



GRINDS360°

HOME ECONOMICS

FOOD ADDITIVES NOTES

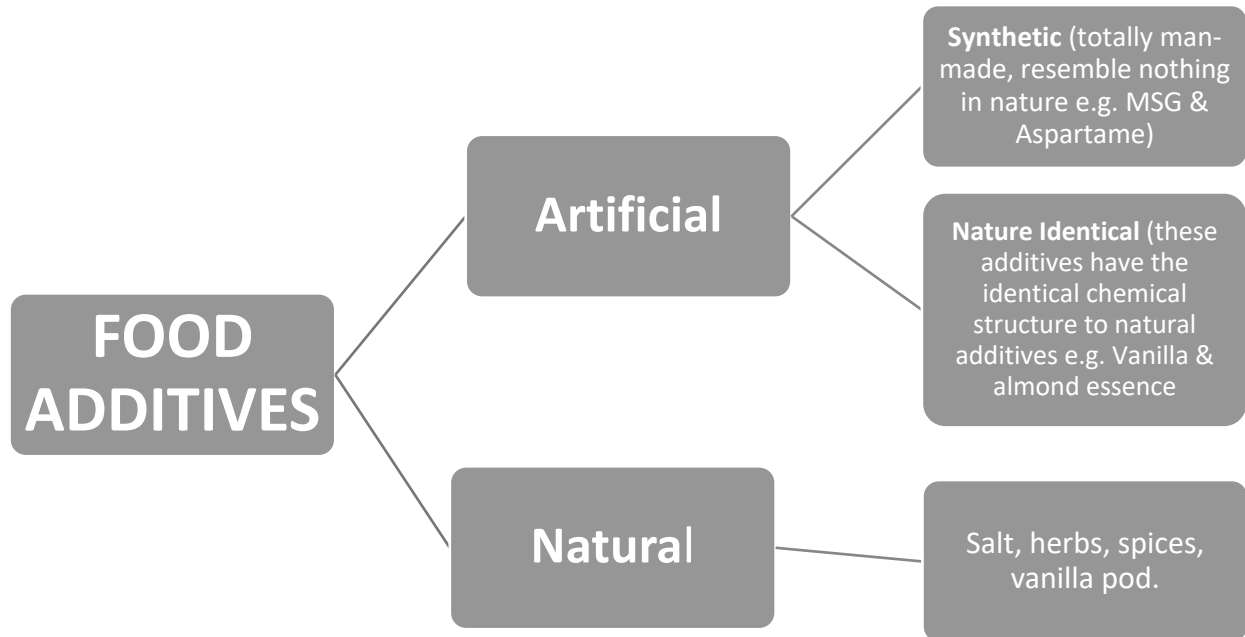
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FOOD ADDITIVES - 1.3.6

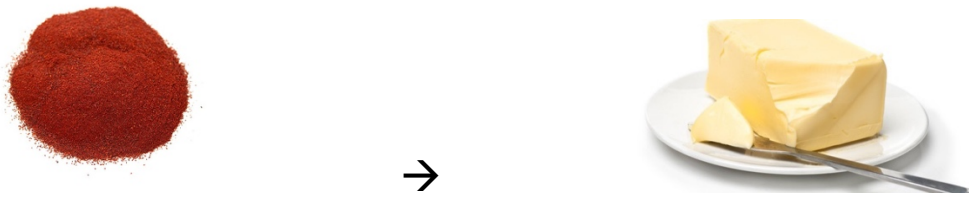
WHAT ARE FOOD ADDITIVES?

- Food additives are not foods themselves.
- They are added to food to improve appearance, taste, texture, keeping qualities and nutritional value.
- They are usually identified by an 'E' number.
- They may be **natural** or **artificial**.



NB : CLASSIFY FOOD ADDITIVES – EG. OF EACH CLASS

<u>E NUMBER</u>	<u>FULL NAME</u>	<u>EXAMPLE</u>	<u>EXAMPLE</u>
E100's	Colours	- Annatto (yellow) E160B	- Caramel (brown) E150
E200's	Preservatives	- Vinegar E260 - Salt	- Sulphur Dioxide (E220)
E300's	Antioxidants	- Vit E (E260) - Vit C (E300)	- BHA (E320) - BHT (E321)
E400's	Physical Conditioning Agents	- Emulsifier (Lecithin)	- Stabiliser (Gums)
---	Nutritive Additives	- Folic Acid - Omega 3 F.A's	- Vitamin C
---	Flavourings/ Sweeteners	- Sugar	- Aspartame



