FOOD COMMODITIES (FRUIT & VEGETABLES) - 1.3.2

- Fruit and vegetables are low in kilocalories, fat and salt while rich in vitamins, minerals, antioxidants and fibre. They are also high in water therefore they contribute to our fluid daily intake.
- The recommended intake of fruit and vegetables is five to seven portions daily.
  - One portion equates to one apple or banana, a small bowl of salad, 3 dessertspoons of peas or beans, half an avocado or a handful of berries
  - The portions of fruit should be ingested fresh and raw if possible.
- The benefits of consuming the recommended servings of fruit and vegetables daily provides greater protection against certain cancers, heart disease, stroke and diabetes.

CLASSIFICATION OF FRUIT

CLASS	EXAMPLES
Citrus	Oranges, lemons, limes
Drupes	Apples, pears, peaches, plums
Berries	Strawberries, blueberries, raspberries
Dried Fruit	Figs, dates, sultanas
Tropical	Mangos, pineapple, starfruit
Others	Rhubarb, grapes

GRADING FRUIT/EU GRADING

- On July 1st 2009 the European Commission abolished 20 year old rules that discriminated against imperfect fresh produce.
- In all 36 types of fruit and vegetables can now be sold whatever their shape, size, lack of sheen or gnarled skin.
  - No longer illegal to sell cauliflower with a diameter less than 11cm!
- Under the SMS (Specific Marketing Standard) 10 fruit/ vegetables will be sold under Extra, Class I and Class II classification.
  - Apples
  - Kiwis
  - Citrus Fruits
  - Pears
  - Lettuce
  - Table Grapes
  - Peaches/Nectarines
  - Strawberries
  - Tomatoes
  - Sweet Peppers

- The listed fruit/vegetables make up approximately 75% of the sales of fresh produce (fruit/vegetable produce)

CLASS EXTRA	○ Best quality produce ○ Flesh must be perfectly sound ○ Virtually blemish free
CLASS I	○ Very good quality ○ Flesh must be perfectly sound ○ Slight defect no greater than 1cm^2 of surface (apple).
CLASS II	○ Free from major defects ○ Allows for slight bruising

in netted bags, punnets plastic bags.

individual, large pieces of fruit loose eg. Orange

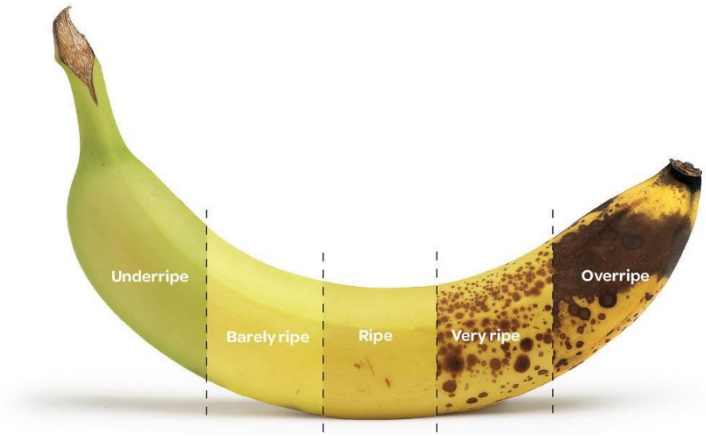
- There is a GMS (General Marketing Standard) for all other fruits, nuts, herbs, cultivated mushrooms. All of the above should be:
  - Intact
  - Sound (ie): not severely bruised
  - Clean
  - Free from pests (practically)
  - Sufficiently developed (ie): ripe
- …. before they can be sold.

RIPENING PROCESS (FRUIT)

- Fruit grows, ripens and decays due to the action of enzymes present in fruit. Enzymes can change the colour and flavour of fruit and may still work after harvest (eg) : green bananas change to yellow then brown and finally black.
- Ethylene gas (sweet smell) is released during ripening of fruit.
- Starch in unripe fruit breaks down to sugar during ripening (polysaccharides → monosaccharides) making fruit easier to digest.
- Pectose (unripe fruit) changes to pectin (ripe fruit) and then pectic acid (over ripe fruit)
- When fruit is shipped long distances, it is kept in an environment where there is a low level of oxygen to slow down oxidation.
- Enzymes, moulds and yeast can cause deterioration/ decomposition of fruit therefore wrapping paper (usually purple colour) is used to cover fruit (eg) : apples are impregnated with preservatives to slow down spoilage. Fruit may also be sprayed with sprays/pesticides.

