

WHAT DO ADDITIVES DO?

Additives have a range of functions including:

- improving the keeping quality of a food by making it last longer on the shelf or in the fridge, e.g. a preservative to prevent growth of bacteria or humectants to prevent food drying out
- improving the taste or appearance of a food, by the addition of flavours, thickeners and colours.

Consumers can actually be offered a wider choice of foods due to the existence of additives. Many manufactured foods contain additives, including margarine, ice cream and bread.

Food additives can occur naturally, such as red colour from beetroot (Beet red), and purple colour from grape skins (anthocyanins). These colours can be extracted and added to other foods. Other additives are found in nature but can also be manufactured, e.g. ascorbic acid. Lastly, some additives are manufactured but not found in nature, such as aspartame, which is used to replace sugar.

CONTROLLING THE USE OF ADDITIVES

Before an additive can be used in a food in New Zealand, Food Standards Australia New Zealand (FSANZ) carries out a safety assessment. This checks that the food additive is safe at the level proposed to be used, and that there are sound technological reasons for the use of the additive. If FSANZ agrees that a food additive should be permitted then approval of government Ministers is sought and only after this approval is granted can a food additive be used in food. The Food Standards Code lists which additives can be used and in what foods.

LABELLING

All food ingredients, including any additives, must be included in the ingredient list on the packaging. The ingredients are listed in descending order of weight. Within the list of ingredients, the class name of the additive will be listed followed by the additive name or code number in brackets. For example, Thickeners (pectin) or Thickeners (440).

Class name – all food additives are grouped into classes according to their function. For example, all colour additives are used to colour food, so are in one group. In the case of a food additive having more than one function then it is classified under both classes and the appropriate class name is used on the label.

Code numbers – most food additives have code numbers, and are part of an international numbering system. Code numbers use less space on labels than names and they help avoid confusion as some additives have more than one or similar names. Enzymes and flavours are not required to be specifically identified with code numbers, so they are required to be labelled by their class name only. If the number has 'E' in front of it then the food is labelled for the European Union market.

In the following information not all the additives allowed by FSANZ are listed below. Instead listed are group names for additives and examples of additives in these groups used in bakery product or of interest to bakers.

COLOURS

Colours make foods look more attractive. They are added to help identify flavours, to make food look brighter and to restore colour that may have been lost during processing.

CODE NUMBER	ADDITIVE NAME	DETAILS	FOOD
100	Curcumin	Orange-yellow colour that is extracted from the roots of the turmeric plant.	Curry, fats and oils, processed cheese.
101	Riboflavin	Riboflavin (vitamin B2) can be obtained by fermenting yeast or synthesised artificially. In foods, it is used as an orange-yellow colour.	Sauces, processed cheese and foods with added vitamins such as bread.
160a	Beta-carotene	Orange-yellow colour found in plants such as carrots, tomatoes and oranges.	Soft drinks, margarine, butter, yoghurt.
150a	Plain Caramel	Dark brown to black colour. About 90% of all colouring used is caramel. Obtained by the heating of sugars.	Confectionery, baked foods, chocolate, vinegar.
123	Amaranth	Dark purple synthetic colour. Similar in colour to blackcurrants.	Powdered soup, jam, ice cream, instant gravy.

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PRESERVATIVES

Preservatives are used to improve the safety of food by controlling the growth of mould, bacteria and yeast that cause food to deteriorate.

CODE NUMBER	ADDITIVE	NAME DETAILS
200	Sorbic acid	Sorbic acid and its salts are naturally occurring substances and they are among the most important food preservatives for industrialised countries. Sorbic acid has two important advantages in that it is effective over a wide range of foods, including beverages, dairy products and baked goods, and it adds no taste or flavour to products.
201	Sodium sorbate	
202	Potassium sorbate	
203	Calcium sorbate	
280	Propionic acid	The propionates are examples of naturally occurring preservatives. They work best in the more Sodium propionate alkaline conditions of bakery products and may be used to delay green mould growth on Sodium propionate alkaline conditions of bakery products and may be used to delay green mould growth on bread.
281	Sodium propionate	
282	Calcium propionate	
283	Potassium propionate	

ACIDITY REGULATORS

Acidity regulators are used to increase the acidity of a product. They can be added for taste but are mainly used to help control dough fermentation or leavening, or to reduce spoilage caused by growth of mould, rope and bacteria.

CODE NUMBER	ADDITIVE	NAME DETAILS
260	Acetic acid, glacial	0.8 (dilute) 0.6–1.5 (vinegar)
262	Sodium acetate or sodium diacetate	0.125–0.4
263	Calcium acetate	0.125–0.4
524	Sodium hydroxide	Caustic soda – strong alkali used as acidity regulator in bakery products.

ANTIOXIDANTS

Antioxidants help to prevent oils and fats from deteriorating and developing rancid flavours. They also slow down colour and flavour changes so foods made using oils and fats can be kept for longer.

