dried and orange pulp, dried with guar gum	Various ground meat and poultry products where binders are permitted	Not to exceed 3.5 percent of the product formulation	GRAS Notice No. 000154	List as "citrus flour" or "dried orange pulp" (2)
Partially hydrolyzed proteins	Various meat and poultry products where binders are permitted.	Not to exceed 3.5 percent of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Pea fiber	Non-standardized meat and poultry products, e.g., meat patties and poultry nuggets	Sufficient for purpose	Acceptability determination	Listed as "isolated pea product" (2)
Pectin	Various meat and poultry products where binders are permitted	Not to exceed 3 percent of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Plum extract, Plum puree, Plum fiber, Plum powder	Whole cuts of meat and poultry products. Various, meat and poultry products where binders are	Not to exceed Up to 2% product formulation	Acceptability Determination	List as "isolated plum product"

	permitted.			
Pork collagen	Various meat and poultry food products where binders are permitted	Not to exceed 3.5 percent of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Pork skin proteins	Various meat products where binders are permitted	Not to exceed 1.5 percent of product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (4)
Pork Protein	As a coating or marinade or addition to pork when the pork protein is used as (a) water binding agent to retain moisture and/or (b) block fat in cooked product	Pork protein is only used in pork products where binders are permitted and the ingredient "Pork Protein" is appropriately declared on the label of raw "Pork with Pork Protein" product per 9 CFR Section 317.2(c)(2); when used as marinade or protein coating not to exceed 0.8% by weight of final product formulation; when used in batter only not to exceed 0.14% by weight of final product formulation; when used as both coating and in batter not to exceed 0.89% by weight of final product formulation	GRAS Notice No. 000314	"Pork Protein" used when the protein concentration is 21% or less; "Concentrated Pork Protein" used when protein concentration is greater than 21%. Final determination will be made by FSIS when label is submitted for approval for "Pork with Pork Protein" product (2)
Potato fiber	Whole muscle poultry products and comminuted meat and poultry products where binders are permitted	Not to exceed 3.5 percent of product formulation	GRAS Notice No. 000310	Listed as "isolated potato product" (2)
Rice bran	Various comminuted meat and poultry products where	Not to exceed 3.5 percent of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients

	binders are permitted (e.g., hot dogs, meatballs, and chicken patties)			statement (2)
Rice starch	Cured pork products	Not to exceed 0.8 percent of product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (4)
Sodium alginate	Various meat products where binders are permitted	Not to exceed 1 percent of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Sodium alginate	Various poultry products where binders are permitted	Not to exceed 0.8 percent of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Soy Fiber (Okara)	Sausages as provided for in 9 CFR Part 319, bockwurst	Not to exceed 3.5 percent of the formulation individually or collectively with other binders for use in meat	Acceptability determination	Listed as "Isolated Soy Product" in the ingredients statement (2)
Soy Fiber (Okara)	Chili con carne, chili con carne with beans	Not to exceed 8 percent of the formulation individually or collectively with other binders for use in meat	Acceptability determination	Listed as "Isolated Soy Product" in the ingredients statement (2)
Soy Fiber (Okara)	Spaghetti with meatballs and sauce, spaghetti with meat and sauce and similar products	Not to exceed 12 percent of the formulation individually or collectively with other binders for use in meat	Acceptability determination	Listed as "Isolated Soy Product" in the ingredients statement (2)
Soy Fiber (Okara)	Various meat and poultry products (e.g., patties, loaves, pates) where binders are permitted	Sufficient for purpose	Acceptability determination	Listed as "Isolated Soy Product" in the ingredients statement (2)
"(species) protein" (e.g., chicken protein)	Whole muscle poultry food products where binders are permitted provided the protein is used in products of the same kind (e.g.,	Not to exceed 0.225 percent of the marinade solution	Acceptability determination	Listed by common or usual name in the ingredients statement (2)

	chicken protein in a marinade injected into whole muscle chicken food products)			
“(species) protein” (e.g., chicken protein, concentrated turkey protein)	Various poultry products where the protein solution is used in products of the same kind (e.g., chicken protein in a coating of a breaded chicken fritter)	As a coating applied to the product and/or as a portion of the batter. Not to exceed 0.8 percent of product formulation when applied as a protein coating only, 0.14 percent of product formulation when used in the batter only, and 0.89 percent of product formulation when used as both a coating and in the batter	GRAS Notice No. 000168	None under the accepted conditions of use (1)
Sugar beet fiber	Used as a binding and/or thickening agent in standardized meat and poultry products, and in non-standardized meat and poultry products such as beef and poultry patties, sausages, or chicken links.	In non-standardized meat and poultry products at levels up to 5%, and in standardized meat and poultry products where binding and/or thickening agents are permitted.	GRAS Notice No. 000430	Listed as “sugar beet pulp,” or “sugar beet powder,” or “sugar beet pulp powder” in the ingredients statement (2)
Transglutaminase enzyme	Texturizing agent in meat and poultry food products where texturizing agents and binders are permitted	Not to exceed 65 ppm of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Transglutaminase enzyme	Cross-linking agent in modified meat and poultry products addressed in Policy Memos 121B and 123.	Not to exceed 65 ppm of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Transglutaminase	Binding and cross-	Not to exceed 100	Acceptability	Listed by common

enzyme	linking agent in uncooked restructured chicken breasts	ppm of the product formulation	determination	or usual name in the ingredients statement (2)
Trehalose	Binding and purge control agent in various meat and poultry products where binders are permitted	Not to exceed 2 percent of the product formulation	GRAS Notice No. 000045	Listed by common or usual name in the ingredients statement (2)
Xanthan gum (purified by recovery with ethyl alcohol)	Various meat and poultry products where binders are permitted	Non-standardized meat and poultry products and products with a standard of identity which currently permit the use of xanthan gum listed in 9 CFR 424.21(c)	GRAS Notice No. 000121	Listed by common or usual name in the ingredients statement (4)
Coloring Agents				
Annatto powder (annatto extract, water, potassium carbonate, potassium hydroxide)	To tint sodium nitrite containing cure meat or poultry blends for purposes of visual confirmation of addition in batching operations (in lieu of FD&C Red #3)	At less than 1 ppm per 1000 pounds of meat or poultry blending	Acceptability determination	None under the accepted conditions of use (1)
Carmine (cochineal)	To color isolated soy protein for use in dry cured acidified sausages	0.2 to 0.4 percent of the hydrated protein gel. The protein gel must not exceed 30 percent of the meat food product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (5); Product name requires qualifying statement such as "Artificially Colored"
Carmine (cochineal)	To color non-standardized fully cooked poultry products and standardized fully cooked poultry products that permit the use of coloring agents	Not to exceed 0.0075 percent of total finished product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (5); Product name requires qualifying statement such as "Artificially Colored"
Citric acid	For use as color	Sufficient for	Acceptability	Listed by common