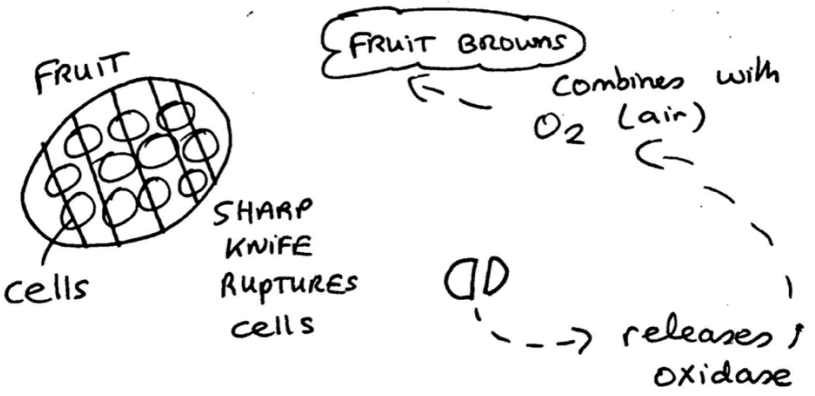
NOTE:

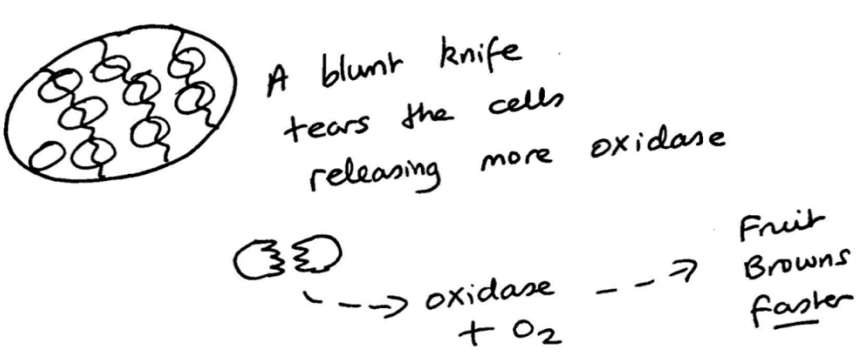
- Bromelin is an enzyme in pineapple.
- Oxidase is an enzyme found in all fruit.
- Always choose **Ripe Fruit** when making jams/jellies as pectin is a gelling agent.



BROWNING/DISCOLOURATION OF FRUIT

- **Enzymic Browning**: As fruit is peeled and chopped, fruit cells are ruptured releasing the enzyme oxidase. The oxidase combines with oxygen in the air.
  - **RESULT:** Browning of fruit (eg) : apples, bananas.
  - **NOTE:** When oxidase is released it also reduces Vitamin C content of food.





- **Metals react with fruit** : Metals can cause browning of fruit (eg) : carbon steel discolours fruit.
  - Lead, Zinc and aluminium may be dissolved by acids in fruit.

HOW TO PREVENT DISCOLOURATION OF FRUIT DURING FOOD PREPARATION

- Cover fruit in lemon juice (eg) : apples, bananas. The acidic pH of lemon juice interferes with the action of oxidase.
- Soak fruit in alcohol (eg) : liquer, in fruit salad. Other : Cointreau, Grand Marnier, Crème de Cassis (alcohol–acidic pH)
- Pour a gelatine glaze over fresh fruit flans or tartlets to prevent oxidation/browning of fruit.
- Use a sharp knife to cut fruit **not** a blunt knife.

NUTRITIVE VALUE OF FRUIT

PROTEIN

- Trace amounts.
- Low Biological Value.

LIPIDS

- 0% fat free.
- Exception: Avocadoes, Olives.
- They contain PUFA (Polyunsaturated Fatty Acids)

CARBOHYDRATE – High %

- **Sugar**: melons, papaya, cherries are high in Fructose. Glucose in all fruit.
- **Starch:** mainly unripe fruit (eg) : green banana.
- **Cellulose**: outer skins (ie) : pears, apples.
- **Pectin**: ripe fruit.

