STUDY MATERIAL:- M.Sc 2nd semester

DEPARTMENT:- Home Science (CCSU, CAMPUS, MEERUT)

COURSE:- Food & Nutrition

SUBJECT:- Advanced Nutrition

NAME OF THE FACULTY:- Dr. Nidhi Chaudhary

UNIT:- 4

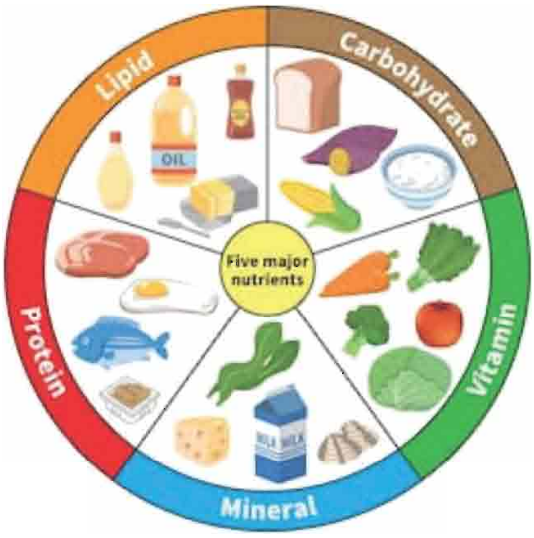
TOPIC:- Non- nutritive food components with potential health effects (polyphenols, tanins, phytates, Phytoestrogens, cynogenic compounds lectins & saponins).

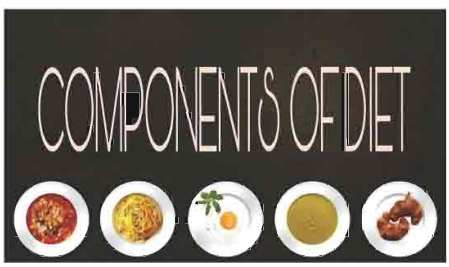
NUTRIENTS:-

• Their are large no of nutrients required in our balanced diet.

• Some of them are nutritive components like: CHO, fats& proteins.

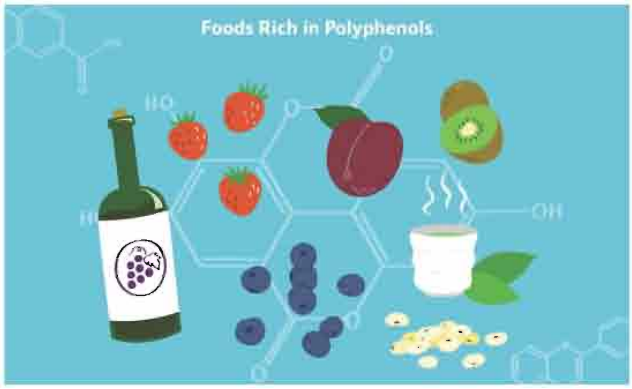
• Some of them are non nutrition components like: polyphenols, etc.





NON NUTRITIVE FOOD COMPONENTS:-

* POLYPHENOLS:-



• Category of animals that naturally occur in plants.

• Works as an antioxidant.

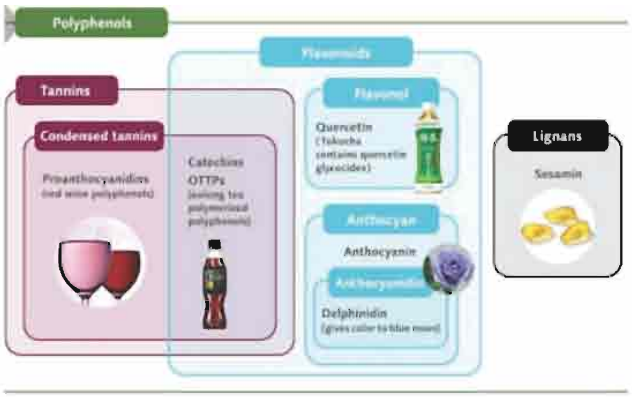
• Generally involved in defense against UV radiation.