	stabilizer in egg products	purpose	determination	or usual name in the ingredients statement (2)
Monopotassium phosphate or monosodium phosphate	For use as color preservative in egg products	Not to exceed 0.5 percent in liquid whole egg. If water is used as a carrier, not to exceed 50% of the solution mixture by weight	Acceptability determination; 21 CFR 160.110(a)	Listed by common or usual name in the ingredients statement (2)
Titanium dioxide	To color non-standardized RTE poultry products and standardized RTE poultry products that permit the use of coloring agents	Not to exceed 0.25 percent by weight of the food product	Acceptability determination; 21 CFR 73.575	Listed by common or usual name in the ingredients statement (5). Product name requires qualifying statement contiguous to product name such as "Artificially Whitened" or "Artificially Lightened"
<i>Curing Accelerators (must be used only in combination with curing agents)</i>				
Potassium erythorbate	Cured pork and beef cuts; cured meat food products; cured comminuted poultry or poultry products	87.5 oz. to 100 gallons of pickle at 10 percent pump; 7/8 oz. to 100 lbs. Of meat, meat byproduct or poultry product; 10 percent to surfaces of cured meat cuts or poultry products prior to <i>packaging</i>	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
<i>Denuding agents (may be used in combination. Must be removed from tripe by rinsing with potable water.)</i>				
Calcium carbonate	Denuding agent for washing tripe	Sufficient for purpose	Acceptability determination	None under the accepted conditions of use (1)
Calcium citrate	Denuding agent for washing tripe	Sufficient for purpose	Acceptability determination	None under the accepted conditions of use (1)
Calcium hydroxide	Denuding agent for	Sufficient for	Acceptability	None under the

	washing tripe	purpose	determination	accepted conditions of use (1)
Potassium carbonate	Denuding agent for washing tripe	Sufficient for purpose	Acceptability determination	None under the accepted conditions of use (1)
Potassium citrate	Denuding agent for washing tripe	Sufficient for purpose	Acceptability determination	None under the accepted conditions of use (1)
Potassium hydroxide	Denuding agent for washing tripe	Sufficient for purpose	Acceptability determination	None under the accepted conditions of use (1)
Tricalcium phosphate	Denuding agent for washing tripe	Sufficient for purpose	Acceptability determination	None under the accepted conditions of use (1)
Tripotassium phosphate	Denuding agent for washing tripe	Sufficient for purpose	Acceptability determination	None under the accepted conditions of use (1)
Film Forming Agents				
A mixture of invert sugar, water, maltodextrin, malic acid, modified food starch, pectin, and xanthan gum	Used to transfer flavorings, spices or coloring to the packaging materials of meat and poultry products	Not to exceed 0.5% of the total of the finished product	Acceptability determination	None under the accepted conditions of use (1)
A mixture of water, glycerin, carrageenan, and cornstarch	Used to aid in the release of elastic netting on cooked meat products that are cooked in elastic netting	Sufficient for purpose	Acceptability determination	None under the accepted conditions of use (1)
A mixture of water, glycerin, carageenan, cornstarch, and caramel	Used to aid in the release of elastic netting on cooked meat products that are cooked in elastic netting	Sufficient for purpose	Acceptability determination	"Caramel Color" listed as an ingredient and as a product name qualifier (2)
A mixture of water, glycerin, carageenan, cornstarch, and smoke flavoring	Used to aid in the release of elastic netting on cooked meat products that are cooked in elastic	Sufficient for purpose	Acceptability determination	"Smoke Flavor" listed as an ingredient and as a product name qualifier (2)

	netting			
A solution of sodium alginate, dextrose, isolated pea protein, sugar, and maltodextrin (DE of 6) used with a solution of calcium chloride, powdered sugar, oleoresin black pepper, and isolated pea protein.	Used to form a calcium alginate-based casing on pork and poultry sausages.	Quantity of the casing on the sausage ranges from 8 to 15 percent of total product formulation and calcium alginate not to exceed 0.219 percent of the finished product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (4)
Gelatin spice sheets	To ensure even distribution of seasonings on cooked pork products	Sufficient for purpose	Acceptability determination	None under the accepted conditions of use (1)
Hydroxypropyl methylcellulose	Film-forming agent in glazes for meat and poultry products	Not to exceed 4 percent of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Methylcellulose	Film-forming agent in glazes for meat and poultry products	Not to exceed 3 percent of the product formulation for poultry products, 3.5 percent of the product formulation for meat products	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Flavoring Agents				
Adenosine 5'-monophosphoric acid (AMP) and its monosodium and disodium salts	As a flavor enhancer for meat and poultry soups and soup mixes	Not to exceed 200 ppm of the product formulation	GRAS Notice No. 000144	Listed by common or usual name in the ingredients statement (2)
Carboxypeptidase enzyme preparation	To accelerate the development of flavor during the ripening process of fermented meat	At levels of 1.2-6.0 milligrams TOS/kg of fermented meat	GRAS Notice No. 000345	Listed as Carboxypeptidase (CPG) enzyme or "enzyme" in the ingredients statement (2)
Encapsulated sodium diacetate	Flavor enhancer in fresh and ready-to-eat (RTE) comminuted and whole muscle meat and fresh and RTE whole muscle poultry applied as a component in	At a level not to exceed 1.0 percent (total formula weight) in combination with other GRAS acids at a level sufficient to achieve a pH of 4.8 – 5.5	Acceptability determination	Listed by common or usual name in the ingredients statement. Comminuted product must be descriptively labeled. (2)