MINERALS

- **Iron:** non haem → ferric iron.
- **Calcium**: oranges, figs, mangoes.
- **Magnesium**: bananas, avocadoes.
- **Potassium**: grapefruit, dates, guava.

VITAMINS

- **Folate**: oranges, avocadoes.
- **Vitamin C** : strawberries, blackcurrants, oranges.
- **Beta Carotene (Pro Vitamin A)** : in all red, yellow, green, orange fruit (eg) : mangoes.

DIETETIC VALUE OF FRUIT

LOW CHOLESTEROL DIETS

- Fruit is fat free.
- Low in kilocalories.

TEENAGERS

- Pro Vitamin A/Beta Carotene good for acne.

ANAEMIA

- Both Iron and Vitamin C present in fruit.

PREGNANCY

- Folate good for neural tube development therefore helps prevent spina bifida.

STIMULATES PERISTALSIS

- Helps prevent constipation/diverticulitis/piles.

ANTIOXIDANTS

- Vitamins A,C,E help reduce the risk of certain cancers, stroke and diabetes.

ADD VARIETY TO THE DIET

- Chopped banana, berries added to breakfast cereal or yoghurts. Smoothies and juices are a good way of ensuring children get part of their “five a day”.

EFFECTS OF HEAT ON FRUIT

- Water soluble vitamins particularly Vitamin C are destroyed by heat.
- Cell walls are softened. Fruit disintegrates if overcooked (eg) : rhubarb, apples.
- Some loss of colour and flavour.
- Cellulose/fibre is hygroscopic therefore a little water is absorbed during cooking.

EFFECTS OF PROCESSING ON FRUIT

- **Drying**: large amounts of vitamins are lost including Vitamin C, B Vitamins and some Vitamin A.
- **Canning:**
  - Fruit softens (eg) : strawberries, peaches.
  - Vitamin C is destroyed (121°C/15 mins)
  - Sugar is sometimes added (eg) : pears in syrup.
- **Freezing**:
  - Best method of processing as the nutritive value does not change very much.
  - Slow freezing @ -18°C may cause large crystals to form which can rupture cell walls of fruit resulting in a 'mushy' texture as the fruit thaws.
  - Ideally blast freeze @ -30°C or lower (tiny ice crystals)
- **Irradiation**:
  - Fruit is exposed to rays of caesium cobalt (gamma rays) which interferes with enzyme activity and delays ripening which allows fruit to be stored for longer.
  - All surface micro-organisms are destroyed.

ECONOMIC VALUE OF FRUIT

- Fruit is cheapest and at its best when in season (eg) : March – fruit in season include rhubarb, cooking apples (Ireland)
- Tropical fruit can be expensive for its size (eg) : Kumquats, Ugli Fruit (due to expense of travel)
- Tinned fruit is cheapest (but quality is not as good as fresh)
- Class II fruit has slight blemishes but is less expensive than Class I, often sold in netted bags (eg) : mandarins.

CLASSIFICATION OF VEGETABLES

- **Leafy Greens**: spinach, kale.
- **Roots/Tubers**: potatoes, carrots.
- **Nuts**: peanuts, walnuts.
- **Fungi**: truffles, mushrooms.
- **Fruits**: peppers, courgettes.
- **Stems**: celery.
- **Bulbs**: onions, garlic.

NUTRITIVE VALUE OF VEGETABLES

PROTEIN

- 1-5%.
- Low Biological Value (LBV)
- Pulses (soya beans) – High Biological Value (74%)

LIPIDS

- 0% (except rape seeds, cotton seed)

CARBOHYDRATES

- 2-20%.
- High in pulses and roots.

(i) Sugar: onions, beetroots.

(ii) Starch: roots, tubers.

(iii) Cellulose: outer skins.

MINERALS

- **Calcium**
- **Potassium**
- **Iodine**
- **Iron** : leafy green vegetables.
- **Selenium** : mushrooms.

