



What are preservatives and what are common examples used in food?

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Preservation techniques have been used as far back as the 14th century when man first used salt (salting) and smoke (curing) to stop meat and fish from going bad. Nowadays, the use of food additive preservatives has become an indispensable part of the food we eat. Despite a number of misgivings about their safety, our increasing demand for greater choice, ease and convenience of foods, and our high standard of food safety, makes them a vital component in our food systems. Let's explore the varying ways preservatives keep our foods fresh, safe, and shelf stable.

What are preservatives and how do they work?

Preservatives are food additives that play an important role in making foods last longer or taste better. Specifically, preservatives help to control and prevent the deterioration of food, providing protection against spoilage from micro-organisms (e.g., bacteria, yeast, moulds), life-threatening botulism and other organisms that can cause food poisoning (antimicrobial function).¹ High-risk foods such as meat, seafood, dairy, and cheese serve as a breeding ground for potentially dangerous micro-organisms, therefore, the addition of a preservative is usually required to ensure food safety.² Next to spoilage caused by micro-organisms, it can also be brought about by chemical (e.g., oxidation) or physical (e.g., temperature, light) factors.¹ Preservatives are also used to prevent these types of spoiling reactions in order to prevent any alterations in foodstuff's taste or, in some cases, their appearance ([antioxidant](#) function). Without the addition of a preservative, certain foods may turn rancid or change in colour. Ultimately, preservatives protect the quality of foods and beverages, reduce food cost, improve convenience, lengthen shelf-life, and reduce food waste.

Besides the use of food additive preservatives, foods can also be preserved by different processing methods like canning, dehydration (drying), smoking, salting, freezing, and the use of packaging.⁴ Some practical examples include the canning of jams and tomato sauce, drying fresh fruits to make dried

fruit, and adding salt to cabbage to make sauerkraut. In this article, however, we will focus on food additive preservatives only.

What are different types of preservatives?

Preservatives currently used in food production are either extracted from natural sources or synthetically produced.¹ For example, the preservative natamycin (E235), which is widely used in the surface treatment of cheese and sausages, can be naturally sourced from bacteria commonly present in soil.³ Natural preservatives can also be sourced from plants, animals, fungi, and algae.¹ Furthermore, common kitchen staples like salt and sugar can also be used to naturally preserve food in certain cases, for example when making pickles or sauerkraut.⁴

Preservatives can be broadly categorized into so-called antimicrobial preservatives and antioxidant preservatives. However, many of the preservatives, like the sulphites used in wine and nitrates used in meat, serve both functions.¹ Antimicrobial preservatives like sulphur compounds such as the sulphites (E220-228) are used to inhibit the growth of bacteria e.g., in wine, dried fruits, vegetables in vinegar or brine.⁵ Sorbic acid (E200) can be used for many different purposes, including the preservation of potato products, cheese and jam.⁶ Benzoic acid and its calcium, sodium or potassium salts (E210-213) are used as antibacterials and antifungals in foods such as pickled cucumbers, low sugar jams and jellies, dressings, condiments.⁷ Antioxidant preservatives are often used in minimally processed vegetable products such as ready-to-use salads, freshly cut fruit, and fresh juices, where browning is a significant concern.¹ Ascorbic acid (E300) and citric acid (E330) can be used to prevent browning because it inhibits a certain enzyme that in the presence of oxygen creates brown pigments.

Examples of widely used preservatives in the EU:^{1,3,5-14}

Type of preservative	E-number	Substance/class	Some foodstuff in which they are commonly used
Antimicrobials	E-200-203	Sorbic acid and sorbate compounds	Processed cheese, processed fruit and vegetables, bread and rolls, fine bakery wares, sauces, potato products
	E-210-213	Benzoic acid and benzoate	Flavoured fermented milk products, fruit and vegetables, confectionery, processed fish and fishery products
	E235	Natamycin	Surface treatment of cheese and sausage
	E-280-283	Propionic acid and propionates	Vinegar, cheese products, milk products, shellfish, coffee
Antioxidants	E-300-302	Ascorbic acid (i.e., vitamin C) and ascorbates	Fine bakery wares, fruit juices, flavoured drinks, unprocessed fruits and vegetables

	E-306-309	Tocopherol	Meat products, food supplements, fine bakery wares, fats and oils, flavoured drinks
	E-320-321	Butylated hydroxyanisole (BHA) & butylated hydroxytoluene (BHT)	Oils, margarines, fat-containing products
	E-330	Citric acid	Non-alcoholic drinks, jams and jellies, sauces, cheese, canned vegetables
Antimicrobials & antioxidants	E-220-228	Sulphur dioxide and sulphite compounds	Dried fruits, fruit preservatives, processed potato products, wine
	E-249-252	Nitrite and nitrate compounds	Meat products, pizza, poultry products, sandwiches/wraps

Are preservatives bad for you and should you avoid them?

There has been much public concern that some food additives cause adverse reactions, although careful investigations show that it is mostly based on misconception rather than on identifiable adverse reactions. Preservatives have rarely been shown to cause true allergic (immunological) reactions. Among the food additives reported to cause adverse reactions are some preservatives from the group of sulphiting agents, which include several inorganic sulphite additive (E220-228), and benzoic acid and its derivatives (E210-213), may trigger asthma characterised by breathing difficulties, shortness of breath, wheezing and coughing in sensitive (e.g. asthmatic) individuals.^{5,7} However, in general, due to stringent EU legislation governing the safety assessment of additives, preservatives can be generally regarded as safe for most consumers.

The European Parliament together with the European Council has laid down a detailed labelling system for food additives to enable consumers to make informed choices with regard to foods containing preservatives.¹⁵ Legislation also stipulates that additives are labelled on the packaging of food products by their category (preservative, colour, antioxidant, etc) with either their name or E-number.

Summary

Food additive preservatives are still necessary to ensure the safety and variety of different foodstuffs available. They function through delaying the spoiling of foodstuffs and preventing any alterations in their taste or appearance. Their assessment and use in foodstuffs is tightly controlled at both the European and the international level.



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