	seasoning blends and meat sauces			
Lactic acid	As a flavor enhancer added to pork fatty tissue used in the production of dehydrated pork fatty tissue	Not to exceed 0.367 percent of the pork fatty tissue, prior to dehydration	Acceptability determination	Product must be descriptively labeled (4)
Laminaria japonica (brown algae)	As a flavor enhancer or flavoring agent in marinades for meat and poultry, meat and poultry soups, gravies, and seasonings	Not to exceed 0.08 percent of the product formulation	GRAS Notice No. 000123	Listed by common or usual name in the ingredients statement (2)
Mixture of citrus (orange) extract, oregano extract, and rosemary extract	As a natural flavoring in meat and poultry products including RTE, fresh, cooked and frozen beef, pork, and poultry products where currently permitted by FSIS regulations	Up to 1000 ppm of the final product formulation	Acceptability determination	Each ingredient listed by common or usual name or collectively as "natural flavoring" (4)
Potassium acetate	Various meat and poultry products	No to exceed 1.2 percent of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (4)
Potassium citrate	As a flavor or flavor enhancing agent in meat and poultry products	Not to exceed 2.25% of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (4)
Sucralose	Non-nutritive sweetener in various non-standardized meat and poultry products	Not to exceed 500 ppm in the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Trehalose	As a flavor enhancer in non-standardized RTE meat and poultry products	Not to exceed 2 percent by weight of product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Miscellaneous				
Alkyl polyglycosides	Hog scalding	Sufficient for purpose of increasing the wetting ability of the	GRAS Notice No. 000237	None under the accepted conditions of use (1)

		caustic solution		
Alkyl polyglycosides	Wash meat (i.e., beef carcasses after the hide has been removed to remove any extraneous hair, dirt, etc.) during butchering	Used at 2% active solution level followed by a potable water rinse	GRAS Notice No. 000237	None under the accepted conditions of use (1)
Ammonium hydroxide	To adjust the pH of brine solutions prior to injection into meat	Sufficient for purpose to achieve a brine solution with a pH of up to 11.6	Acceptability determination	None under the accepted conditions of use (1)
An aqueous solution of arginine, potassium hydroxide, salt, and water	pH control agent in brine solutions for beef subprimals or to make beef patties	Arginine is added to the salt and water brine solution and the pH is adjusted. The potassium hydroxide is then added and the pH is adjusted.	Acceptability determination L-arginine: GRAS Notice No. 000290	Salt and water must be listed by common or usual name on the ingredients statement
A 60/40 blend of sodium bicarbonate and citric acid	To generate carbon dioxide in packages of raw whole muscle cuts of meat and poultry; raw meat and poultry trimmings; raw ground meat and poultry	Incorporated into soaker pads at a level not to exceed 0.5 to 2 grams per pad	Acceptability determination	None under the accepted conditions of use (1)
A solution of water, dextrose, glycerin, maltose, and sodium phosphate	To aid in the removal of residual blood from beef and bison carcasses after the typical exsanguination process is completed	Sufficient for purpose	Acceptability determination	For all edible tissue none under the accepted conditions of use unless the Moisture Fat Free% (MFF%) analysis shows treated carcasses are not in compliance with retained water requirements. All edible tissue from treated carcasses not in compliance must be labeled in accordance with Policy Memo 066C. Organ meat

				from all treated carcasses must be descriptively labeled (1)
Algal oil derived from <i>Schizochytrium sp.</i>	For use as an alternative edible oil in the production of various meat and poultry products	Not to exceed 1.45 percent by weight of the product formulation for meat products and 0.87 percent by weight of the product formulation for poultry products	GRAS Notice No. 000137	Listed by common or usual name in the ingredients statement (2)
Barley fiber	For use as a texturizer in sauces, soups, and gravies containing meat and poultry	Not to exceed 2.5 percent by weight of the product formulation	GRAS Notice No. 000344	Listed as "isolated barley product" in the ingredient statement (2)
Cellulose (powdered)	To facilitate grinding and shredding in cheese	Not to exceed 2 percent of the cheese	Acceptability determination	None under the accepted conditions of use (1)
Choline chloride with or without magnesium stearate	For use as a direct replacement for sodium chloride in meat and poultry products including processed, ready-to-eat (RTE), fresh and frozen meat and poultry products with or without stated standards of identity or composition	Not to exceed 6000 ppm choline chloride. When magnesium stearate is used with choline chloride it is used with 2% added magnesium stearate	Acceptability determination	Listed as "choline chloride" in the ingredient statement (1)
Citroglycerides (citric acid esters of mono- and diglycerides)	To aid in the dispersion of lauric arginate (LAE)	Used in a 5:1 mixture with lauric arginate with the maximum amount in meat and poultry products not to exceed 1125 ppm	GRAS Notice No. 000222	Listed by common or usual name in the ingredients statement (2)
Cultured Sugar (derived from cane, corn, or beets)	In uncooked (raw) sausage meat	At up to 4.8 percent of the product formula	GRAS Notice No. 000240	Cultured cane and beet sugar listed by common or usual name (e.g., "cultured cane sugar) or as "cultured sugar."

				Cultured corn sugar listed as “cultured corn sugar” or “cultured dextrose” (2)
Diacylglycerol oil	For use as an alternative edible oil in the production of various meat and poultry products	Not to exceed 11 percent of the meat or poultry product formula	GRAS Notice No. 000115	Listed by common or usual name in the ingredients statement (2)
Dimethylpolysiloxane (methyl polysilicone)	Antifoaming agent in soups, rendered fats, and curing solutions	Up to 10 ppm in soups and rendered fats; up to 50 ppm in curing solutions	21 CFR 173.340 and 9 CFR 424.21(c)	None under the accepted conditions of use (1)
Erythorbic Acid	To delay discoloration in ground beef and ground beef patties	Not to exceed 0.04 percent of the product formulation	Acceptability determination	Product must be descriptively labeled (2)
Fish oil concentrate	For use as an alternative edible oil in the production of various meat and poultry products	Not to exceed 2.9 percent by weight of the product formulation for meat products and 1.7 percent by weight of the product formulation for poultry products	GRAS Notice No. 000105	Listed by common or usual name in the ingredients statement (2)
Fish oil (predominantly sardine, anchovy, and tuna)	For use as an alternative edible oil in the production of various meat and poultry products	Not to exceed 3.3 percent by weight of the product formulation for meat products and 2.0 percent by weight of the product formulation for poultry products	GRAS Notice No. 000193	Listed by common or usual name in the ingredients statement (2)
Fish oil (predominantly anchovy)	For use as an alternative edible oil in the production of various meat and poultry products	Not to exceed 3.3 percent by weight of the product formulation for meat products and 2.0 percent by weight of the product formulation for poultry products	GRAS Notice No. 000138	Listed by common or usual name in the ingredients statement (2)
Fish oil (predominantly	For use as an alternative edible oil	Not to exceed 6.0 percent by weight of	GRAS Notice No. 000138	Listed by common or usual name in