NB : non haem (ferric iron)

VITAMINS

- **Beta Carotene** : brightly coloured vegetables.
- **Thiamin** : pulses.
- **Vitamin C**
- **Folate** : cauliflower, leafy green vegetables.

WATER

- 70-95%

EFFECTS OF HEAT ON VEGETABLES

- Cell walls are softened and broken (more digestible)
- Starch grains burst.
- Water soluble vitamins dissolve into cooking water.
- 50% of Vitamin C and B destroyed.
- Loss of colour and flavour.

EFFECTS OF PROCESSING ON VEGETABLES

- **Drying**: loss of Thiamin (B1) and Vitamin C.
- **Freezing:**
  - Best method.
  - Least amount of nutrients altered.
- Sulphur Dioxide E220 destroys Thiamin (B1)
- **Freeze Drying** : some loss of Vitamin C.
- **Canning** :
  - Loss of colour and texture.
  - Loss of Vitamin B1 and C.

DIETETIC VALUE OF VEGETABLES

- SAME AS FRUIT.

GRADING OF VEGETABLES

- SAME AS FRUIT.

BUYING FRUIT / VEGETABLES

- Buy in season (cheap, plentiful and at their best)
- Buy loose or netted produce (plastic encourages mould growth)
- Should look fresh, unbruised and have a good colour.
- Roots and tubers should be heavy for size.
- Greens should be crisp and fruits should be brightly coloured.
- Medium sized fruit and vegetables are a good choice.
  - Small : very tasty but expensive.

PULSE VEGETABLES

- Peas.
- Beans.
- Lentils.
- **NOTE** : Seeds of leguminous plants.

NUTRITIVE VALUE/DIETETIC VALUE

- **Energy**
- **Fiber**
- **Calcium**
- **Iron**
- **Vitamin B**
- **High in Protein**
  - Soya beans contain 74% High Biological Protein (HBV)

NB :

- Soak pulses overnight in water.
- Rinse well.
- Boil rapidly for 10 minutes (destroys Lectins)

ORGANIC FRUIT / VEGETABLES

- Organic food is food that has been produced without the use of soluble fertilisers, pesticides, growth additives and other chemicals often used in conventional farming.
- Instead, animal manure and vegetable wastes are used to fertilise organic crops.
- The soil used to grow organic vegetables must be free from pesticides for 2-4 years (depending on the type of farming on the land prior to this)
- Organic fruit and vegetables are :
- Usually more expensive than other fruit/vegetables.
- Many have an “irregular/misshapen” shape (ie) : not perfectly formed.
- Smaller in size and as a result of this, have a slightly better taste.
- Organic fruit/vegetables should carry an “organic symbol”.
- **NOTE** : as of yet there is no scientific evidence to substantiate that organic food is safer and more nutritious than conventionally produced food.

ORGANIC TRUST

- Organic Trust Logo.
- Organic certification for professional organic producers, processors and distributors.
- Organic fruit, vegetables, meat.

IOFGA

- Approved by the Irish Organic Farmers and Growers Association.

RETENTION OF MINERALS/ VITAMINS IN FRUIT AND VEGETABLES

PREPARATION	COOKING	SERVING
○ Always prepare fruit and vegetables just before cooking (to retain minerals/ vitamins and protect against oxidation ○ **DO NOT SOAK** fruit/ vegetables in water, especially overnight (increases loss in water soluble vitamins) ○ Tear leafy greens (eg): cabbage (**DO NOT CHOP** as this tears the cell walls and releases oxidase) ○ Use sharp knife to peel and chop (see above) ○ Cover fruit in lemon juice to prevent oxidation.	○ Cook vegetables in boiling water (reduces cooking time) ○ Avoid using bread soda (alkali) when cooking cabbage and peas (**THOUGHT TO KEEP THE GREEN COLOUR IN VEGETABLES**) as alkalis destroy vitamin C. ○ Use the minimum amount of water as B vitamins and vitamin C are water soluble open **(steaming is a good cooking method)** ○ Avoid cooking in copper pots **(destroys vitamin C)** ○ Cook vegetables 'al dente' ie: with a bite. Overcooking destroys texture and water-soluble vitamins.	○ Serve cooked fruit and vegetables immediately. ○ Avoid reheating (further heating destroys even more vitamins).