• Participate in plant regulatory mechanism.

• Consumption of polyphenols is associated with lower risk of major chronic disease.

• Found widely in hole plant kingdom.

* TYPES OF POLYPHENOLS:-



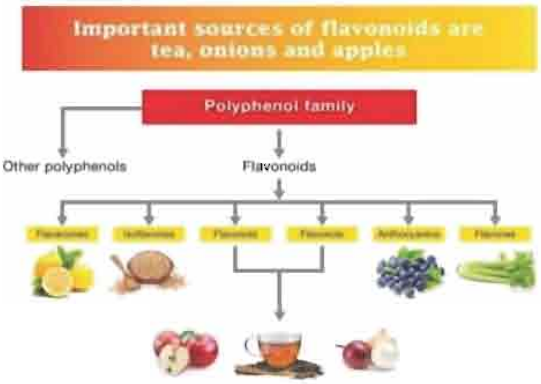
• Flavonoids.

• Phenolic Acid.

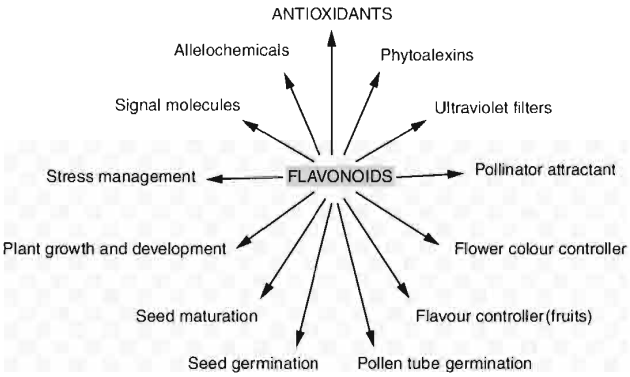
• Lignans.

• Stilbenes.

FLAVONOIDS= It is found in wide variety of plant based foods like fruits, vegetables, legumes, red wine, etc.



> FUNCTIONS:-



• Antibiotic activity.

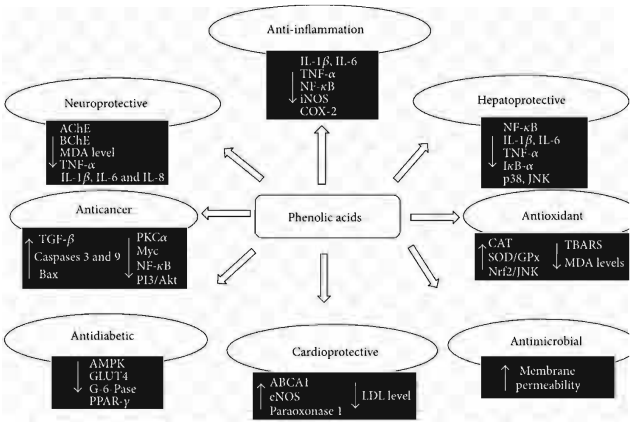
• Inflammation control.

• Vitamin C support.

• Protection of cell structure.

PHENOLIC ACID= Found in variety of plant based foods. Seeds & skin of fruits & leafs of vegetables contains the highest concentration of phenols.

> FUNCTIONS:-



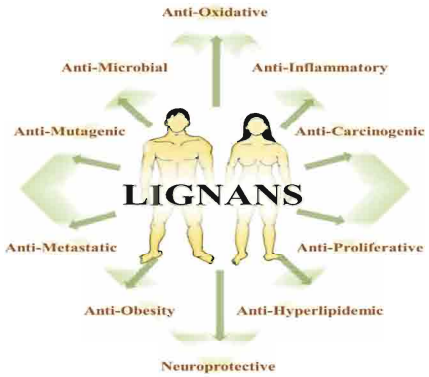
• Easily absorbed through the wall of intestine tract.