(Annatto (yellow) E160B provides Margarine with it's 'yellow' colour)

ADVANTAGES VS DISADVANTAGES

ADVANTAGES	DISADVANTAGES
<ul style="list-style-type: none"> ○ Improve colour/flavouring of food which may be lost in processing. 	<ul style="list-style-type: none"> ○ Side effects (particularly colours affect children), hyperactivity, asthma.
<ul style="list-style-type: none"> ○ Help preserve food E200's. 	<ul style="list-style-type: none"> ○ May have a cumulative effect (ie) : build up in the body.
<ul style="list-style-type: none"> ○ Help prevent food poisoning. 	<ul style="list-style-type: none"> ○ There may be a "cocktail effect".
<ul style="list-style-type: none"> ○ Provide a wide choice of food. 	<ul style="list-style-type: none"> ○ Some bulking agents deceive consumers.

NB: LEGISLATION/LAWS/SAFETY OF FOOD ADDITIVES

A: EFSA (EUROPEAN FOOD SAFETY AUTHORITY)

- Prior to authorization, all food additives are assessed for safety by the EFSA.
- Risk assessments on food additives are carried out by a scientific panel specialized in food additives.
- The panel can withdraw additives from an approved list if there are concerns about safety.
- This scientific panel determines an Acceptable Daily Intake (ADI) for safe additives. However, if additives are not eliminated from the body within 24 hours of ingestion, they are not allowed in food production.
- "E" is an international code given to an additive that has passed tests and thought to be safe for human consumption, therefore under normal circumstances "E" numbers are safe. However, the "E" numbers are under constant revision and may not pass future tests.

B : JECFA (JOINT EXPERT COMMITTEE ON FOOD ADDITIVES)

- This group is made up of members of WHO and FAO thus the name joint committee.
- They evaluate the safety of food additives, contaminants and residues of veterinary drugs in food.
- The JECFA insist that all additives are :
 - Toxicologically safe.
 - Meet consumer demand.
 - Have a technological need (ie) : a purpose.

NB: FUNCTIONS OF FOOD ADDITIVES

- **To prolong shelf life of food** (eg) : E220 Sulphur Dioxide added to sausages, cartons of fruit juice.
- **To reduce risk of food poisoning** (eg) : preservative E200's can retard microbiological growth in food.
- **To meet consumer demands** (eg) : colours E160B gives margarine a "yellow colour", E924 Potassium Bromate is used to bleach flour so consumers have "white flour" – Endosperm is naturally cream/yellow.
- **To improve taste/flavour of food** (eg) : salt added to cereals, baked beans, MSG added to crisps, noodles.
- **To improve nutritional value** (eg) : Folic Acid in breakfast cereals, Omega 3 FAs in milk.
- **To improve texture of food** (eg) : stabilisers in salad cream.

Food Additives 1.3.6**(Have No E. Number) FLAVOURINGS 2018 Q3.B (b)**

<u>Classification</u>	<u>Examples</u>	<u>Use</u>	<u>Function</u>
Natural Flavourings	1. Salt 2. Sugar 3. Spices (ginger, turmeric) 4. Herb (oregano, basil) 5. Vanilla Pod	→ To season salad, crisps → Sprinkled over fruit → Used in Indian chicken curry → To season roast chicken → Vanilla cupcakes	<u>Functions of Flavourings:</u> 1) To replace flavour lost in food processing <ul style="list-style-type: none"> E.g. Adding salt to convenience foods (<i>tinned beans</i>). 2) To add flavour <ul style="list-style-type: none"> Example: Chilli-flavoured crisps, sugar in breakfast cereals.
Artificial Flavourings	1. Benzyl Acetate (rum flavour) 2. Amyl Acetate (pear flavour) 3. Maltoe (flavour of baked goods/ dextranisation) 4. Artificial Sweetner (Aspartame E951) <u>NOTE: Flavour Enhancer is MSG (crisps, soysauce) Monosodium Glutamate</u>	→ commercially produced deserts → pear flavoured sweets → sprayed in bakery section/ cakes/breads. → to flavour low kcal fizzy drinks - Has <u>no</u> flavour - Stimulates taste buds to intensify natural flavour in food	3) To enhance flavour <ul style="list-style-type: none"> Example: Adding rum flavour or orange flavour to chocolate bars

Food Additives 1.3.6 - Colours (E100's)