anchovy) microencapsulated	in the production of various meat and poultry products	the product formulation for meat products and 3.6 percent by weight of the product formulation for poultry products		the ingredients statement (2)
Glucose oxidase and catalase enzymes from <i>Aspergillus niger</i> with a dextrose energy source and sodium bicarbonate buffer	To maintain a low oxygen atmosphere in packages of raw whole muscle cuts of meat and poultry	Incorporated into soaker pads such that the enzymes do not exceed 0.03 percent by weight of the meat or poultry	Acceptability determination	None under the accepted conditions of use (1)
Glucose oxidase and catalase enzymes from <i>Aspergillus niger</i> with a dextrose energy source and sodium bicarbonate buffer	To maintain a low oxygen atmosphere in packages of shelf-stable, ready-to-eat, meat products	Applied to the surface of the product such that the enzymes do not exceed 0.03 percent by weight of the meat food product	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Glycerophospholipid cholesterol acyltransferase (GCAT) enzyme preparation from <i>Bacillus licheniformis</i> expressing a modified GCAT gene from <i>Aeromonas salmonicida</i> subsp. <i>salmonicida</i> (GCAT enzyme preparation)	For use as an emulsifier in comminuted meat products	Not to exceed 22.6 mg TOS/kg of total product formulation	GRAS Notice No. 000265	Listed by common or usual name in the ingredients statement (2)
Guar gum	For use as whipping aid in egg products	Not to exceed 0.5 percent	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Hydrogen peroxide	To minimize biofilm buildup on reverse osmosis and ultrafiltration membranes for processing beef plasma	Not to exceed 100 ppm added just prior to plasma entering membranes	Acceptability determination	None under the accepted conditions of use (1)
Hydrogen peroxide	Used as prescribed for alternative pasteurization treatments of egg	Used at 10 percent solution	21 CFR 178.1005	None under the accepted conditions of use (1)

	products			
Hydrolyzed gelatin	To prevent moisture loss from fresh cuts of meat and poultry	A 13 percent aqueous solution of hydrolyzed gelatin sprayed on the surface not to exceed 2 percent hydrolyzed gelatin by weight of the meat or poultry	Acceptability determination	Listed by common or usual name in the ingredients statement. Label must also bear a statement, contiguous to the product name, indicating product has been coated with hydrolyzed gelatin to prevent moisture loss. (4)
Medium and long chain triacylglycerol (tailored triglycerides containing approximately 12 percent medium chain fatty acids)	For use as a supplementary source of vegetable oil in the production of various meat and poultry products	Sufficient for purposes	GRAS Notice No. 000217	Listed by common or usual name in the ingredients statement (2)
Microcrystalline cellulose coated with cellulose gum, potato starch, sodium tripolyphosphate (a stabilizer), chicken egg white powder, tetrasodium pyrophosphate (a stabilizer), and transglutaminase	For use as a fat replacer and moisture binder in non-standardized comminuted meat products or standardized comminuted meat products that permit the use of binders and phosphates	Not to exceed 2.77% by weight of the final products	Acceptability determination	Labeled in the correct order of predominance followed by a sublisting of each ingredient of the blend listed by its common or usual name in the ingredients statement. Phosphates may be listed collectively as "sodium phosphate" in the correct order of predominance in the sublisting of the blend in the ingredients statement
Polyglycerol ester produced by transesterification of triglycerol with soybean oil	Added to fresh livestock blood during collection to eliminate foaming	Not to exceed 60 ppm in the fresh livestock blood	Acceptability determination	None under the accepted conditions of use (1)

Polyglycerol polyricinoleic acid (PGPR)	For use as an emulsifier in the formulation of color additives which are subsequently used in processed meat and poultry products for which colors are permitted	Sufficient for purpose using good manufacturing practices	GRAS Notice No. 000270	Listed by common or usual name in the ingredients statement (2)
Salmon oil	For use as an alternative edible oil in the production of various meat and poultry products	Not to exceed 5.0 percent by weight of the product formulation for meat products and 3.0 percent by weight of the product formulation for poultry products	GRAS Notice No. 000146	Listed by common or usual name in the ingredients statement (2)
Silicon dioxide	For use as anticaking agent in egg products	Not to exceed 1.0 percent in dried whole eggs or yolks	Acceptability determination; 21 CFR 172.480	Listed by common or usual name in the ingredients statement (2)
Small planktivorous pelagic fish oil	For use as an alternative edible oil in the production of various meat and poultry products	Not to exceed 3.3 percent by weight of the product formulation for meat products and 2.0 percent by weight of the product formulation for poultry products	GRAS Notice No. 000102	Listed by common or usual name in the ingredients statement (2)
Sodium bicarbonate	Neutralize excess acidity (maintain pH) in fresh pork and beef cuts	In an injected solution, not to exceed 0.5 percent of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Sodium bicarbonate	Maintain pH and reduce purge in fresh turkey products	In an injected solution, not to exceed 0.5 percent of the product formulation	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Sodium bicarbonate	To soak natural casings to ease stuffing	1.06 percent of an aqueous solution. Casings must be rinsed with potable water prior to stuffing	Acceptability determination	None under the accepted conditions of use (1)
Sodium carbonate	Used as an anti-	Up to 15 percent of	Acceptability	None under the

	scaling agent with authorized sodium metasilicate (SMS) meat and poultry uses	a solution of sodium metasilicate and sodium carbonate (sodium metasilicate not to exceed 6 percent) applied as a surface application at a rate not to exceed 700 ppm by weight of the authorized SMS meat and poultry product uses	determination	accepted conditions of use (1)
Sodium desoxycholate	For use as whipping aid in egg products	Not to exceed 0.1 percent in egg products	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Sodium gluconate	For use as a stabilizer in emulsion-type sausages (derived from its sequestering properties)	When used in accordance with 21 CFR 182.6757 as a sequestrant and in accordance with good manufacturing practice	Acceptability determination	Listed as "sodium gluconate" in the ingredients statement (2)
Sodium hydroxide	For application to poultry carcasses immediately after removal of feathers and prior to evisceration to minimize fecal material from adhering to the carcass	0.05 percent solution	Acceptability determination	None under the accepted conditions of use (1)
Sodium hydroxide and hydrochloric acid	To adjust the pH of (species) plasma during processing (in which it is exposed to heat) to prevent gelling	Sufficient for purpose to adjust pH	Acceptability determination	None under the accepted conditions of use (1)
Sodium lauryl sulfate	For use as whipping aid in egg products	Not to exceed 0.1 percent in dried egg whites; Not to exceed 0.0125 percent in liquid or frozen egg whites	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Sodium nitrite	For use on one side	At a maximum level	GRAS Notice	Red meat