• Works as an antioxidant.

• Also promote anti inflammatory condition.

LIGNANS= Sources of lignans include cereals, soybeans, broccoli, cabbage & strawberries, etc.

> FUNCTIONS:-



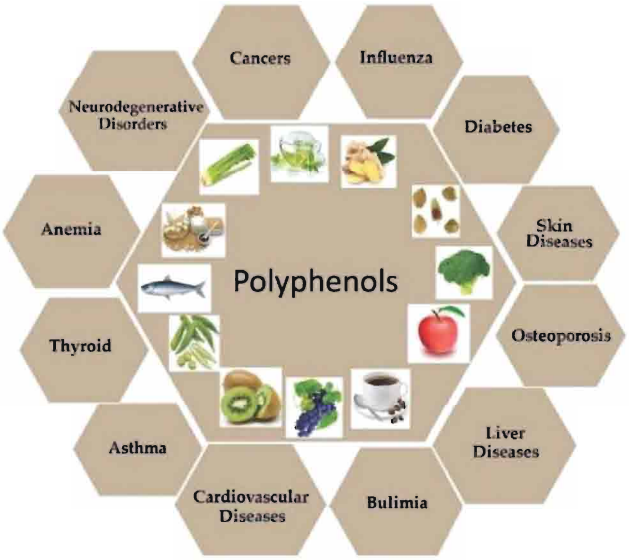
• Possess antioxidant property.

• Protect against cancer.

• Classified as Phytoestrogens which are like good for menopausal women health.

STILBENES= They are not abundant in foods as flavonoids, phenolic acid, lignans. These are of 2 types : resveratrol & pterostilbene.

* ADVANTAGES OF POLYPHENOLS:-



• Effect on cadio protective.

• Anti cancer effect.

• Anti diabetic effect.

• Anti ageing effect.

* DISADVANTAGES OF POLYPHENOLS:-

• Cause kidney damage.

• Imbalance thyroid hormone level.

• Increased risk of stroke.

• Premature death.

* TANINS:-

• Complex substances that usually occur as a mixture of polyphenols that are very difficult to seperate since they don't crystallized are called as tanins.

• Tanins are poly hydroxy phenolic compounds.

* PHYSICAL PROPERTIES OF TANINS:-

• Colour= Dark brown or radish brown.

• Taste= Puckering taste.

• Solubility= Soluble in water, alcohol, dilute alkalis, gyclerols & acetons.

* CHEMICAL PROPERTIES OF TANINS:-

• Precipitation.

• Antioxidizing properties.

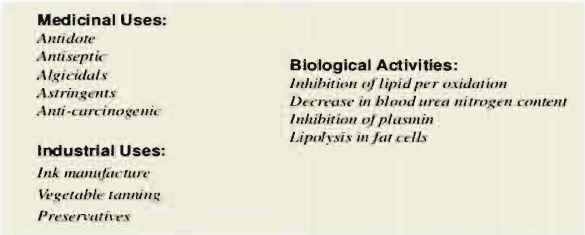
• Astringent.

• Carcinogenicity.

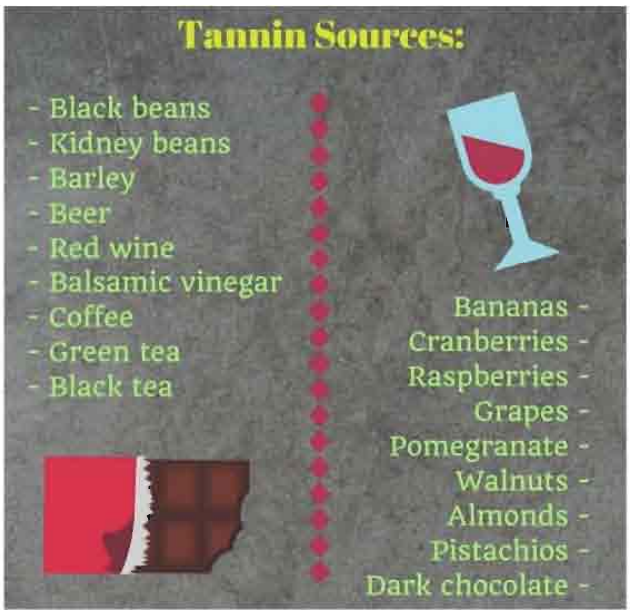
• Reactions with salt.

