

Lecture 1 – Introduction and Plant Metabolites

■ How do we use plants and their products?

- * Plants are primary producers
- * Plants produce oxygen
- * We use them in clothing, rubber, food...

■ Primary Metabolites - Found in all plant cells, necessary for survival.

1. Carbohydrates:

Mono- and Disaccharides: Short term energy storage and transport. (Fructose, Glucose, Sucrose)
Polysaccharides: Longer term energy storage and cell wall structure. (Starch, Cellulose)

2. Lipids:

Fats and Oils: Energy storage.
Phospholipids: Cell membranes.
Cutins, Suberins, Waxes: Barriers against water loss (cuticle).
Steroids: Some plant hormones (brassinosteroids)

3. Proteins: Assembled from amino acids. Can act as enzymes or as structural components of the cell.

Examples: Polymerase, Actin

4. Nucleic acids

DNA: Encodes instructions for every protein needed to build an entire plant.
RNA: Carries instructions from the DNA to the protein synthesis machinery.
(RNA can also form enzyme-like molecules on its own; ribozymes)

■ Secondary Metabolites - Different from one species to another

- They are in specialized cells
- They enhance survival

- * Reproduction: some species...
used for pollinators and seed dispersal
- * Protection: herbivores, pathogens, environmental conditions
- * Communications: within plant, and with other plants

1. Alkaloids:

- Have nitrogen containing rings
- Bitter white powders
- Many are medically important

Examples -

Caffeine or Tea

-May be toxic to insects and fungi

- * Nicotine: Produced by tobacco species
- * Morphine: Produced by opium poppy
- * Cocaine: Produced in relatively small amounts in coca leaves