

## LAB 12 - EXERCISE ON FRUITS

### FRUIT TYPES

Botanically speaking, the fruit of a flowering plant may be defined as a matured ovary and its contents, together with other flower parts that may sometimes adhere to it.

The ovary wall, known as the PERICARP, consists of three layers in fruits: the EXOCARP, or outer layer, which is often the skin; the MESOCARP, or middle layer, which may become fleshy; and the ENDOCARP, or inner layer, which is sometimes modified in various ways.

The following is a list of the types of fruits we'll consider:

- Achene.** A dry, simple fruit that does not dehisce\* when ripe. (Example: Sunflower)
- Aggregate.** A cluster of fruits derived from a single flower the flower consists of many pistils on a common receptacle. The individual fruits of the aggregate may be drupes or achenes. (Example: Strawberry)
- Berry.** A simple fruit in which the entire pericarp is fleshy. It may contain one or more seeds. (Example: Tomato)
- Drupe.** A simple, fleshy fruit with a single seed enclosed in a stony endocarp or "pit". The skin of these fruits is the exocarp; the fleshy edible portion is the mesocarp. (Example: peach)
- Hesperidium.** A type of berry in which the rind is made up of exocarp and mesocarp; the "edible" portion is the endocarp. (Example: Orange)
- Legume.** A simple dry, dehiscent fruit usually splitting along two sutures. (Example: Pea)
- Multiple Fruit.** A fruit which is derived from many separate but closely clustered flowers. (Example: Pineapple)
- Nut.** A simple, dry indehiscent fruit with a bony shell. (Example: Chestnut)
- Pepo.** A berry with a hard rind made up of exocarp and receptacle tissue. (Example: Muskmelon)
- Pome.** A simple, fleshy fruit in which the inner portion of the pericarp forms a dry paper-like "core". (Example: Apple)

\*NOTE: 3 extra terms

**Dehiscent Fruits** that split apart when ripe.

**Indehiscent Fruits** that do not split apart when ripe.

**Simple Fruit**, a fruit composed of a single ovary.

## EDIBLE FRUITS

1. **Kumquat.** a small tropical citrus used for marmalade and for table decorations. They are rather bitter even after made into marmalade.
2. **Kiwifruit** (*Actinidia chinensis*).  
imported from New Zealand. New Zealand has a law that their import-export ratio must balance so in order to sell them refrigerators and cars, etc., we must purchase something. The kiwi has caught the fancy of the Americans and most who taste it, like it. The small trees are now being planted in California.
3. **Grapefruit.**  
so called because the original "wild" type or Pomelo, bears its fruit in large bunches. The fruit is a citrus or hesperidium, a special type of berry. Note that it is divided into sections and that the pulp or juice is compartmented into large cell-like structures within the sections. The grapefruit is subtropical though it is often produced in more tropical areas. It is best when some cold weather is involved in its development. The trees are evergreen and develop in alternate "growth flushes" and "rest periods". It may be easily damaged while in a growth flush but may withstand 25-26° for considerable periods if in rest.  
  
The grapefruit is called the "wake up" fruit and is a favorite for breakfast. It has just a hint of bitterness if you think it is too sour, you are probably eating too much sugar laden food.  
  
The best grapefruit comes from Texas and the Indian River area of Florida. Look for smooth skin, slightly flattened, symmetrical shape, heavy for its size. Do not buy if light or has a sheep-nose shape. Scale insects on the surface should not affect the internal quality, nor should a russeted surface. Pits on the surface with a brown color indicate exposure to chilling temperatures and such fruit should be

avoided.

