Sodium Acid Pyrophosphate

Handling/Processing

Identification of Petitioned Substance

Chemical Name:
Sodium acid pyrophosphate

CAS Number:
7758-16-9

Other Names:
Disodium pyrophosphate
Disodium diphosphate
Disodium dihydrogen pyrophosphate
Acid sodium pyrophosphate

Other Codes:
EINECS 231-835-0
INC 450(i)

Characterization of Petitioned Substance

Composition of the Substance:

Sodium acid pyrophosphate (SAPP) is a condensed phosphate, formed when sodium orthophosphate is heated to remove the water. It is expressed by the formula $Na_2H_2P_2O_7$ and is composed of 20.72% Na, 0.91% H, 27.91% P, and 50.46% O (Merck, 2006). Its chemical structure is illustrated as following:

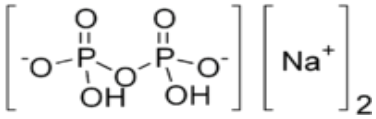

Figure 1. Chemical structure

Properties of the Substance:

Physical and Chemical Properties	
Color	White
Appearance	Crystalline powder or granules
Odor	Odorless
Molecular weight	221.94
Decomposition	220° C
Relative density	1.86 g/cm^3
Solubility	Soluble in water
pH	4*

Source: Food Chemicals Codex, 2010-2011; the Merck Index, 2006.
* The pH value is for a 1% solution.

Specific Uses of the Substance:

The petitioner requests that SAPP be used as a sequestrant to maintain the appearance and texture of cooked and uncooked fruits and vegetables.

SAPP is a common food additive which serves more than one function. It is commonly used as:

- A chemical leavening agent in baked goods.
- A sequestrant/chelating agent in processed potatoes.
- An emulsifying agent in cheeses and related products.

- An inhibitor agent in canned tuna.
- A curing accelerator in processed meat and poultry products.

Moreover, SAPP can be used in potable water treatment, animal feeds, and hog carcass scald and poultry carcass de-feathering agents. In petroleum production, it can be used as a dispersant in oil well drilling mud.

Approved Legal Uses of the Substance:

EPA— SAPP listed under 40 CFR §180.910 Inert ingredients used pre- and post-harvest; exemptions from the requirement of a tolerance. Its listed uses are as a surfactant, suspending agent, dispersing agent, and buffer. For potable water treatment, the maximum use level of SAPP is 12.0 mg/l.

FDA— See Table 1.

Table 1. FDA Regulation, 21 CFR

Regulatory Citations		Technical Effects	Status	Use Limits
SUBCHAPTER B—FOOD FOR HUMAN CONSUMPTION	Part 133—Cheese and related cheese products. Subpart B—Requirements for specific standardized cheese and related products. §133.147, §133.169, §133.170, §133.171, §133.172, §133.173, §133.174, §133.179, §133.180.	Emulsifier	SAPP permitted as optional ingredient in a standardized food.	Not more than 3% of the weight of the finished food
	Part 137—Cereal flours and related products. Subpart B—Requirements for specific standardized cereal flours and related products. §137.180 Self-rising flour.	Buffer and neutralizing agent	SAPP generally recognized as safe in foods but limited in standardized foods where the standard provides for its use.	Combined weight of acid-reacting substance and sodium bicarbonate is not more than 4.5 parts to each 100 parts of flour used
	Part 161—Fish and shellfish. Subpart B—Requirements for specific standardized fish and shellfish. §161.190 Canned Tuna	Inhibitor (prevent struvite crystal formation)	SAPP permitted as optional ingredient in a standardized food.	Not in excess of 0.5% by weight of the finished food
	Part 182—Substances Generally Recognized As Safe. Subpart B—Multiple Purpose GRAS Food Substances. §182.1087 Sodium acid pyrophosphate		GRAS	Good manufacturing practice
SUBCHAPTER E—ANIMAL DRUGS, FEEDS, AND RELATED PRODUCTS	Part 582—Substances Generally Recognized As Safe. Subpart B—General Purpose Food Additives. §582.1087 Sodium acid pyrophosphate		GRAS	Good manufacturing or feeding practice

USDA — Food Safety and Inspection Service (FSIS), Federal Register/Vol. 64, No. 246/Thursday, December 23, 1999/Rules and Regulations. Action: Final rule. SAPP is approved for use in preparation of meat and poultry products, see Table 2. In addition, SAPP is listed under NOP the National List of Allowed and Prohibited Substance. 7 CFR §205.605 (b) Synthetics allowed "Sodium acid pyrophosphate (CAS # 7758-16-9) – for use only as a leavening agent".