• Reactions with ammonia.

* IMPORTANCE OF TANINS:-



* SOURCES OF TANINS:-



*DISADVANTAGES OF TANINS:-

• Stomach irritation.

• Nausea.

• Vomiting.

• Liver damage.

* PHYTATES:-

• It has a strong binding affinity to minerals such as calcium, magnesium, iron, copper & zinc.

• It has direct anti nutritional effects.

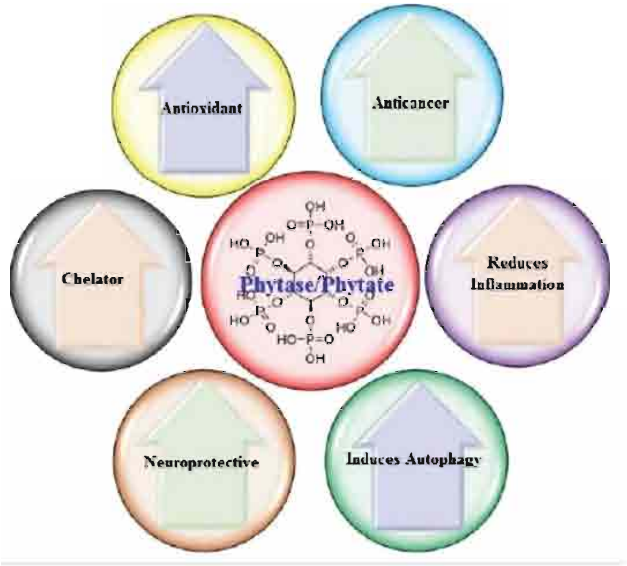
• Phytates was discovered in 1903.

• It is the principal storage form of phosphorus in plant tissue specially bran & seeds.

* SOURCES OF PHYTATES:-

• Cereals, legumes, oilseeds & nuts.

* FUNCTIONS & BENEFICIAL ASPECTS:-



HEALTH BENEFITS OF PHYTATES

• Antioxidative effect.

• Preventing pathological conditions like kidney stones.

• Cholesterol lowering effects.

• Anti cancer activity.

• Prevent cardiovascular diseases.

* DISADVANTAGES:-

• Affects mineral uptake/intake.

• Phytic acid shows negative effect on iron absorption.

• It negatively effects energy metabolism.

* PHYTOESTROGENS:-

• Plant derived xenoestrogens, functioning as the primary female sex hormone.

• Not generated within endocrime system.

• Also called dietary estrogens.

• Have the ability to cause estrogenic or anti estrogenic effect.

* ESTROGENS:-

• Main sex hormone in women.

• Essential to the menstrual cycle.

• Contributes to the development of secondary sex characteristics.

• Important to a women's health.

• Reduces after menopause.

* FOOD SOURCES:-

• Flaxseeds.

• Soybeans.

• Sesame seeds.

• Flax bread.

• Multi grain bread.

• Soy yogurt.

• Tofu.

* BENEFITS & FUNCTIONS OF ESTROGENS:-

• Maintain memory.

• Improve mood & happiness.

• Improve sleep quality.

• Decreases wrinkles.

• Increases vaginal secretions.

• Increases cognitive abilitiy.