<u>Classification</u>	<u>Examples</u>	<u>Use</u>	<u>Functions</u>
Natural colours	E160b Annatto (derived from seeds of annatto tree)	<u>Orange colour</u> , cheese, crackers	1. <u>Replace colour lost in processing</u> - e.g., tinned strawberries. 2. <u>Improve the appearance of food</u> - e.g., Annatto added to margarine gives a deep yellow colour, or to cheese.
	E150 Caramel (from caramelisation of sugar)	<u>Brown colour</u> , cola drinks, meat rubs	
	E160c Paprika extract	<u>Red colour</u> , crisps, tomato sauce	
	E140 Chlorophyll	<u>Green colour</u> , mint flavoured sweets, green soft drinks (lime/apple)	
Artificial Colours	E110 Sunset Yellow	<u>Orange colour</u> , cereals, sauces, Fanta	3. <u>Helps consumers identify the flavour of food</u> - e.g., - Red → Strawberry - Yellow → Lemon flavour - Brown → Chocolate flavour
	E133 Brilliant Blue	Cakes, cupcakes, flavoured water	
	NOTE: Artificial colours are derived from <u>Azo dyes</u> . <u>10% of people show allergic reactions</u> to them, such as migraine, rashes, itching, and hyperactivity (especially in children).		

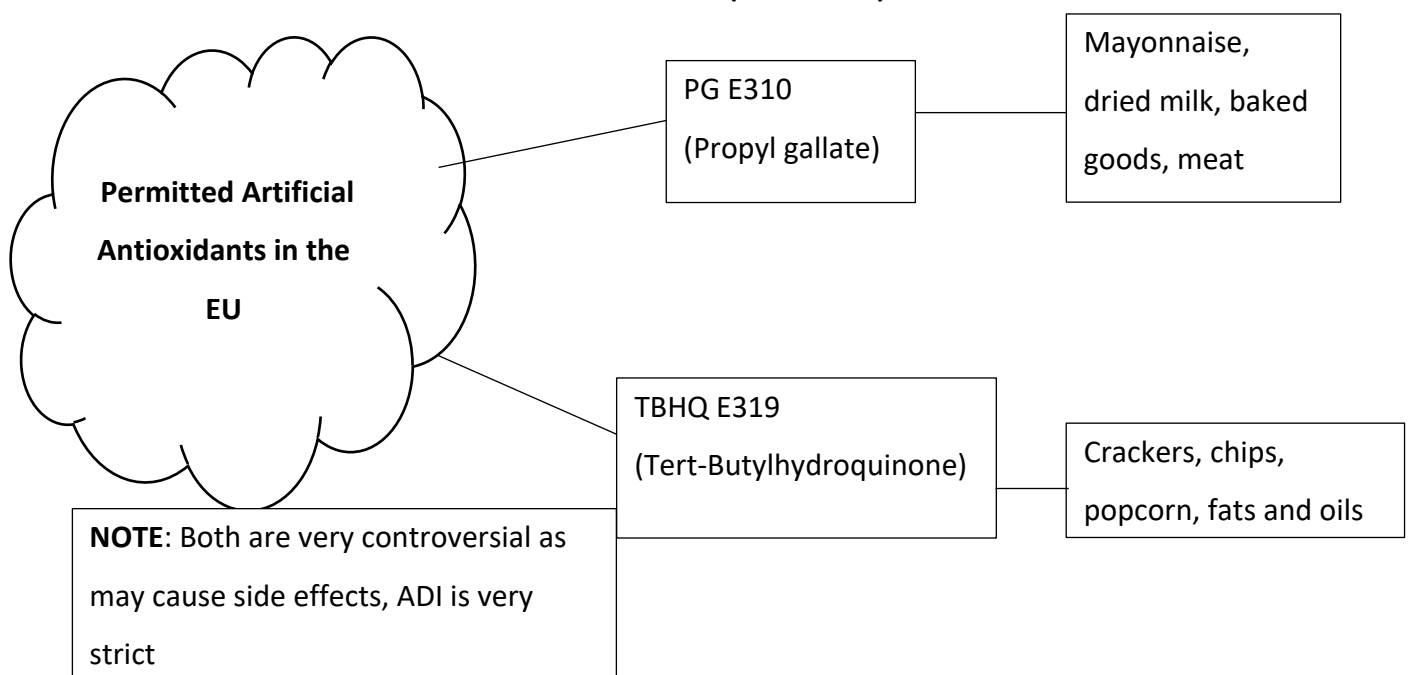
Food Additives 1.3.6 - Preservatives (E200s)