	of a food packaging film used for vacuum packaging raw red meat and raw whole muscle cuts of red meat as a color fixative	of 113 milligrams per square meter of film.	No. 000228	packaged in a film containing sodium nitrite must be coded with a "Use or Freeze by" date not to exceed 34 days after packaging for ground red meat and 36 days for whole muscle cuts of red meat. A statement similar to "Color maintained with sodium nitrite from packaging" must be placed contiguous to the product name and appear in a type size that is no smaller than 1/3 the size of the largest type size used elsewhere in the product name
Sodium potassium hexametaphosphate	To decrease the amount of cooked out juices in meat and poultry products except where otherwise prohibited by the meat or poultry inspection regulations	Not to exceed 0.5 percent of product formulation	GRAS Notice No. 000316	Listed by common or usual name in the ingredients statement (2)
Sodium silicoaluminate	For use as anticaking agent in egg products	Not to exceed 2.0 percent in dried whole eggs or yolks	Acceptability determination; 21 CFR 160.105(d)(1)	Listed by common or usual name in the ingredients statement (2)
Stearidonic acid (SDA) soybean oil	For use as an ingredient in meat and poultry products	Sufficient for purpose	GRAS Notice No. 000283	Listed by common or usual name in the ingredients statement (2)
Triethyl citrate	For use as whipping aid in egg products	Not to exceed 0.03 percent in liquid or frozen egg whites; not to exceed 0.025	Acceptability determination	Listed by common or usual name in the ingredients statement (2)

		percent in dried egg whites		
Triple salt of magnesium, ammonium, and potassium chloride	For use as a substitute for a portion of the sodium chloride normally used in meat and poultry products.	Sufficient for purpose	GRAS Notice No. 000272	Listed by common or usual name in the ingredients statement (2)
Trisodium phosphate (as a component of phosphate blends, not to exceed 40 percent of the phosphate blend)	To decrease the amount of cooked out juices in meat food products except where otherwise prohibited by the meat inspection regulations and poultry food products except where otherwise prohibited by the poultry products inspection regulations	For meat food products, 5 percent of phosphate in pickle at 10 percent pump level; 0.5 percent of phosphate in meat food product (only clear solution may be injected into meat food product). For poultry food products, 0.5 percent of total product.	Acceptability determination	Listed by common or usual name in the ingredients statement (4) Note: Phosphates may be collectively designated as "sodium phosphates" or "potassium phosphates"
Trisodium diphosphate	For use as a stabilizer, moisturizer, and sequestrant for use in sausages (fine emulsions)	Not to exceed 0.5 percent of phosphate in product	GRAS Notice No. 000300	Listed by common or usual name in the ingredients statement (2) Note: Phosphates may be collectively designated as "sodium phosphates" or "potassium phosphates"
Tuna oil	For use as an alternative edible oil in the production of various meat and poultry products	Not to exceed 3.1 percent by weight of the product formulation for meat products and 1.8 percent by weight of the product formulation for poultry products	GRAS Notice No. 000109	Listed by common or usual name in the ingredients statement (2)
Xanthan gum	To aid in suspending carrageenan and other insoluble solids (e.g., starch and soy protein) in the brine	Not to exceed 2 percent of the amount of carrageenan	Acceptability determination	None under the accepted conditions of use (1)

	tank before poultry and ham pumping			
Packaging Systems				
Carbon monoxide gas as part of Cryovac's modified atmosphere packaging system (for use with 550P Tray/Lid and LID551P)	Packaging fresh cuts of case ready muscle meat and case ready ground meat to maintain wholesomeness, provide flexibility in distribution, and reduce shrinkage of the meat	The use of carbon monoxide (0.4 percent), carbon dioxide (30 percent) and nitrogen (69.6 percent) as part of the Cryovac low oxygen modified atmosphere packaging system used with 550P Tray /Lid	Acceptability Determination	None under the accepted conditions of use (2)
Carbon monoxide gas as part of Cryovac's modified atmosphere packaging system	Packaging fresh cuts of case ready muscle meat and case ready ground meat to maintain wholesomeness	The use of carbon monoxide (0.4 percent), carbon dioxide (30 percent) and nitrogen (69.6 percent) introduced directly into the package. System uses a barrier lid that only covers a highly permeable patch. The permeable patch is a one half inch hole in the lid film. Barrier lid removed prior to display for retail sale	Acceptability determination	None under the accepted conditions of use (2)
Carbon monoxide gas as part of the Pactiv modified atmosphere packaging system (ActiveTech 2001)	Packaging fresh cuts of case ready muscle meat and case ready ground meat to maintain wholesomeness	The use of carbon monoxide (0.4 percent), carbon dioxide (30 percent) and nitrogen (69.6 percent) as part of the Pactiv modified atmosphere packaging system	GRAS Notice No. 000083	None under the accepted conditions of use (2)
Carbon monoxide gas as part of a high oxygen modified atmosphere packaging (MAP)	Packaging fresh cuts of fresh ground and whole muscle meat to maintain wholesomeness,	Not to exceed 0.4 percent of the modified atmosphere gas mixture	GRAS Notice No. 000251	None under the accepted conditions of use (2)