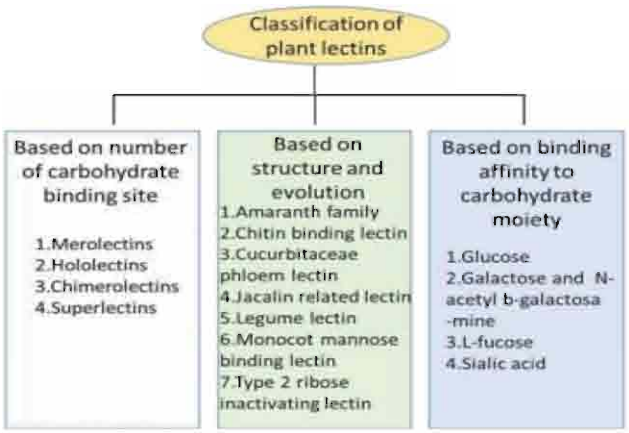
* LECTINS:-

• They are also called agglutinins.

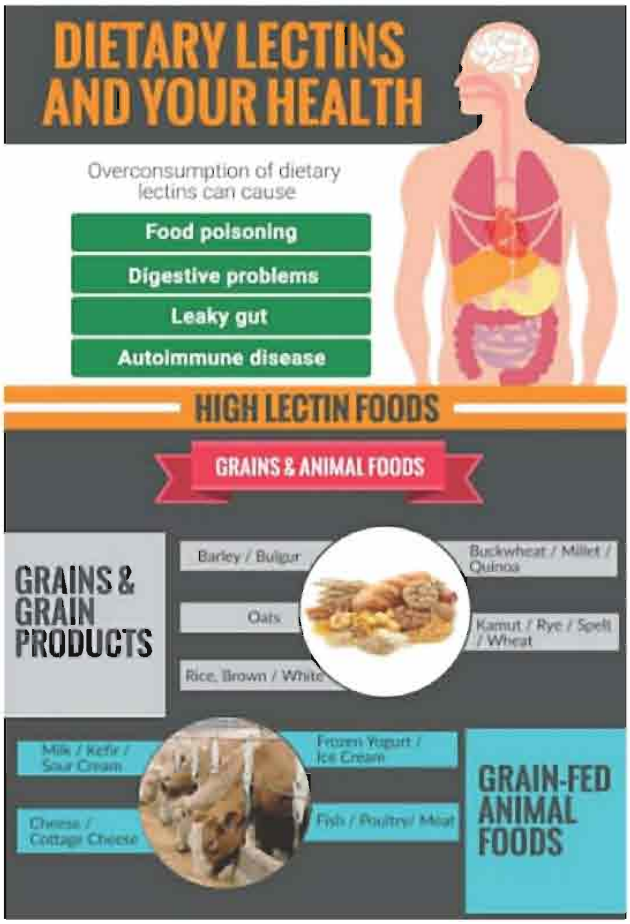
• Ubiquitous in nature.

• Found in many foods such as beans & grains.