Table 2. The Usage of SAPP in Meat and Poultry Products

Class	Purpose	Product	Amount
Curing accelerators (must be used only in combination with curing agents)	To accelerate color fixing or preserve color during storage	Frankfurters, wieners, vienna, bologna, garlic bologna, knockwurst, and similar products	Not to exceed alone or in combination with other curing accelerators for use in meat the following: 8 oz in 100 lb of meat, or meat and meat byproducts, content of the formula; nor 0.5% in the finished product.
Hog scald agents (must be removed by subsequent cleaning operations)	To remove hair	Hog carcasses	Sufficient for purpose
Miscellaneous	To decrease the amount of cooked out juices	Meat food products except where other 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% of phosphate in pickle at 10% pump level; 0.5% of phosphate in meat food product (only clear solution may be injected into meat food product). For poultry products, 0.5% of total product.
Poultry scald agents (must be removed by subsequent cleaning operations)	To remove feathers	Poultry carcasses	Sufficient for purpose

Action of the Substance:

According to the petition, SAPP is used as a sequestrant on cooked or uncooked produce. A sequestrant is a food additive whose role is to improve the quality and stability of the food products. Sequestrants form chelate complexes with polyvalent metal ions, especially copper, iron, and nickel. They are also referred to as metal scavengers since they combine with trace metals (such as iron and copper) and remove them from solution. The trace metals when naturally occurring in foods become oxidation catalysts and induce many off-color reactions (Potter, 1973).

Generally, chelation proceeds only if two general conditions are met: (1) the sequestrant must have the proper steric and electronic configuration in relation to the metal being complexed and (2) the surrounding environment (i.e., pH, ionic strength, solubility, etc.) must likewise conducive to complex formation.

In the food processing, sequestrants are employed as additives to limit the participation of metal, as catalysts, in numerous deleterious reactions in food system. For example, SAPP and Na_2EDTA[1] are the

[1] ethylenediamine tetraacetic acid (EDTA)

sequestrants of choice to inhibit the after-cooking darkening for the potato processing in accordance with Furia (1980).

Smith (1977) has reported that the most logical theory of the cause of after-cooking darkening appears to be a reaction between certain types of orthodiphenols and certain forms of iron. Ferrous ions in potato combine with an orthodiphenol forming a colorless or faintly colored compound which is oxidized when exposed to air forming the deeply colored ferric compound. These chemicals (such as SAPP and Na_2EDTA) have reduced darkening by sequestering or chelating the ferrous ions in potatoes so that it is held in a nonionizable form and cannot react with orthodiphenol and, therefore, prevents the normal formation of the dark colored pigment, a ferric-orthodiphenol compound (Smith, 1977).

Status

Domestic:

EPA — SAPP is listed under 40 CFR §180.910 Inert ingredients used pre- and post-harvest; exemptions from the requirement of a tolerance. It is also listed in the List 4B – Other ingredients for which EPA has sufficient information to reasonably conclude that the current use pattern in pesticide products will not adversely affect the public health or the environment. Updated August 2004.

FDA — See the above, the Approved Legal Uses of the Substance section.

USDA — See the above, the Approved Legal Uses of the Substance section.

International:

Codex — Disodium pyrophosphate (INS: 450i) listed under phosphate group of the General Standard for Food Additives. The specification prepared at the 41st Joint FAO/WHO Export Committee on Food Additives (JECFA) meeting (1993), published in Food and Nutrition Paper (FNP) Series No. 52, Addendum 2 (1993) superseding specifications prepared at the 37th JECFA (1990), published in FNP 52 (1992). Metals and arsenic specifications revised at the 55th JECFA (2000). A group maximum tolerable daily intake of 70 mg/kg body weight, expressed as phosphorus from all food sources, was established at the 26th JECFA, 1982. Functional Class: Food additives (raising agent, buffering agent, and sequestrant).

European Union — 'E 450 (i) DISODIUM DIPHOSPHATE' listed in Commission Directive 2002/82/EC of 15 October 2002, amending Directive 96/77/EC laying down specific purity criteria on food additives other than colors and sweeteners.

