BHARATHIDASAN UNIVERSITY TIRUCHIRAPPALI-620 024 TAMIL NADU,INDIA

Programme : M.Sc., Biochemistry

Course Title : Value Addition in food Couse Code :BC003VAC

UNIT-III

FOOD GRAINS,SPICES AND PLANTATION CROPS

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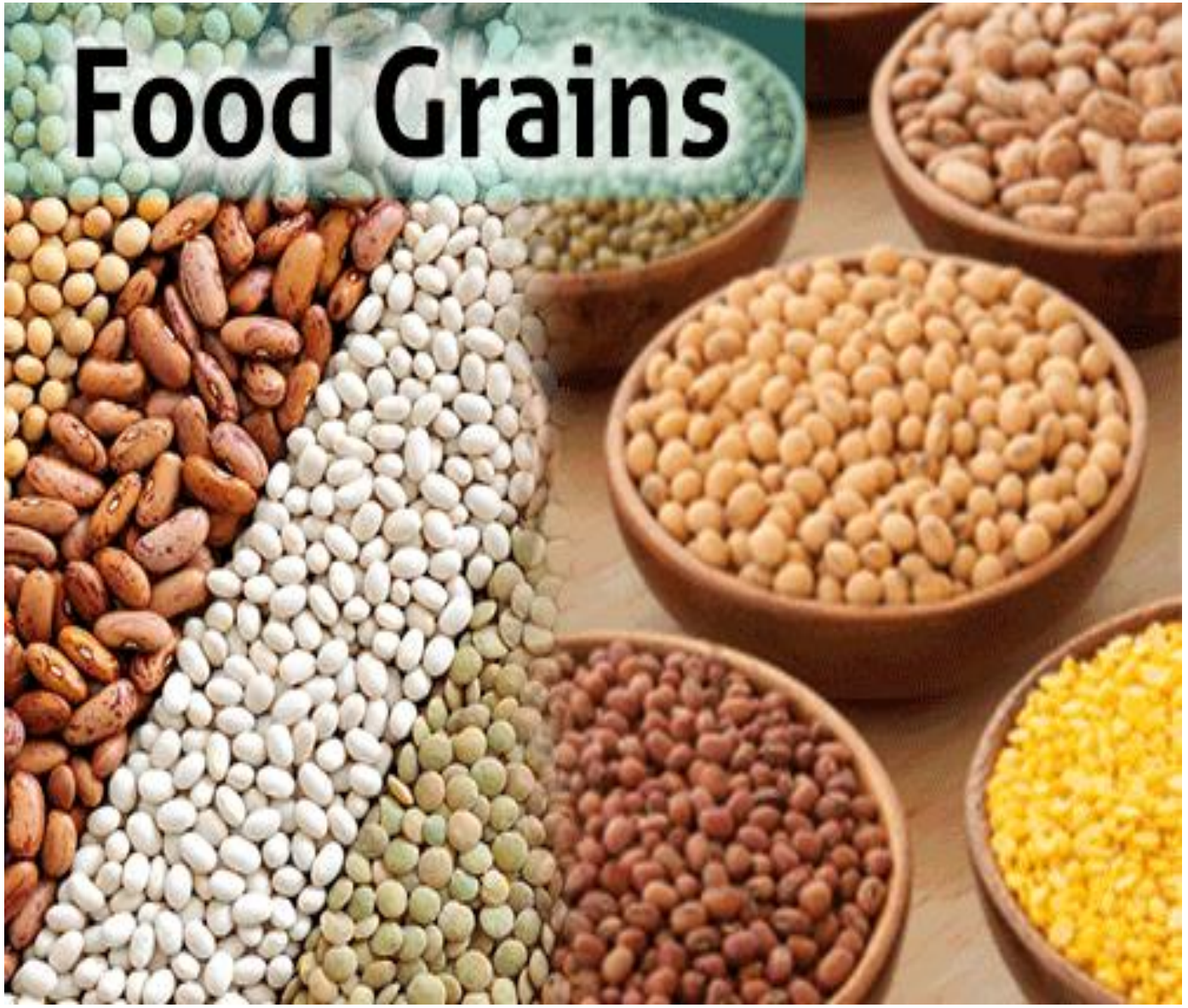
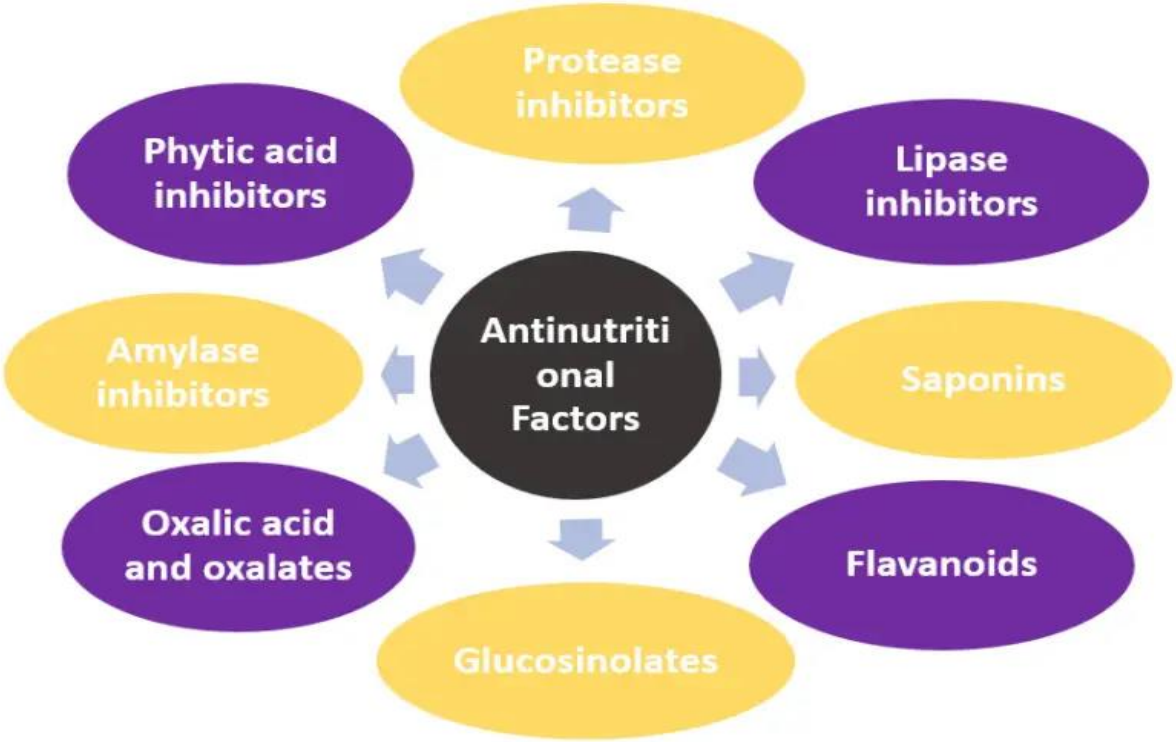
UNIT III