4. **Mango.** a truly tropical fruit with a large flat seed. They generally are chilled to the point where they will rot before they ripen and develop their characteristically bright flavor. They are really good, so do not judge them by their "Fargo flavor".
5. **Mandarins.** Oranges with a particular bright flavor, generally very juicy and thin skinned. A different species from the true "orange". Mandarins include the Tangerine, King, Satsuma, etc., and usually cost more than oranges because they require special handling and have a short shelf life.
6. **Pineapple.** native to Mexico and Central America. Now grown in Hawaii. They are easily chilled so are seldom good when purchased at Fargo stores. When imported by boat or from Mexico by train or truck, they may be picked very green if not chilled, they will ripen satisfactorily. Or they may be picked almost ripe and flown in, in which case they are very expensive and usually delicious. Even when fully ripe, they should not be chilled below 45°F. When green, they will chill at temperatures under 60°F. Each section appearing on the surface is a fruit, all are fused together in a giant multiple fruit.
7. **Pear.** A pome fruit. Note the structure of the core. Till recent years, pears were seasonal fruits, seen only for a week or two in the stores each year. Now they are harvested in a green mature condition and placed in a "controlled atmosphere" (CA) storage where the carbon dioxide is raised to about 3% and the oxygen is lowered to about 5% which puts the living tissue into a suspended state. They may be held this way for several months in almost perfect condition, then packed and sent to distant stores, they are still green and will stay "asleep" for two or three weeks. Take them home and expose them to room temperatures till they turn yellow. Eat then when they become just slightly soft and be sure to eat the core and the seeds too. (In CA they are also kept cold, about 32°F.) What is the ambient concentration of CO<sub>2</sub> and O<sub>2</sub> in the atmosphere? If the CA is made to the specifications above, what material composes the remainder? The most popular and best tasting pear is the Bartlett, however, it does not store as well as the d'Anjou which is usually larger. The pears on exhibit may include a variety that is russeted, the Bosc.
8. **Tangelo.** a cross between the grapefruit (Pomelo) and the tangerine (Mandarin). There are many types. One called the Mineola has a characteristic sheep-nose. What kind of fruit is the Tangelo Hybrid?
9. **Temple Orange.**

a cultivar with a bright flavor much like a Mandarin and highly colored and thin skinned, too.

10. **Nuts.** Define the nut as a type of fruit! Some of the nuts on exhibit may include the Coconut, English Walnut, Pecan, Almond, Brazil Nut and Filbert or Hazelnut. There are some trees of a wild Hazelnut that grow in North Dakota. Their nuts are very small and are not sold commercially. Acorns may be eaten, too, but sometimes must have their tannins extracted to avoid poisonous consequences. No other nut crops are produced in North Dakota. (Peanuts are not nuts, what are they?)
  
11. **Coconuts.** grow on very tall "fan" palms. The white meat inside is the copra of commerce from which the oil is extracted. Inside is a liquid endosperm called "milk" because it is rich in vitamins and growth factors. Outside the copra is a hard shell which makes the best quality charcoal absorbent for use in gas masks. Surrounding the nut is a strong fibrous coating that enables the nut to survive falling from the 150 foot high trees or floating across the salty oceans.  
Open the coconut by first driving a nail into two eyes and draining the milk before smashing the shell with a hammer.
  
12. **Banana.** A berry (seeds embedded in the pulp) but the seeds in the popular fruit are mere remnants. The banana seen in our stores is a bland icky fruit that is almost flavorless compared to many good bananas. But so it is that it was so chosen you will have to go to the tropics yourself to partake of the heavenly goodness. As you see it, the fruit is sent here completely green and ripened when desired by exposure to ethylene gas. Bananas are easily chilled by putting them in the refrigerator where they will quickly blacken. If they are already ripe, it won't harm them internally, however. Bananas belong to the genus *Musa*. A similar plant of this genus is the source of Manilla Hemp.
  
13. **Lemons.** The variety most popular is the Eureka which normally has two puffy pointed ends. The Eureka is yellow, but all varieties are not. Lemons are tropical, injured by light frosts, so limited in the US to California. Highly acid, rich in Vitamin C. Recent research demonstrated that the Vitamin C is lost rapidly when the lemon is juiced, even when the juice is stored in cold temperatures! Vitamin C is water soluble, therefore, your body needs a daily supply.
  
14. **Honeydew melon.**  
A pepo berry. The honeydew is very popular with the Semite peoples, but increasing in use by others as it becomes more available. Remember that it will not be good until it becomes soft. Put it out at room temperature and wait for it to soften which may take 2 days to 2 weeks; be patient. There is a variety that will mature in North Dakota's short season. Of the melon fruits that can

be produced in North Dakota include the muskmelon and the watermelon.

**15. Dried fruits.**

An old method of food preparation being revived. Fruits are the most easily prepared because they contain larger amounts of sugar than vegetables and meats. Drying was once done in the sun, but the task can be accomplished faster and with less loss of flavor and nutritious vitamins when forced air dried. The dried fruits on exhibit are those popularly sold in the grocery such as raisins (dried grapes), currants (miniature raisins), apricots, pears, apples, plums (prunes), peaches, figs and dates (fruit of a frond palm).

Drying removes the moisture and leaves the remaining fruit pulp which is very concentrated. Use care not to eat very much at one time, it is not natural to consume such highly concentrated foods. You may be surprised at the price of dried fruits, but if you could the numbers of fruits instead of thinking of it as weight or quantity, the price is rational. There is some savings in shipping costs of dried food, but it probably is not enough to balance the cost of drying. Some of the dried fruit is first sulfured by exposing the fresh material to sulfur dioxide fumes. This preserves the color, makes the fruit a little more tart, and preserves the vitamins, which ordinarily are lost in the drying process. There is no indication that sulfuring is deleterious to health, but some health food "purists" suggest that this might be a possibility.