Canada — Disodium pyrophosphate listed in the Natural Health Products Ingredients Database. Maximum Tolerable Intake: up to 70 mg/kg body weight daily for phosphorus from all sources. Purposes: buffering agent, emulsifying agent, emulsion stabilizer, gelling agent, pH adjuster, sequestering agent, and thickening agent.

Japan — 'Disodium Dihydrogen Pyrophosphate (Acidic) Disodium Pyrophosphate (266)' listed on Table 1 related to Articles 12 and 21 of the Food Sanitation Law Enforcement Regulations. Last amendment November 29, 2005. Ministry of Health, Labor, and Welfare Ordinance No. 166.

IFOAM — Not listed under IFOAM Indicative List of Substances for Organic Production and Processing dated on April 24, 2008.

Canada — SAPP (for use as a leavening agent only) listed under Subsection *6.3 (Non-organic Ingredients Classified as Food Additives)* of Section *6 (Permitted Substances Lists for Processing* of the *Organic Production System Permitted Substances Lists)*. Amended October 2008 and December 2009.

European Union — Not listed under the Organic Regulations, Commission Regulation (EC) No 889/2008 of September 5, 2008.

Evaluation Questions for Substances to be used in Organic Handling

Evaluation Question #1: Discuss whether the petitioned substance is formulated or manufactured by a chemical process, or created by naturally occurring biological processes (7 U.S.C. § 6502 (21).

According to the petition, SAPP is manufactured by (1) partial neutralization of phosphoric acid (H_3PO_4) with sodium hydroxide (NaOH) or sodium carbonate (Na_2CO_3) to form monosodium phosphate (NaH_2PO_4) and then (2) dehydration of monosodium phosphate at approximately 250° C to form SAPP ($Na_2H_2P_2O_7$). The process is shown in Equation 1.

$$H_3PO_4 + NaOH \rightarrow NaH_2PO_4 + H_2O, \text{ or}$$

$$2\ H_3PO_4 + Na_2CO_3 \rightarrow 2NaH_2PO_4 + H_2O + CO_2$$

$$2\ NaH_2PO_4 \rightarrow Na_2H_2P_2O_7 + H_2O$$

Equation 1. Chemical reaction of SAPP

In the Hazardous Substances Data Bank (HSDB) of the Toxicology Data Network (TOXNET), it states that manufacturing method of disodium pyrophosphate is a reaction of sodium carbonate with phosphoric acid, followed by heating of the resulting monosodium phosphate to 220° C.

Evaluation Question #2: Describe the most prevalent processes used to manufacture or formulate the petitioned substance. Further, describe any chemical change that may occur during manufacture or formulation of the petitioned substance when this substance is extracted from naturally occurring plant, animal, or mineral sources. (7 U.S.C. § 6502 (21))

The prevalent process used to manufacture SAPP is stated above in Evaluation Question #1 (EQ #1). Phosphoric acid and sodium carbonate are the feedstock for producing SAPP.

Phosphoric acid

Phosphoric acid is produced by two commercial methods: wet process or thermal process. Wet process produced phosphoric acid is used in the fertilizer production. Thermal process produced phosphoric acid has a higher purity and is used to manufacture high grade chemicals, pharmaceuticals, food products, beverages, and other nonfertilizer products (EPA AP-42, 1995). Raw materials used for the thermal process are elemental (yellow) phosphorus, air, and water.

Phosphoric acid (H_3PO_4) manufactured by thermal process involves three major steps:
1) Combustion— liquid elemental phosphorus is burned (oxidized) in ambient air in a combustion chamber at temperatures of 1650 to 2760 °C (3000 to 5000 °F) to form phosphorus pentoxide.
2) Hydration— phosphorus pentoxide is then hydrated with diluted H_3PO_4 or water to produce strong phosphoric acid liquid.
3) Demisting— the final step removes the phosphoric acid mist from the combustion gas stream before release to the atmosphere. This is usually done with high-pressure drop demistors.

The concentration of H_3PO_4 produced from the thermal process normally ranges from 75 to 85 percent. This high concentration is required to manufacture high grade chemical production and other nonfertilizer products (including foods and beverages). Efficient plants convert about 99.9 percent of elemental phosphorus to phosphoric acid (EPA AP-42, 1995).