<u>Classification</u>	<u>Examples</u>	<u>Use</u>	<u>Functions</u>
Natural Preservatives	1. Salt	Smoked fish (e.g., salmon)	1. <u>Help prolong the shelf life of food</u> <ul style="list-style-type: none"> ○ E.g. E220 added to fresh sausages to last for <u>7 days</u>.
	2. Vinegar	Chutneys, pickled vegetables	
	3. Spices (ginger, turmeric)	Fruit cakes (rich)	
Artificial Preservatives	1. Sorbic Acid E200	Processed cheese, baked goods/commercial cakes	2. <u>Retard microbial growth in food</u> <ul style="list-style-type: none"> ○ Helps reduce the risk of food poisoning. ○ Example: Sorbic acid.
	2. Benzoic Acid E210	Fruit juice, pickles	
	3. Sulphur dioxide E220	Sausages, frozen chips, fruit juices	
			3. <u>Help prevent changes in food colour, flavour, or texture</u> <ul style="list-style-type: none"> ○ E.g. Benzoic acid is used as a preservative for coloured fruit juices.

Food Additives 1.3.6 – E300s ANTIOXIDANTS 2018 Q3. B (b)

<u>Classification</u>	<u>Examples</u>	<u>Use</u>	<u>Functions</u>
Natural Antioxidants	Vitamin C E300	Production of Yams, Jellies and Sauces	1. <u>To delay oxidation in lipid foods</u> (i.e. Oxidative rancidity) 2. <u>Prolongs shelf life of food</u> e.g. sunflower oil can last up to 1 year.
	Vitamin E E306	Production of Vegetable oils e.g. sunflower oil	
Artificial Antioxidants	<u>BHA E320</u> (Butylated hydroxy anisole) (Banned in EU/2022)	(allowed in USA) Added during the production of breakfast cereal and other dry goods	3. <u>Reduces food waste</u> as spoilage of food is delayed (Jams and jars of pasta sauce 18-24 months)
	<u>BHT E321</u> (Butylated hydroxy toluene) (banned in EU/2022)	(allowed in USA) Used in hot dogs, breakfast cereals, processed meat). Crisps, stock cubes,	

NOTE: BHA and BHT are now BANNED in the EU (since 2022)



Food Additives 1.3.6 – Physical Conditioning Agents (E400s)

<p>1. Emulsifiers *</p>	<ul style="list-style-type: none"> • Function: Hold immiscible substances together, e.g., oil and vinegar in a permanent emulsion such as mayonnaise. • Example: Lecithin (egg yolk), GMS (Glycerol Monostearate).
<p>2. Stabilisers *</p>	<p>☐ Function: Help maintain emulsions once they have been formed by increasing the viscosity of the mixture so that fat/oil droplets move more slowly and cannot coalesce or separate.</p>
<p>3. Humectants</p>	<ul style="list-style-type: none"> • Function: Help prevent food from drying out. • Example: Glycerine (used in chewing gum and fondant/roll-on icing).
<p>4. Modified Starch</p>	<p>☐ s: Used as bulking agents or thickeners in food. These are based on starch extracted from grains and vegetables such as wheat, maize, and potatoes.</p> <p>☐ Example: Used in packet soups and packet sauces.</p>
<p>5. Polyphosphates</p>	<ul style="list-style-type: none"> • Function: There are many types of polyphosphates, with two popular types: <ul style="list-style-type: none"> ○ A. Anti-caking agents: Help prevent the formation of lumps in gravy powder, packet cake mixtures, and milk powder. ○ B. Increase water holding capacity: Helps meat retain water, making it appear larger. <ul style="list-style-type: none"> ▪ Example: Chicken fillets, pre-sliced ham, and processed meats. • REVISE chapter on lipids for more detail

Food Additives 1.3.6 – Sweeteners (Artificial) (E900s)

<u>Classification</u>	<u>Description</u>	<u>Examples</u>	<u>Use</u>	<u>Functions</u>
Bulk Sweeteners	→ <u>Used in similar quantities to normal sugar</u>	<u>Sorbitol</u> <ul style="list-style-type: none"> - Sugar alcohol - Metabolises slowly in the body - Made from corn syrup 	<ul style="list-style-type: none"> - Often used in <u>diabetic foods</u> e.g. diabetic jam and diabetic chocolate. 	① Used in low kcal food eg. low kcal “fizzy” drinks, sugar free gum ② Used as a humectant in food (eg. <i>glycerine</i>) to prevent food drying out ③ Production of diabetic foods (eg. <i>Jam / chocolate</i>) eg. Xylitol, Sorbitol
	→ <u>Just a little less sweet than sugar (sucrose)</u>	<u>Xylitol</u> <ul style="list-style-type: none"> - Processed from birch wood - Tastes like sugar but - 40% less kcals - Low GI 	<ul style="list-style-type: none"> - <u>Sugar free chewing gum</u> - Sugar free mints. 	
Intense Sweeteners	→ <u>Used in a much smaller amount compared to normal sugar (sucrose)</u>	<u>Aspartame E951</u> <ul style="list-style-type: none"> - 200 times sweeter than sugar - Leaves bitter aftertaste 	<ul style="list-style-type: none"> - <u>Low kcal carbonated/ “fizzy” soft drinks</u> e.g. “diet coke” 	④ To sweeten foods eg. commercially made desserts, tea, coffee
	→ <u>Much, much sweeter than normal sugar (sucrose)</u>	<u>Steviol glycosides</u> <ul style="list-style-type: none"> - 300 times sweeter than sugar - Negligible effects on blood glucose levels. 	<ul style="list-style-type: none"> - <u>Flavoured waters</u> - Fruit juice drinks 	