**16. Limes.** Small citrus, very sour, distinctive taste, high in vitamin C. Long before Vitamin C was understood, the British Navy rationed limes to their sailors to prevent them from becoming diseased from scurvy. This enables them to compete against the navies of the world and become superior in sea faring it also gave the British people the name of "Limey". Purchase limes when they are green. When they begin to ripen to a yellow color, they begin to dry and lose their juice. Do they lose their Vitamin C, too?

**17. Figs.** seldom seen fresh this far north. Dried figs have been in common use for ages though. The fig is another "Multiple Fruit". But different from the pineapple which has its stigmas facing inward. There is a small hole at the bottom of the fig through which a small wasp can fly to reach the pollen and stigmas and pollinate them. Considered a tropical fruit, figs can be grown in northern Texas.

**18. Apples.** Pome fruits in shades of yellow, red and green. One of the more important tree fruits which can be grown in North Dakota. Haralson is the favorite variety. It is fairly tart and stays crisp for a considerable period. Haralson is excellent for

cooking. Commercially the variety Delicious is sold most. Delicious is lovely to look at with its characteristic elongated cheeks on the blossom end.

19. **Quince.** a pome of ancient history. Fruit which has merited little or no improvement. Used for cooking, jellies, preserves.

20. **Papaya.** A tropical American fruit with some of the appearance of a small melon. If the sweet mushy flavor is objectionable to you, try adding some lemon juice or even salt and pepper or sugar. Papayas contain papain, an enzyme similar to pepsin, which is used to tenderize meat. The papaya is a giant herbaceous plant, 25-30 feet high and is grown in Florida, Texas, California and of course Hawaii from seed.

21. **Strawberry.**  
an aggregate in which the individual fruits are the achenes which are consumed along with the pulpy mass of receptacle tissue. Strawberries are being produced in North Dakota gardens, but are seldom sold in stores because of the high cost of harvesting. Commercial growers harvest by allowing the consumer to pick (PYO), then charging only a fraction of the cost that would be due a supermarket. The varieties grown most in North Dakota, Ogallala and Redcoat, are extra hardy. Strawberries contain more Vitamin C than oranges.

22. **Red Raspberry.**  
another fruit being produced commercially in North Dakota. Raspberry fruits are aggregates of tiny drupes. Most popular variety is the Boyne because it withstands the winter and is disease resistant. Raspberries are customer picked and bring about twice the price of strawberries.

23. **Sweet Orange.**  
The most popular of the citrus fruits. Orange juice is fed to babies, often their first food after milk. It is high in Vitamin C. The most flavorsome varieties are the Blood (not seen in the USA), the Valencia, the Washington Navel, and the Temple. Other less flavorsome varieties are called "juice" oranges and their quality or soluble solids content is markedly lower.

24. **Gooseberry.**  
a fruit that is produced in North Dakota gardens but hasn't the popularity of raspberries and strawberries. Perhaps the most popular variety in the U.S. is "Pixwell" which originated at NDSU. Pixwell gooseberry fruits hang on long stems well below the thorny stems.

**25. Persimmon.**

Native species are found in the southern states, generally with several seeds. They are very astringent and pucker your mouth when green. Kakis or Oriental species are much improved and considered by the Japanese to be one of their best fruits. The Khaki should be eaten when at the consistency of custard.

**26. Peach.**

Very popular drupe fruit, seen in North Dakota stores in season but seldom of good quality because it is picked green for the long distance shipment.

**27. Cranberry.**

A favorite at Thanksgiving and Christmas. They are grown in highly specialized bogs, areas where water for irrigation and flooding can be controlled and the soil is acid. Massachusetts, Wisconsin, and Washington State.

**28. Blueberry.**

A more recent introduction to commerce. Blueberries are produced on acid soils. One of the top berry crops of Michigan but giving way to the Carolinas.

**29. Plantain** (*Musa paradisiaca*).

Also known as the Cooking Banana and is not suitable to eat without cooking for its flesh is firm and not so sweet as the common banana.

**30. Avocado.**

Contains up to 18% vegetable oil so considered more as a main course food than as a dessert. Most commonly used as a salad with the addition of salt, pepper, or lemon juice. The seed is not bony hard and so evaluation of the avocado as a drupe is not clear. Most texts dodge this issue and do not classify it.