Sodium carbonate

Sodium carbonate (Na_2CO_3), commonly referred to as soda ash, may be manufactured synthetically or from naturally occurring raw materials such as ore. In the U.S., only one facility recovers small quantities of Na_2CO_3 as a byproduct of cresylic acid production. Over 85% of soda ash originates in Wyoming, with the remainder coming from Searles Valley, California (EPA AP-42, 1995).

The raw material for Wyoming soda ash is mined trona ore. There are two processing methods (sesquicarbonate process and monohydrate process) used to produce natural soda ash (EPA AP-42, 1995).

- In the sesquicarbonate process, trona ore is first dissolved in water and then treated as brine. This liquid is filtered to remove insoluble impurities before the sodium sesquicarbonate is precipitated out using vacuum crystallizers. The result is centrifuged to remove remaining water, and can either be sold as a finished product or further calcined to yield soda ash with light to intermediate density.
- In the monohydrate process, crushed trona is calcined in a rotary kiln, yielding dense soda ash. CO_2 and water are byproducts. The calcined material is then combined with water to allow settling out or filtering of impurities such as shale. After that, it is concentrated by evaporators and/or mechanical vapor recompression crystallizers to precipitate out sodium carbonate monohydrate. Impurities such as sodium chloride and sodium sulfate remain in solution. The crystals and liquor are centrifuged, and the recovered crystals are calcined again to remove remaining water.

Evaluation Question #3: Provide a list of non-synthetic or natural source(s) of the petitioned substance (7 CFR § 205.600 (b) (1)).

No information was indentified to suggest that there is a non-synthetic or natural source of the SAPP.

Evaluation Question #4: Specify whether the petitioned substance is categorized as generally recognized as safe (GRAS) when used according to FDA's good manufacturing practices. (7 CFR § 205.600 (b)(5))

The petitioned substance is regulated as GRAS when used in accordance with good manufacturing or feeding practices. SAPP uses as a multiple purpose GRAS food substance in food for human consumption are listed under 21 CFR §182.1087. In addition, it uses as a general purpose food additive in animal drugs, feeds, and related products are listed under 21 CFR §582.1087.

Evaluation Question #5: Describe whether the primary function/purpose of the petitioned substance is a preservative. If so, provide a detailed description of its mechanism as a preservative. (7 CFR § 205.600 (b)(4))

The petitioned substance is used as a sequestrant. According to FDA's definitions, sequestrants are substances which combine with polyvalent metal ions to form a soluble metal complex, to improve the quality and stability of products (21 CFR §170.3 (o) (26)).

No information sources reviewed specifically address the primary function/purpose of SAPP as a preservative.

Evaluation Question #6: Describe whether the petitioned substance will be used primarily to recreate or improve flavors, colors, textures, or nutritive values lost in processing (except when required by law) and how the substance recreates or improves any of these food/feed characteristics. (7 CFR § 205.600 (b)(4))

SAPP would be applied to cooked or uncooked produce to maintain the appearance and texture of these foods in accordance with the petition.

The petitioned substance has been used for the potato industry to prevent after-cooking darkening of cooked and oil-blanched French-fried potato for several decades. Smith and Davis (1960, 1961, and 1962) found that the addition of SAPP at any one of various locations in the processing line increased the mealy texture of reconstituted dehydrated potato, and prevented discoloration from after-cooking darkening in cooked and many forms of processed products (such as dehydrated flakes and granules, oil-blanched French fries, potato salad, peeled small frozen potatoes as well as in boiled or steamed whole or sliced frozen potatoes). SAPP has also been used in potato products which have already developed after-cooking darkening to reduce this dark color to an acceptable light color. In addition, sweet potatoes may be treated with SAPP to inhibit discoloration (Lampila and Goober, 2002). Blanda et al. (2010) conducted a study of off-odor and off-flavor development in boiled potatoes, and the effects of the use of food additives—after cooking and before storage—were examined. They concluded that the best additive was SAPP since potato slice flavor was almost unchanged during storage.

In the invention of US Patent No. 4647462 (Gogins and Smith, 1987), it states adding SAPP prevents discoloration and stabilizes the texture and the taste properties of the frozen cauliflower pieces during frozen storage. However, the use of SAPP alone in the retort process is ineffective to prevent discoloration of the cauliflower. Moreover, Beck (1995) and Warren (1991) has patents using a mixture, which blended SAPP and other chemicals, to prevent discoloration of produce during processing, handling and/or storage (US Patent Nos. 5389389 and 5055313).