SWEETENERS

- Leaving Cert Higher Level 2011 Q2 Section B / Q2(B)
- Sweeteners can be divided into two main groups (E900 – E999):
 - **A** : Bulk Sweeteners.
 - **B** : Intense Sweeteners.

A: BULK SWEETENERS

- They are usually used in similar quantities to sugar, in food and are just a little less sweet than sugar.

1) Sorbitol

- It is a sugar alcohol that has a sweet taste.
- The human body metabolises sorbitol slowly therefore it is often used in diabetic foods.
- Most sorbitol is made from corn syrup.
- Excess sorbitol has laxative effects.
- Naturally present in prunes, peaches.

2) Xylitol

- Can be processed from birch (wood)
- Looks and tastes like sugar but has fewer kilocalories (40%)
- It has a low GI (Glycemic Index) and doesn't raise blood sugar levels.
- It is a sugar alcohol (ie) : a hybrid of a sugar molecule.
- **USES** : Mints, Sugar Free Chewing Gum, Sugar Free Diabetic Foods.

B: INTENSE SWEETENERS

- Low in kilocalories and used in small amounts as they have an “intense” flavour and are much sweeter than sugar.

1) Steviol Glycosides (E960)

- Mixtures of Steviol Glycosides used as a sweetener and extracted from the leaves of the stevia plant.
- It has up to 300 times the sweetness of sugar.
- The sweetener has an almost negligible effect on blood glucose levels.
- November 2011, the EFSA granted authorization of the use of Steviol Glycosides as a sweetener in food.

2) Aspartame (E951)

- Made by joining amino acids : **Aspartic Acid + Phenylalanine.**
- The most popular artificial sweetener on the market today.
- 200 times sweeter than sugar.
- Leaves a bitter aftertaste.
- Some people (RARE) are born with PKU – Phenylketonuria, making them allergic to phenylalanine and therefore Aspartame.
- Others have an allergic reaction to Aspartame causing inflammation in the lining of the intestines leading to nausea, diarrhoea, abdominal cramping, stomach pain and bloating.
- Even though a lot of controversy surrounds Aspartame, it is one of the most tested and regulated artificial sweeteners.
- **USES** : Low Kilocalorie Carbonated Drinks (eg) : 7UP Free, Diet Coca Cola.
- In July 2023, the WHO (World Health Organisation) classified Aspartame as “possibly carcinogenic” to humans based on limited evidence it might cause cancer specifically liver cancer.

FUNCTION OF SWEETENERS

- To sweeten food improving flavour e.g Corn Syrup, commercially made biscuits, jams, sweets, baked goods (cookies, cakes).
- To replace sugar in diabetic foods e.g. Sorbitol in diabetic jam and chocolate.
- To sweeten food that is low in kilocalories (eg) diet carbonated (fizzy) drinks e.g. aspartame.
- Used as a humectant to prevent food drying out e.g. glycerine in chewing gum and fondant icing.

EXAMPLES OF NATURAL SWEETENERS

- Honey.
- Sugar (Sucrose)
- Maple Syrup.
- Stevia Plant.

PHYSICAL CONDITIONING AGENTS

POLYPHOSPHATES

- Used in foods since the 1950's
- Many uses as there are many different polyphosphates with varying properties.
- **USES :**
 - **A: ANTI-CAKING AGENTS** – Helps prevent formation of lumps (eg) : dried milk, chocolate powder, pocket cake mixture.
 - **B: INCREASE WATER HOLDING CAPACITY** – Can increase the water holding capacity of meat (ie) : Helps chicken breasts hold water therefore the chicken looks “larger” and as a result, it is more appealing to the customer.