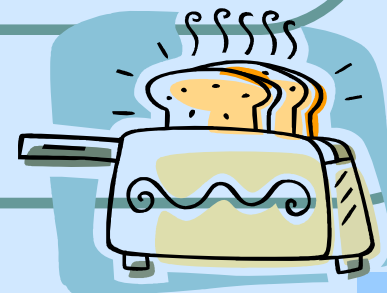


Food Safety (level 3)

Food Additives FS0724

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Emulsifiers, Stabilizers and Thickeners

- Preservatives
- Flavouring Agents
- Colouring Agents
- Emulsifiers, Stabilizers and Thickeners
- Nutrients
- Antioxidants
- Harmful Effects of Food Additives
- Monitoring of Use of Food Additives



- Carboxymethyl cellulose
- Xanthan Gum
- Pectin
- Dextrins
- Sodium Alginate

Emulsifiers:



- Emulsions in food are mixtures of oil and water.
- Emulsifier keeps the mixture stable and prevents the oil and water from separating into two layers.

Other Functions:

- Make food appealing
- Effect on the texture of food
- Prevent the growth of moulds in low fat spreads
- Aid in processing and help maintain quality and freshness



Examples of food emulsifiers are:

Egg yolk (in which the main emulsifying agent is lecithin)

Proteins and low-molecular-weight emulsifiers are common as well

Soy lecithin is another emulsifier and thickener

In some cases, particles can stabilize emulsions through a mechanism called Pickering stabilization

sodium stearoyl lactylate

DATEM (Diacetyl Tartaric Acid Ester of Monoglyceride) is an emulsifier primarily used in baking

Emulsifiers Commonly found in

- Peanut butter
- Icecream
- Coffee whiteners
- Margarine/low fat spread
- Biscuits and toffees
- Cakes
- Frozen desserts
- Bread
- Chewing gum



Acidulants:

- They are additives that give a sharp taste to foods.
 - Also assist in the setting of gels and to act as preservative
 - The acid environment they produce prevents the growth of microbes
- Eg: widely used organic acid is **citric acid** in food products , drinks and pharmaceuticals



Anticaking agents:



- Processed food often contains ingredients that are mixed as powders.
- anti-caking agents are added to allow them to flow and mix evenly during the food production process.

Eg: silicon dioxide ,calcium silicate



Anti-caking agents:



Commonly found in

- **vending machine powders(coffee , cocoa)**
- Milk and cream powders
- **Grated cheese**
- **Icing sugar**
- Baking powder
- Cake mixes
- Instant soup powders
- **Drinking chocolate**
- **Table salt- magnesium carbonate is the agent added**



Physical Conditioning agents E400-499

Classes	Examples	Use	Origin	Function
Emusifiers	Lecithin Alginates E401-404	Mayonnaise Hollandaise Ice cream	Eggs, soya beans Sea weed	To make permanent emulsions
Stabilisers	Carageen Guar gum E412	Ice cream Confectionary	Sea weed Guar plant	To stabilise emulsions by thickening them
Poly-phosphates	Magnesium carbonate	Salt- as anti- caking agent, Cake mixes	Lab	To prevent lumping
Pectin E440		Jams / jellies	fruit cell walls	To set mixtures
Humectants	Sweetners sorbital and mannitol	Confectionary and sweets Cakes/ buns	Lichen	They absorb water vapour from air and keep foods moist

Nutrients

- Preservatives
- Flavouring Agents
- Colouring Agents
- Emulsifiers, Stabilizers and Thickeners
- Nutrients →
- Antioxidants
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- Vitamins
- Minerals & Iodine

Sweeteners E900-E999

Class	Examples	Use	Origin	Functions
Natural	Fructose Sucrose Glucose syrup	Tinned peas Biscuits, sweets, tinned fruit Tinned fruit, jelly	Fruit Sugar beet & sugar cane Fruit & honey	To sweeten food
Artificial	Aspartame E951 <i>"Nutrasweet, Canderel"</i> Saccharine E954 <i>'Hermesetes'</i>	Diet drinks Sweetener Diet drinks Sweetener	Dipeptide (aspartic acid+ phenylalanine) Coal tar	Used in low calorie / diabetic food & drinks
Bulk Sweeteners	Sorbitol Mannitol E965	Diabetic food, sugar free food Sugar free gum, ice cream	Lichens Lichens	Sorbitol used in diabetic food as it does not need insulin

Sweeteners:

(*nonnutritive or alternative sweeteners*):

Substances that impart sweetness to food but supply little or no energy to the body



Functions :

- Provide texture in baked foods
- Humectant in cakes
- Lowers the freezing point in icecream
- Preservative in jams
- Adds bulk to baked foods
- Strengthens “mouthfeel” in soft drinks



Food sweeteners :



Eg: **aspartame, saccharin, acesulfame K**

Found in

Sugar free chewing gums, **Drinks** (carbonated , non-carbonated , milk based , alcoholic), **Breakfast cereals**, Desserts, fillings and toppings, Processed fruit and vegetable products(jams, **jellies**), **Yoghurt**



Side effects of sweeteners :



- behavioural problems,
- hyperactivity ,
- allergies and
- possibly carcinogenic

Advantage :

They allow diabetics to have sugar free but sweet tasting food.