Evaluation Question #7: Describe any effect or potential effect on the nutritional quality of the food or feed when the petitioned substance is used. (7 CFR § 205.600 (b)(3))

According to the Select Committee on GRAS Substances (SCOGS) Reviews on SAPP, it states that none of the GRAS phosphates is intrinsically harmful and this use in foods does not present a hazard when the total amount of phosphorus (P) ingested and the intakes of calcium (Ca), magnesium, vitamin D, and other nutrients are satisfactory. The phosphorus supplied by GRAS phosphates, other than calcium phosphates, added to foods is low in relation to the total amount of phosphorus naturally present in the diet. However, the possibility that unreasonable increases in the usage of these phosphates in common foods could significantly lower the Ca:P ration. Ingestion of excessive levels of phosphorus should be considered in assessing the probability of a health hazard existing. The Select Committee has no evidence that the use of any of these non-calcium phosphates as food ingredients at current levels is creating such a problem (SCOGS, Report No. 32, 1975).

Evaluation Question #8: List any reported residues of heavy metals or other contaminants in excess of FDA tolerances that are present or have been reported in the petitioned substance. (7 CFR § 205.600 (b)(5))

No information was indentified to suggest that SAPP contains residues of heavy metal or other contaminants in excess of FDA tolerances. The petitioned substance is not listed as a commodity (the applicable human food and animal feed products) under FDA's "*Guidance for Industry: Action Levels for Poisonous or Deleterious Substances in Human Food and Animal Feed*".

According to the Food Chemical Codex (2010-2011) monograph on SAPP, it stipulates the impurities acceptable criteria are not more than 3 mg/kg, 0.005%, and 2 mg/kg of arsenic, fluoride, and lead, respectively.

Evaluation Question #9: Discuss and summarize findings on whether the manufacture and use of the petitioned substance may be harmful to the environment. (7 U.S.C. § 6517 (c) (1) (A) (i) and 7 U.S.C. § 6517 (c) (2) (A) (i))

Sodium acid pyrophosphate

SAPP is listed in the EPA List 4B— Other ingredients for which EPA has sufficient information to reasonably conclude that the current use pattern in pesticide products will not adversely affect the public

health or the environment. No data on toxicity, water pollution potential, and ecological toxicity of SAPP were found in the Pesticide Action Network (PAN) Pesticides Database.

In the petition, it states SAPP is not expected to produce any significant environmental effects when recommended use instructions are followed in accordance with the Material Safety Data Sheet (MSDS). SAPP released into the soil, sub-surface or surface waters may be taken up by plants and used as essential nutrients, such as temporary algae blooms. Phosphates may also form precipitates, usually with calcium or magnesium. The resultant compounds (calcium phosphate and magnesium phosphate) are insoluble in water and become part of the soil or sediment (ICL Performance Products LP, 2007).

Phosphoric acid

Elemental phosphorus, which is produced from phosphate rock, is used for synthesis of phosphoric acid by thermal process. Phosphate rock may contain significant amounts of naturally occurring heavy metals. Mining operations processing phosphate rock can leave tailings piles containing elevated levels of cadmium, lead, nickel, copper, chromium, and uranium (Gnandil, et al., 2006). Unless carefully managed, these waste products can leach heavy metals into groundwater or nearby estuaries. Uptake of these substances by plants and marine life can lead to concentration of toxic heavy metals in food products (Gnandil, et al., 2006).

According to EPA (AP-42, 1995), the major source of emission from the thermal process is phosphoric acid mist contained in the gas steam from the hydrator. It is not uncommon for as much as half of the total phosphorus pentoxide to be present as liquid phosphoric acid particles suspended in the gas stream. Efficient plants are economically motivated to control this potential loss with various control equipment. Phosphoric acid mist can be transported in air and dissolved in water.

In the Australian Government's National Pollutant Inventory, it states that "phosphoric acid has moderate acute and chronic toxicity to aquatic life in the waters of low alkalinity." While small quantities of phosphoric acid can be neutralized by the alkalinity in aquatic ecosystems, larger quantities can lower the pH for extended periods of time, posing a potential risk to aquatic organisms. Phosphate (formed when phosphoric acid is dissolved) is unlikely to bioaccumulate in most aquatic species.