* CLASSIFICATION OF PLANT LECTINS:-



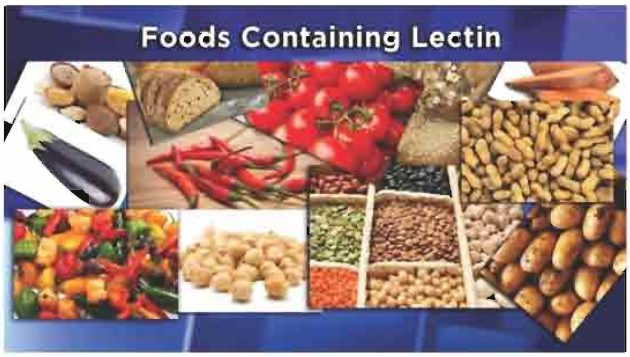
* SOURCES:-



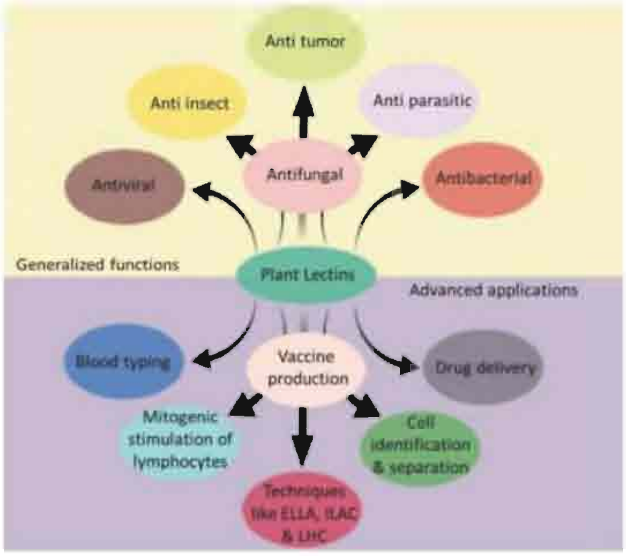
• Seed grain= Wheat, soy, peanuts, kidney beans, corn, etc.

• Vegetables= Lima beans, fava beans, tomato, egg plant, etc.

• Roots, tubers & rhizomes.



* FUNCTIONS:-



• Helps in establishment plant soil bacterial interaction.

• Play a role in plant germination.

• Control protein level in blood in animals.

* ADVANTAGES:-

• Involved in immune regulation.

• Antimicrobial effects.

• Effective against several bacterial strains.

• Fight from fungi & viral infections.

• Possess anti cancer activity.

* DISADVANTAGES:-

• Difficult to digest.

• Can damage gut wall.

• Act as an nutrient.

• Can interfere with digestion & absorption of foods.

* SAPONINS:-

• It is derived from Latin word sapo meaning soap.

• Plant containing saponins produce frothing in aqueous solution.

• Some plants have been used because of their property of forth with detergent actions.

* CHARACTERISTICS:-

• Saponins have bitter taste.

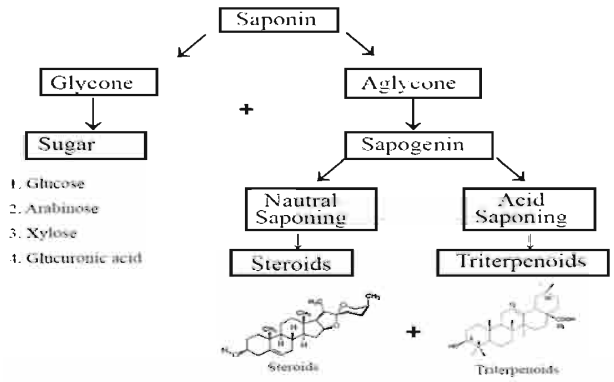
• Drugs containing saponins cause irritation of mucous membrane.

• Saponins take by mouth are harmless.

• They have high molecular weight.

* BIOLOGICAL IMPORTANCE:-

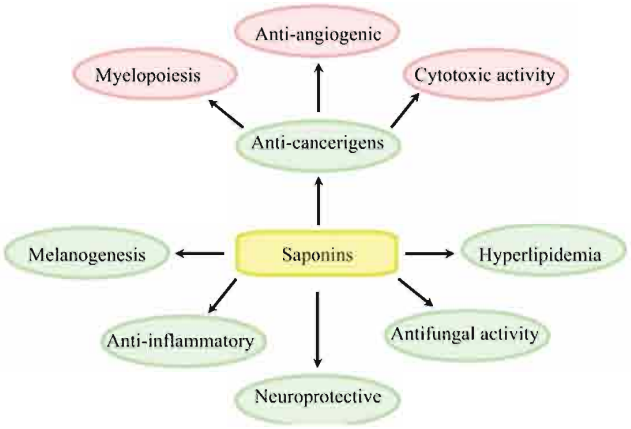
• Possess strong biological activity.



• Observed that saponins are the plant active immune system.

• They also acts as toxins.

* ADVANTAGES:-



• Decrease blood lipid.

• Lower cancer risks.

• Maintain normal body weight.

• Boost immune system.