Antioxidants

- Preservatives
- Flavouring Agents
- Colouring Agents
- Emulsifiers, Stabilizers and Thickeners
- Nutrients
- Antioxidants →
- Harmful Effects of Food Additives
- Monitoring of Use of Food Additives

- Ascorbic Acid and Ascorbates
- BHA and BHT

Antioxidants :



- Oxidation is a destructive process , causing loss of nutritional value and changes in chemical composition
- Antioxidants are added to food to slow the rate of oxidation and if used properly can extend the shelf life of food in which they have been used.

Eg: BHA(butylated hydroxy anisole) , BHT(butylated hydroxy toluene)



Antioxidants :

Commonly used in

Vegetable oil

Meat ,fish , poultry

Margarine

Dairyproducts

Mayonnaise / salad dressing

Potato products (instant mashed potato)at KFC



Antioxidants :



Side effects:

- Hyperactivity ,
- Asthma ,
- Angiodema,
- Rhinitis ,
- Urticaria and
- May affect ESTROGEN levels .
- Have been linked with cancer in animals



Antioxidants E300-399

Classes	Examples	Use	Origins	Functions
Natural	Ascorbic acid Tocopherol (E306)	Fruit drinks Vegetable oils	Fruit & veg. Nuts & seeds	Prevents oxidation where food is spoiled by reacting with oxygen
Artificial	BHA (E320) BHT (E321)	Stock cubes, cheese spread Chewing gum	Made in lab	
BHA and BHT not permitted in baby food				

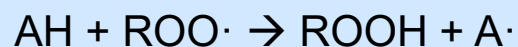
BHA and BHT

- # BHA (butylated hydroxyanisole)
- # BHT (butylated hydroxytoluene)
- # Commonly used antioxidants for fat-soluble fatty products
- # Similar properties to the natural antioxidant, vitamin E



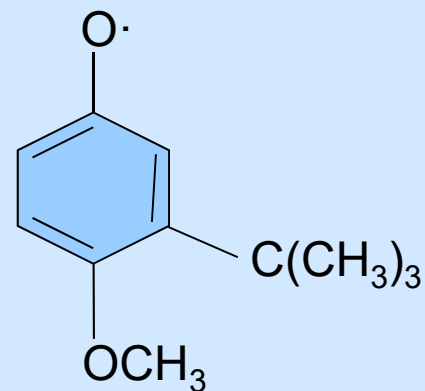
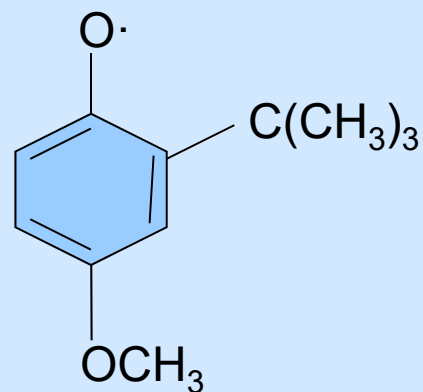
BHA and BHT

- They appear to work by donating the H atom of the –OH group to the free hydroperoxide radical ($\text{ROO}\cdot$) involved in the autoxidation of fats and oil, thereby stopping the chain reactions in oxidative spoilage.

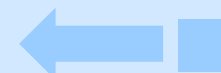


where AH represents the antioxidant, and A is a radical derived from the antioxidant

e.g.



Antioxidant radicals from BHA



BHA/BHT – potato chips , vegetable oils ,
chewing gum
(butylated hydroxy anisole/toluene)

Side effects:

- May be carcinogenic to humans .
- BHA also interacts with nitrites to form chemicals known to cause changes in the DNA of cells.
- Toxic to CNS and liver.



Additives...

- Butylated Hydroxytoluene (**BHT**)
 - cereal, chewing gum, & potato chips as an antioxidant. It keeps oils from going rancid.
- Gums: (Arabic, guar, locust bean)
 - used in beverages, candy, cottage cheese, dough, drink mixes, frozen pudding, ice cream, salad dressings as stabilizers & thickening agents

Ascorbic Acid and Ascorbates

✚ Ascorbic Acid

- 🍷 Chemical name of Vitamin C
- 🍷 Reducing in nature
- 🍷 Reduce the amount of dissolved oxygen in food

✚ Ascorbic Acid and Ascorbates

- 🍷 Antioxidants for water-soluble fatty products



Common Food Additives:

- **Ascorbic Acid:**

- used in **cereals, cured meats & fruit** drinks as an **antioxidant, colour** stabilizer or as a **nutrient**

- **Artificial & natural flavouring:**

- used in **cereals, candy**, gelatin, desserts, **soft** drinks & many other foods as “mimic” of natural flavours