When spilled onto soil, phosphoric acid will infiltrate downward, the rate being greater with lower concentration because of reduced viscosity (TOXNET). During transport through the soil, phosphoric acid will dissolve some of the soil material, in particular, carbonate-based materials. The acid will be neutralized to some degree by soil. However, significant amounts of acid will remain for transport down toward the groundwater table. Upon reaching the groundwater table, the acid will continue to move in the direction of groundwater flow.

Sodium carbonate (soda ash)

The principal air emissions from the sodium carbonate production methods are particulate emissions. Particulate emissions are typically controlled by venturi scrubbers, electrostatic precipitators, cyclones or baghouse filters. These control devices should be an integral part of the manufacturing process (EPA AP-42, 1995).

Carbon monoxide, nitrogen oxides, sulfur dioxide, and carbon dioxide are other emissions of products of combustion from direct-fired process. With the exception of carbon dioxide, which is suspected of contributing to global climate change, available data are insufficient to quantify these emissions with a reasonable level of confidence (EPA AP-42, 1995).

According to HSDB (TOXNET), the sesquicarbonate and monohydrate processes produce no large volume of associated wastes. The major waste products—tailings, insoluble shale and minerals associated with trona ore—are produced during processing. These solids along with purge liquors containing organic and

trace impurities should be sent to evaporation ponds where concentration of the aqueous stream is a first step in the eventual recovery of residual alkali (TOXNET).

Evaluation Question #10: Describe and summarize any reported effects upon human health from use of the petitioned substance. (7 U.S.C. § 6517 (c) (1) (A) (i), 7 U.S.C. § 6517 (c) (2) (A) (i)) and 7 U.S.C. § 6518 (m) (4))

In the SAPP report of SCOGS Reviews (Report No. 32, 1975), the Select Committee has weighed the foregoing and concludes that there is no evidence in the available information on SAPP that demonstrates or suggests reasonable grounds to suspect a hazard to the public when they are used at levels that are now current or might reasonably be expected in the future.

OSHA has not established specific SAPP limits for occupational exposure limits. However, OSHA has established limits for particulates not otherwise regulated and particulates not otherwise classified which are the least stringent exposure limits applicable to dusts. Here are the OSHA Permissible Exposure Limits: 15 mg/m^3 (total dust) 8-hr Time Weighted Average (TWA) and 5 mg/m^3 (repairable) 8-hr TWA.

According to the MSDS, the dry powder of SAPP may cause body irritation in some individuals. Prolonged contact with the dry powder may cause drying or chapping of the skin. Workers exposed to the dust of SAPP reported mild irritation of the nose and throat, with five of the eighteen workers reporting nasal stuffiness and nosebleeds. High dust concentrations were reported to cause mild eye and skin irritation (ICL Performance Products LP, 2007). Individuals handling SAPP should use suitable respiratory equipment and wear appropriate protective clothing and eyewear. Hands and contaminated skin thoroughly washed after handling SAPP.

The following toxicological information was excerpt from the MSDS (2007) provided by the petitioner:

"Data from ICL Performance Products LP single-dose (acute) animal studies with this material[2] are given below:

Oral — rat LD_{50} –	3,600 mg/kg; slightly toxic
Dermal — rabbit LD_{50} –	>7,940 mg/kg; practically non-toxic
Eye irritation — rabbit –	66.5/110; severely irritating
Skin irritation — rabbit –	0.7/8.0; slightly irritating
Inhalation — LC_{50} –	>0.58 mg/L, 4 hr. (rat) – maximum attainable concentration

No birth defects were reported in mice, hamsters, or rabbits given sodium acid pyrophosphate during pregnancy. No adverse genetic effects were reported in standard tests using animals or bacterial or yeast cells."

Evaluation Question #11: Provide a list of organic agricultural products that could be substituted for the petitioned substance. (7 CFR § 205.600 (b)(1)

No information sources reviewed specifically address that an organic agricultural product could be substituted for SAPP.

SAPP is listed on NOP the National List of Allowed and Prohibited Substance under §205.605 Nonagricultural (nonorganic) substances allowed as ingredients in or on processed products labeled as "organic" or "made with organic (specified ingredients or food group(s))." (b) Synthetics allowed. Currently, SAPP is only allowed for use as a leavening agent.

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