system used in accordance with GRN 000083 (Pactiv)	provide flexibility in distribution, and reduce shrinkage of the meat			
Carbon monoxide gas as part of a high oxygen modified atmosphere packaging system used in accordance with GRN 000083 (Cargill)	Packaging fresh cuts of case-ready muscle meat and ground meat to maintain wholesomeness	Not to exceed 0.4 percent of the modified atmosphere gas mixture	Acceptability determination	None under the accepted conditions of use (2)
Carbon monoxide gas a part of Cargill's modified atmosphere packaging system introduced directly into the bulk or master container used for bulk transportation of fresh meat products. Meat products are subsequently repackaged in packages not containing a carbon monoxide modified atmosphere prior to retail sale (In accordance with GRN 000083)	Packaging fresh cuts of muscle meat and ground meat to maintain wholesomeness	Not to exceed 0.4 percent of the modified atmosphere gas mixture	Acceptability determination	None under the accepted conditions of use (2)
Carbon monoxide gas as part of the Precept modified atmosphere packaging system	Packaging case-ready fresh cuts of beef and pork as well as ground beef and pork to maintain wholesomeness	Carbon monoxide 0.4 percent (with a process tolerance of 20 percent, allowing for a carbon monoxide concentration up to 0.48 percent) in combination with carbon dioxide (20-100 percent) and nitrogen (0-80 percent)	GRAS Notice No. 000143	None under the accepted conditions of use (2) Products packaged in this MAP system must be coded with a "Use or Freeze by" date not to exceed 28 days after packaging for ground meat and 35 days for whole muscle cuts
Carbon monoxide	Packaging case-	Carbon monoxide	Acceptability	None under the

gas as part of Precept's modified atmosphere packaging system	ready fresh cuts of poultry as well as ground poultry	0.3 percent (with a process tolerance of 20 percent, allowing for a carbon monoxide concentration up to 0.36 percent), in combination with nitrogen (0-80 percent), and carbon dioxide (20-100 percent)	determination	accepted conditions of use (2) Products packaged in this MAP system must be coded with a "Use or Freeze by" date not to exceed 28 days after packaging for ground poultry and 35 days for whole muscle cuts of poultry
Carbon monoxide as a component of a modified atmosphere packaging system (Tyson Foods, Inc.)	Packaging case-ready fresh cuts of beef and pork as well as ground beef and pork	Carbon monoxide (at a level not to exceed 2.2 mg carbon monoxide per pound of packaged meat) in combination with carbon dioxide and nitrogen	GRAS Notice No. 000167	None under the accepted conditions of use (2) Products packaged in this MAP system must be coded with a "Use or Freeze by" date not to exceed 28 days after packaging for ground meat and 35 days for whole muscle cuts
<i>Poultry scald agents (must be removed by subsequent cleaning operations)</i>				
Alkyl polyglycosides	To remove feathers from poultry carcasses	Sufficient for purpose	GRAS Notice No. 000237	None under the conditions of use (1)
Calcium acid phosphate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Calcium acid pyrophosphate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Calcium bicarbonate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Calcium carbonate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)

Calcium dodecylbenzene sulfonate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Calcium 2-ethylhexyl sulfate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Calcium hexametaphosphate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Calcium hydroxide	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Calcium lauryl sulfate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Calcium phosphate (mono-, di-, and tribasic)	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Calcium pyrophosphate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Calcium sesquicarbonate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Calcium sulfate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Calcium tripolyphosphate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Potassium acid phosphate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Potassium acid pyrophosphate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Potassium bicarbonate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Potassium carbonate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Potassium dodecylbenzene sulfonate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Potassium 2-ethylhexyl sulfate	To remove feathers from poultry	Sufficient for purpose	Acceptability determination	None under the conditions of use

	carcasses			(1)
Potassium hexametaphosphate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Potassium hydroxide	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Potassium lauryl sulfate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Potassium phosphate (mono-, di-, and tribasic)	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Potassium pyrophosphate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Potassium sesquicarbonate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Potassium sulfate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Potassium tripolyphosphate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Tetracalcium pyrophosphate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
Tetrapotassium pyrophosphate	To remove feathers from poultry carcasses	Sufficient for purpose	Acceptability determination	None under the conditions of use (1)
<i>Tenderizing Agents</i>				
Calcium gluconate	Raw meat products	Solutions applied or injected into raw meat shall not result in a gain of 3 percent above green weight	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Protease preparation derived from <i>Bacillus subtilis</i>	Raw meat products	Solutions applied or injected into raw meat shall not result in a gain of 3 percent above green weight	Acceptability determination	Listed by common or usual name in the ingredients statement (2)
Protease produced from <i>Bacillus subtilis</i> var. <i>amyloliquefaciens</i>	Raw meat products	Solutions applied or injected into raw meat shall not result in a gain of 3	Acceptability determination	Listed by common or usual name in the ingredients statement (2)

		percent above green weight		
Protease produced from <i>Aspergillus niger</i>	Raw meat cuts and raw poultry muscle tissue of hen, cock, mature turkey, mature duck, mature goose, and mature guinea	Solutions applied or injected into raw meat or poultry tissue shall not result in a gain of 3 percent above green weight	GRAS Notice No. 000089	Listed by common or usual name in the ingredients statement (2)

- 1) The use of the substance(s) is consistent with FDA’s labeling definition of a processing aid.
- 2) Generally Recognized as Safe (GRAS)
- 3) Secondary Direct Food Additive
- 4) Direct Food Additive
- 5) Color Additive
- 6) Food Contact Substance

* Substances identified in **bold** print in the table are substances that have been added to the directive since it was last issued on July 5, 2012.

Questions and Answers on the Use of Antimicrobial Agents in the Production of Meat and Poultry Products

The following set of questions and answers provide information regarding the requirements for the use of antimicrobial agents in meat and poultry production.

References

- Final Rule, “Food Ingredients and Sources of Radiation Listed or Approved for Use in the Production of Meat and Poultry Products” (December 1999).
- MOU between FDA and FSIS for Ingredient Approval (January, 2000).
- FSIS Directive 7120.1, “Safe and Suitable Ingredients Used in the Production of Meat and Poultry Products.”
- Guidance document on “Ingredients and Sources of Radiation Used to Reduce Microorganisms on Carcass, Ground Beef and Beef Trimmings.”
- Guidance Procedures for Notification and Protocol Submission of New Technology, February 2004
http://www.fsis.usda.gov/regulations_&_policies/New_Technology_Notification_&_Protocol_Submission/index.asp
- Federal Register* Notice, “FSIS Procedures for Notification of New Technology” (68 FR 6873) (February, 2003)
- [9 CFR Part 416.4](#)
- [FSIS Directive 6355.1](#), “Use of Chlorine Dioxide in Poultry Chill Water.”
- 9 CFR 424.21(c)
- FSIS Directive 6700.1 and [FSIS Directive 6700.1 Amendment 1 - Html](#) , “Retained Water in Raw Meat and Poultry Products.”
- 21 CFR Part 172,173, 182, 184
- [21 CFR 101.100](#) (a)(3)(ii)(c)

1. Question: What is the definition of a New Technology?

Answer: According to the FSIS *Federal Register* Notice (68 FR 6873) entitled, "FSIS Procedures for Notification of New Technology," FSIS defines a "new technology" as new, or new applications of, equipment, substances, methods, processes or procedures affecting the slaughter of livestock and poultry or processing of meat, poultry, or egg products which could affect product safety, inspection procedures, inspection program personnel safety, or require a waiver of a regulation.