CODE NUMBER	ADDITIVE	NAME DETAILS
300*	Ascorbic acid	Beers, cut fruits, jams, dried potato. Helps to prevent cut and pulped foods from going brown by preventing oxidation reactions that cause the discolouration.
301*	Sodium ascorbate	
302*	Calcium ascorbate	
303*	Potassium ascorbate	
306*	Tocopherols	Oils, meat pies. Obtained from soya beans and maize. Reduces oxidation of fatty acids and some vitamins.
330	Citric acid	Jam, tinned fruit, biscuits, alcoholic drinks, cheese, dried soup.
331	Sodium citrates	
332	Potassium citrates	
333*	Calcium citrate	

* Denotes additives that can also be added to food as a vitamin or mineral, where the Food Standards Code permits.

EMULSIFIERS

Emulsifiers are used to ensure that mixtures of oil and water (emulsions) stay mixed together. In addition to this emulsifiers can also aerate, increase product softness, reduce staling and modify structure and consistency.

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CODE NUMBER	ADDITIVE	NAME DETAILS
322	Lecithin	Natural emulsifier found in egg yolk. Used in range of baked goods including doughnuts and cakes to control flow and viscosity.
471	Mono- & di-glycerides of fatty acids	Used as an emulsifier in fat emulsions; can be added as a dispersion in water. In yeast-raised foods it improves softness and shelf life.
472a	Acetic and fatty acids esters of glycerol	
472b	Lactic and fatty acids esters of glycerol	
472c	Citric and fatty acids esters of glycerol	
472e	Diacetyltartaric and fatty acid esters of glycerol	'Datem', used as dough conditioner (strengthen) and sometimes crumb softener.
481	Sodium lactylate or sodium oleyl lactylate or sodium stearyl lactylate	Able to bind with gluten – improving dough strength, and starch – which improves crumb softness. When used in bread it improves texture and softness and reduces staling.
482	Calcium lactylate or calcium oleyl lactylate or calcium stearyl lactylate	Used in a similar way to SSL (481). It improves mixing tolerance of a dough, increases loaf volume, improves texture and shelf life.

THICKENERS, STABILISERS, GELLING AGENTS

Thickeners thicken food and ensure uniform consistency. They include modified starches. Stabilisers make it possible for two or more ingredients (which usually don't stay mixed) to stay together. Gelling agents modify food texture through the formation of a gel to help food set.

CODE NUMBER	ADDITIVE	NAME DETAILS
400	Alginic acid	Alginates are alginic acid salts sourced from algae. Sodium alginate dissolves in cold water, with 1% forming a firm gel. Alginates are water binding additives in bakery products. They increase water absorption, which increases water per unit weight in the final baked product. They increase lift in puff pastry products. Alginates make it possible to use flours with slightly lower water absorption rates.
401	Sodium alginate	
402	Potassium alginate	
403	Ammonium alginate	
404	Calcium alginate	
405	Propylene glycol alginate	
406	Agar	Tasteless gum extracted from certain types of Pacifica and NZ seaweed. Agar contains an unusual polysaccharide that acts as a powerful gelling agent. It is used to make confectionery including marshmallow pie filling and meringue.
407	Carrageenan	Seaweed extract. As per alginates, used as water binding additive or gum in baked product, such as puff pastry and toppings.
410	Locust bean gum or carob bean gum	Made from two plant seeds. A 0.5% solution gives a thick liquid and 5% a thick paste. They resist acid attack so are used to thicken fruit pies.
412	Guar gum	
414	Acacia gum or gum arabic	Made from the acacia tree. Nearly tasteless and odourless and soluble in cold water. It acts as an emulsifying agent as it coats tiny particles and stabilises suspended particles and emulsions. This gum is brushed over macaroon goods to give a shiny glaze.

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CODE NUMBER	ADDITIVE	NAME DETAILS
415	Xanthan gum	Natural polysaccharide produced by fermentation of sugar by bacterium <i>Xanthomonas campestris</i> . It is used as stabiliser / thickener in cake mix.

RAISING AGENTS

Raising agents are used in bakery products to make them rise.

CODE NUMBER	ADDITIVE	FUNCTION IN BAKERY PRODUCTS
500	Sodium carbonate or sodium bicarbonate	Sodium bicarbonate is baking soda. When used on its own as a leavener it releases gas very slowly and produces an alkaline dough. It is not generally used for aerating pastry products. It is a chemical source of carbon dioxide in baking powder.
503	Ammonium bicarbonate or ammonium hydrogen carbonate	Used to aerate some products, such as crackers, to achieve the desired texture. Their reactions are different from those of other baking powders; when heated they decompose into carbon dioxide and ammonia gas.

ENZYMES

Enzymes describe a biological catalyst (proteins) capable of speeding up chemical reactions without being destroyed themselves. Different enzymes may be added to assist mixing, development and fermentation and to reduce staling.

CODE NUMBER	ADDITIVE	FUNCTION IN BAKERY PRODUCTS
1100	alpha-Amylase	Added to dough to increase available sugar. If the amount of sugar is limiting fermentation, then adding amylase will increase the proof rate and reduce proof time.
1101	Proteases (papain, bromelain, ficin)	In the USA, these are used with over-strong flours to reduce mixing time, saving power and time. They can be added to English muffin dough to create the open, porous texture required.

REFERENCES

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