



# FOOD TECHNOLOGY FACT SHEET

Adding Value to OKLAHOMA

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## The Oklahoma Cooperative Extension Service Bringing the University to You!

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; home economics; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of Cooperative Extension are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and based on factual information.

- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

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## What is a Processing Aid?

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### Introduction

Processing aids are substances or additives of natural or synthetic origin used in the production of foods. They are commonly used in a wide variety of products including bakery, confectionery, jams, jellies, meat and produce. The Food and Drug Administration or United States Department of Agriculture must approve processing aids prior to commercial use. They are considered extremely safe and are used in small volumes and do not alter the taste or appearance of the finished product.

The objective of this fact sheet is to describe the purpose and use of processing aids in the food industry.

### Purpose of Processing Aids

The primary purpose of a processing aid is to facilitate the manufacturing of a food product. Processing aids are used for variety of reasons:

1. Improve product quality and consistency.
2. Enhance nutrition.
3. Help maintain product wholesomeness.
4. Enhance shelf life.
5. Help packing and transportation.

An incomplete list of process aids and their purposes is given in Table 1.

### Examples of Processing Aids

Processing aids can include everything from food contact lubricants (Al-Mazeedi et al., 2013) used on equipment and pans to antimicrobials used in the final wash of produce to enhance shelf life and promote food safety (Hricova et al., 2008). Other examples include foaming agent, pH regulator and anti-caking agent. Table 1 gives examples of processing aids, food products they are used in and their purpose.

### Criteria for Processing Aids

The criteria stipulated to qualify for a processing aid by the FDA are listed in Table 2. In the United States, the Food Safety Inspection Service determines if a substance meets the criteria for a processing aid. Canada does not have a regulatory definition of a food-processing aid; however, food additives require pre-clearance by the Canadian minister of health (Health Canada Food and Nutrition, 2014).

### The FDA (USDA, 2008) defines a processing aid as a substance added to a food:

1. During the processing of such food but are removed from the food before it is packaged in its finished form.
2. During processing, and are converted into constituents normally present in the food and do not significantly increase the amount of the constituents naturally found in the food.
3. To achieve a technical or functional effect in 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 live-stock carcass wash applied pre-chill.

Source: 21 CFR.101.100 (a) (3) (ii)

## Ethics of Using Processing Aids

Assuming processing aids are safe, ethical use is a top concern. Mehpam (2011) suggested three crucial ethical questions regarding food additives: (1) consumer sovereignty to act on informed judgments, (2) risk of harm to the consumer and (3) the effects on laboratory animals during testing. The answers to these questions may guide the ethical use of processing aids. Each concerned manufacturer

and consumer should identify and explore the ethical issues associated with processing aids.

Ethical use of processing aids also may center around personal beliefs. Consumers on strict diets such as kosher, halal or vegetarian could have particular concerns about processing aids. For example, a vegetarian might want to avoid foods that have contacted processing aids made from animal fat (Tiersky 2012).

Table 1. Examples and functions of processing aids (Sources: Food Insight 2013; FDA 2017) incomplete list in alphabetical order according to product).

No.	Food Products	Processing Aid	Purpose
1.	Apple juice	Gelatin with gums	Helps to eliminate suspended particles
2.	Baked goods and baking mixes	Agar-agar	Vegan substitute for gelatin that helps the gelling of mixes
3.	Beverages	Silicone	Antifoam
4.	Bread	Phospholipase	Increase volume and prolongs softness
5.	Cheese	Rennet	Separates curd and whey
6.	Chill water	Ozone	Antimicrobial
7.	Dough	Xylanase	Increases flexibility
8.	Fish and meat (seafood)	Salt	Decrease water activity to improve shelf life
9.	Frozen dough (e.g. waffles and pancakes)	Sodium stearoyl lactylate	Strengthens dough
10.	Fruit and vegetable washes	Chlorine organic acid washes	Antimicrobial
11.	Liquid nitrogen	BBQ sauce	Improves stability of plastic container
12.	Meat	Ammonium hydroxide	Antimicrobial
13.	Products transported on conveyors	Oil or synthetic	Lubricant
14.	Sugar	Dimethylamine epichlorohydrin copolymer	Decoloring agent helps in clarification of sugar



Nitrogen gas used as a processing aid in a barbecue sauce plant.

## Future of Processing Aids

Owing to the advantages of using processing aids, they are not likely to be eliminated; however, continuous improvements in processing methods and equipment may make them obsolete. Improvements in the formulation and application of processing aids also might make them more effective and more ethical for their intended use. Finally, companies may opt to select more ethical processing aids or include them in their ingredient list.

Table 2. FDA / United States Guidelines for Processing Aids (adapted from Magazine et al., 2016)

<b>Criteria</b>	No technical effect on final food product
<b>Ingredients</b>	No pre-approval process by FDA "Food Quality" under 21CFR Independent Evaluations + GRAS, EAFUS, FCC
<b>Level</b>	Used at level to obtain needed effect. Some chemicals may have specified max allowable levels. Trace levels may be present in final food.
<b>Process Compliance</b>	Good Manufacturing Practice

## Food Safety

Processing aids are not required to be listed on the label, but some trace amounts of the material may remain in the product. Also, some processing aids are converted to normal constituents of the food but must not significantly increase the original amount. In any case, a processing aid is required to be "Generally Recognized as Safe" (GRAS). This means the overwhelming evidence considered by industry, academia and independent experts agrees the processing aid is safe for consumers.

## Conclusion

Food-processing aids are important to the production of safe, quality foods. They perform valuable functions making them indispensable in many applications. Use of processing aids should be evaluated from the standpoint of food safety, ethics and efficiency (in that order) before use.

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