2. Question: What is the definition of a processing aid?

Answer: According to the Food and Drug Administration's (FDA) regulations (21 CFR 101.100 (a) (3) (ii)), the definition of a processing aid is:

- a. Substances that are added to a food during the processing of such food but are removed in some manner from the food before it is packaged in its finished form.
- b. Substances that are added to a food during processing, are converted into constituents normally present in the food, and do not significantly increase the amount of the constituents naturally found in food.
- c. Substances that are added to a food for their technical or functional effect in the processing but are present in the finished food at insignificant levels and do not have any technical or functional effect in that food.

An example of a processing aid is the use of organic acid(s) (e.g., lactic, acetic, or citric acid) as part of a livestock carcass wash applied pre-chill.

FSIS has posted guidelines on processing aids in regulating the labeling of meat and poultry products at:

http://www.fsis.usda.gov/PDF/Determination_of_Processing_Aids.pdf.

http://www.fsis.usda.gov/PDF/Prohibited_Substances_in_FSYS_Actions_on%20Use_of_Ingredients.pdf

3. Question: What are secondary direct food additives and direct food additives?

Answer: According to FDA's regulations (21 CFR Part 173), secondary direct food additives are substances whose functionality is required during the manufacture or processing of a food and are ordinarily removed from the final food. Although residuals might carry over to the final food, residuals must not exhibit any technical effects. Secondary direct food additives are consistent with FDA's definition of a processing aid so labeling is not required. Examples of secondary direct food additives are acidified sodium chlorite (21 CFR 173.325) and peroxyacids (21 CFR 173.370).

According to FDA's regulations (21 CFR Part 172), direct food additives are used to provide a technical effect in the final food. The antioxidants BHA and BHT are examples of substances that are approved as direct food additives.

4. Question: Do organic acid(s) (e.g., lactic, acetic, or citric acid) that are used as antimicrobial agents need to be declared on the label if they are applied to livestock carcasses after the chilling step?

Answer: Organic acid(s) are generally recognized as safe (GRAS) and are listed in FSIS regulations for use as an acidifier in various meat and poultry products at a level which is sufficient for purpose (9 CFR 424.21(c)). All ingredients, including organic acid(s), require labeling unless the use of a substance is consistent with FDA's definition of a processing aid or is a secondary direct food additive.

FSIS has recently stated no objection to the use of 5% hot lactic acid as an antimicrobial agent to treat beef carcasses prior to fabrication (i.e., pre and post-chill). Data was submitted to the Agency that demonstrated no lasting effect under the specified conditions of use. FSIS determined that the proposed use is consistent with the definition of a processing aid. Therefore, its use would not need to be reflected on the labeling for treated carcasses or products produced from treated carcasses. This new use is listed in the table of this directive.

If a company is interested in using one or more of these organic acid(s) as an antimicrobial agent on livestock carcasses or trim in a manner other than which is currently approved, they must provide data to the Agency that show that the use complies with FDA's definition of a processing aid. The data must show that the organic acid has only a momentary technical effect, not a lasting effect on the meat, e.g., fresh color is not preserved, normal spoilage indicators (e.g. discoloration) are not masked; and there is no extension of shelf life as compared to products made with untreated trimmings. The data must also show that the nutrient composition is not affected by the treatment and the sensory characteristics of the product are not affected. (Note: the reference to "Guidance on Ingredients and Sources of Radiation used to Reduce Microorganisms on Carcasses, Ground Beef, and Beef Trim," can be accessed at <http://www.fsis.usda.gov/oppde/larc> at the "ingredients" link)

5. Question: What is the maximum amount of organic acid(s) permitted to be applied to livestock carcasses pre-chill without having to declare the organic acid(s) on the label?

Answer: Historically, the maximum amount of organic acid(s) that can be used to treat livestock carcasses without labeling is up to 2.5 % of a solution applied pre-chill. Labeling is not required for this specific use of organic acid(s) (which the Agency has permitted for many years) because it is based on data that showed that this application is consistent with FDA's definition of a processing aid.

FSIS has recently stated no objection to the use of 5 % hot lactic acid as an antimicrobial agent on beef carcasses prior to fabrication (see question number four). This use was determined to be consistent with the definition of a processing aid. Therefore, its use would not need to be reflected on the labeling for treated carcasses or products produced from treated carcasses.

6. Question: Do organic acid(s) (e.g., lactic, acetic, or citric acid) that are used as antimicrobial agents need to be declared on the label if they are applied to livestock carcasses?

Answer: Unless the proposed use has been determined by FSIS to be consistent the definition of a processing aid (e.g., the application of acetic or citric acids at 2.5 % of a beef carcass wash solution applied pre-chill or the use of a 5% lactic acid solution to treat beef carcasses prior to fabrication either pre- or post-chill) the organic acid(s) would require labeling.

7. Question: Is the maximum amount of organic acid(s) allowed, without labeling the product, based on the concentration of the organic acid(s) applied to the carcass or the concentration of the organic acid(s) draining from the carcass?

Answer: The amount of organic acid(s) is based on the percentage of organic acid(s) in the carcass wash (aqueous solution) prior to application. It is not based on the residual level of organic acid(s) draining from a treated carcass during application.

8. Question: Do organic acid(s) (e.g. lactic, acetic, or citric acid) have to be declared on the label if they are applied to cut-up and ground meat and poultry?

Answer: Yes, all ingredients, including organic acid(s), require labeling unless the use of a substance is consistent with FDA's definition of a processing aid or is a secondary direct food additive. If an establishment is interested in using organic acid(s) to treat meat and poultry cuts and/or ground meat and poultry to momentarily reduce microorganisms, data must be submitted to FSIS to show that the proposed use of organic acid(s) is consistent with FDA's definition of a processing aid.

9. Question: Do organic acid(s) (e.g. lactic, acetic, or citric acid) have to be declared on the label if they are applied to livestock or poultry byproducts and giblets (e.g. livers, hearts, and gizzards)?

Answer: No, labeling is not required when organic acid(s) are applied pre-chill at up to 2.5% of an aqueous solution to treat livestock and poultry byproducts and giblets.

FSIS has recently stated no objection to the use of 5% lactic acid as an antimicrobial agent to treat beef carcasses prior to fabrication (i.e., pre and post-chill).

10. Question: Are organic acid(s) used as antimicrobial agents permitted to be used on poultry carcasses?

Answer: Yes, organic acid(s) are GRAS and are listed in FSIS regulations for use as an acidifier (which may have an antimicrobial effect) in various meat and poultry products at a level which is sufficient for purpose (9 CFR 424.21(c)). Organic acid(s) are permitted to be applied to poultry carcasses pre-chill at a concentration of up to 2.5 percent of a solution without labeling.

11. Question: If organic acid(s) (e.g., lactic, acetic, or citric acid) are used on ready-to-eat products as a spray or dip, must the application be followed by a potable water rinse?

Answer: No, the use of organic acid(s) on ready-to-eat products are not required to be followed by a potable water rinse. However, the organic acid(s) will be considered ingredients that require labeling unless data can be submitted to FSIS that show that their use is consistent with FDA's definition of a processing aid.

12. Question: Are organic acid(s) (e.g., lactic, acetic or citric acid) permitted to be used on a continuous basis on conveyor belts? What are the conditions for their use? When do the organic acids need to be declared on a product label?

Answer: FSIS has no objection to the use of organic acids on conveyor belts on a continuous basis. However, the process should not result in the organic acid(s) having a lasting technical effect on meat or poultry which comes into contact with the conveyor belts. Labeling is required if the organic acid(s) exhibit a lasting technical effect on meat or poultry which comes into contact with the treated conveyor belts.

13. Question: Are antimicrobial agents other than organic acid(s) permitted to be used on a continuous basis on conveyor belts if they are approved as an antimicrobial agent in the production of meat and poultry products? What are the conditions for their use? When do the antimicrobial agents have to be included on a product label?

Answer: Yes, antimicrobial agents approved for use in the production of meat and poultry products may be used on conveyor belts provided they are followed by a potable water rinse. Substances listed in 21 CFR 178.1010 may be used in sanitizing solutions on food contact surfaces with only adequate draining (no water rinse) before contact with food.

14. Question: Is trisodium phosphate (TSP) permitted to be used as an antimicrobial agent on livestock carcasses, viscera, and parts?

Answer: TSP may only be used on livestock carcasses according to interim Agency policy.

15. Question: Where is TSP allowed to be used as an antimicrobial agent on poultry?

Answer: TSP is permitted to be used as an antimicrobial processing aid for raw poultry under the following conditions:

Pre-chill: Applied to carcasses or parts as a spray or dip up to 15 seconds using an 8-12 percent solution within the temperature range of 65° F to 85° F. Applied to giblets as a spray or dip up to 30 seconds using an 8-12 percent solution. Both applied in accordance with good manufacturing practice.(21 CFR 182.1778)

Post-chill: Applied to carcasses or parts as a spray or dip up to 15 seconds using an 8-12 percent solution within a temperature range of 45° F to 55° F and used in accordance with good manufacturing practice. (9 CFR 424.21 (c) and 21 CFR 182.1778)

TSP is also used in some on-line reprocessing operations. Establishments which use on-line reprocessing have been permitted by FSIS to operate under an experimental exemption listed in 9 CFR 381.3(c). The conditions of use for TSP in on-line reprocessing are limited by the parameters listed in the FSIS approved on-line reprocessing protocol, not the conditions of use listed above.

16. Question: Is chlorine dioxide permitted to be used as an antimicrobial agent on livestock carcasses, viscera, and parts?

Answer: Chlorine dioxide may be used as an antimicrobial agent to treat red meat carcasses, parts, and organs. It is applied as a spray or dip at a level not to exceed 3 ppm residual chlorine dioxide.

17. Question: Is chlorine dioxide allowed to be used as an antimicrobial agent on poultry? What are the conditions for its use?

Answer: Chlorine dioxide may be used as an antimicrobial agent to treat water in poultry processing as prescribed in FDA's regulations (21 CFR 173.300). Residual chlorine dioxide must not exceed 3 ppm in the poultry processing water.

18. Question: Is hydrogen peroxide allowed to be used as an antimicrobial agent on meat and poultry products (e.g. carcasses, parts, processed products)?

Answer: No, hydrogen peroxide cannot be used as an antimicrobial when applied by itself. However, it can be used as an antimicrobial when used as a component of peroxyacids (Acceptability determination, 21 CFR 173.370; FCN 000323; FCN 000880; FCN 000887, FCN 000993). In addition, it is listed as GRAS in FDA regulations (21 CFR 184.1366) for use as a bleaching agent to treat beef feet and in FSIS regulations (9 CFR 424.21 (c)) as a bleaching agent to treat tripe (followed by a water rinse).

19. Question: Can any and all antimicrobial agents be used on poultry carcasses during on-line reprocessing?

Answer: No, on-line reprocessing operations function under an experimental exemption (9 CFR 381.3 (c)). The use of antimicrobial agents in on-line reprocessing are limited by the parameters of the FSIS approved on-line reprocessing protocol.

20. Question: Can antimicrobial agents be used (spray or dip) on the same carcasses or parts more than once, without labeling?

Answer: Yes, antimicrobial agents may be used more than once. However, the antimicrobial agents must be used in accordance with the approved or accepted conditions of use. Labeling is required unless the use of the substance is consistent with FDA's definition of a processing aid or is a secondary direct food additive.

21. Question: Do all uses of antimicrobial agents need to comply with the requirements of 9 CFR 441.10 for retained water? What are the requirements?

Answer: Yes, any establishment that uses a post-evisceration process that results in water retention in raw livestock or poultry carcasses or parts must maintain on file a written data collection protocol in accordance with 9 CFR 441.10 (c) (1). Any treatment in the chilling process such as antimicrobial treatments should be described in the protocol. An establishment does not have to maintain a protocol on file if it has data or information that clearly demonstrates that its products do not retain water as a result of the process, e.g., spraying boneless meat with antimicrobial agents where the end product does not retain water from the antimicrobial application ([FSIS Directive 6700.1](#) and [6700.1 Amend 1](#)).

END