SPICES&PLANTATION CROPS:



ANTINUTRITIONAL FACTORS

Anti-Nutritional

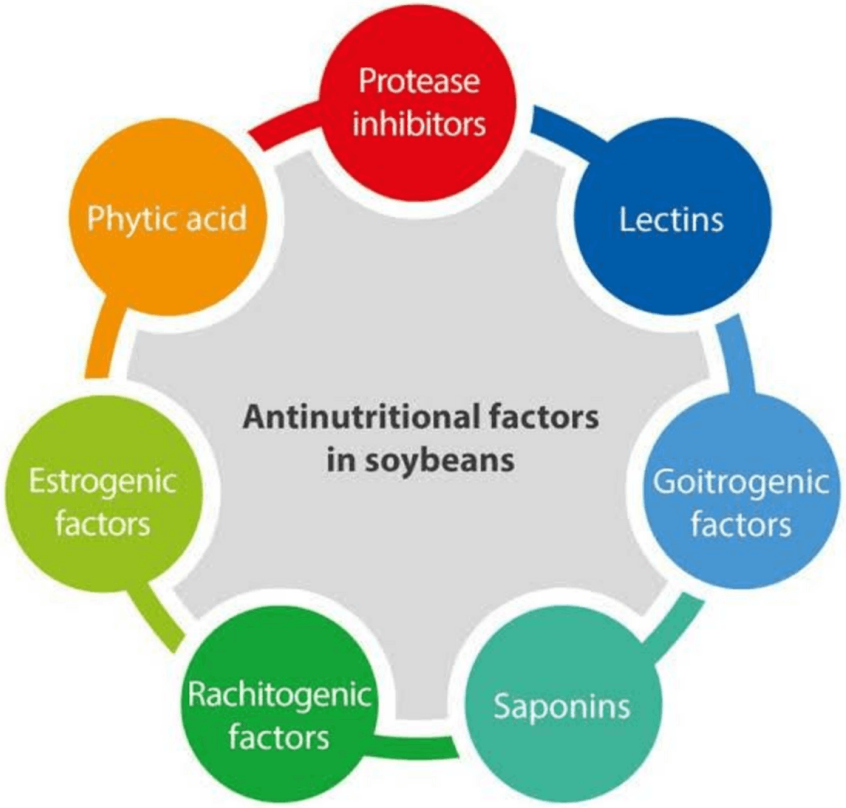


INTRODUCTION

Antinutritional factors (ANFs) are defined as biological components present in foods that can reduce nutrient utilization or food uptake, which leads to impaired gastrointestinal functions and metabolic performance.

EXAMPLES;

- lectins
- oxalates
- goitrogens
- phytoestrogens
- phytates
- tannins



Anti-nutritional factors in food grains

Food grains contain several anti-nutritional factors that can impact their nutritional value and digestibility. Here are some common anti-nutritional factors found in food grains

Phytates:

Common in whole grains like wheat, rice, barley, and maize, phytates bind essential minerals such as calcium, iron, and zinc, reducing their absorption in the digestive tract.

Tannins:

Found in sorghum, millet, and barley, tannins can bind and precipitate proteins, interfering with their digestion and reducing protein availability.

Lectins:

Present in various grains such as wheat, rice, and barley, lectins can bind to the lining of the gastrointestinal tract, causing digestive disturbances and inhibiting nutrient absorption.

Protease Inhibitors:

Found in grains like soybeans and other legumes, protease inhibitors can block the activity of enzymes that break down proteins, reducing protein digestion and absorption

Saponins:

Present in grains such as quinoa and some legumes, saponins can interfere with nutrient absorption and can damage the lining of the intestines, although they also have some health benefits.

Oxalates:

Found in certain grains like buckwheat, oxalates can bind calcium, forming insoluble complexes that reduce calcium absorption and can contribute to kidney stone formation.

Amylase inhibitor:

Present in grains like wheat and barley, these inhibitors can interfere with the breakdown of starch into sugars, impacting carbohydrate digestion.

Cyanogenic Glycosides:

Found in lower amounts in some grains, these compounds can release cyanide when metabolized, though typically only in harmful amounts if consumed in large quantities or improperly processed.

- Proper processing techniques can significantly reduce the levels of these anti-nutritional factors in food grains.
- Methods such as soaking, fermenting, sprouting, cooking, and milling can help decrease their concentration and improve the nutritional quality of grains.

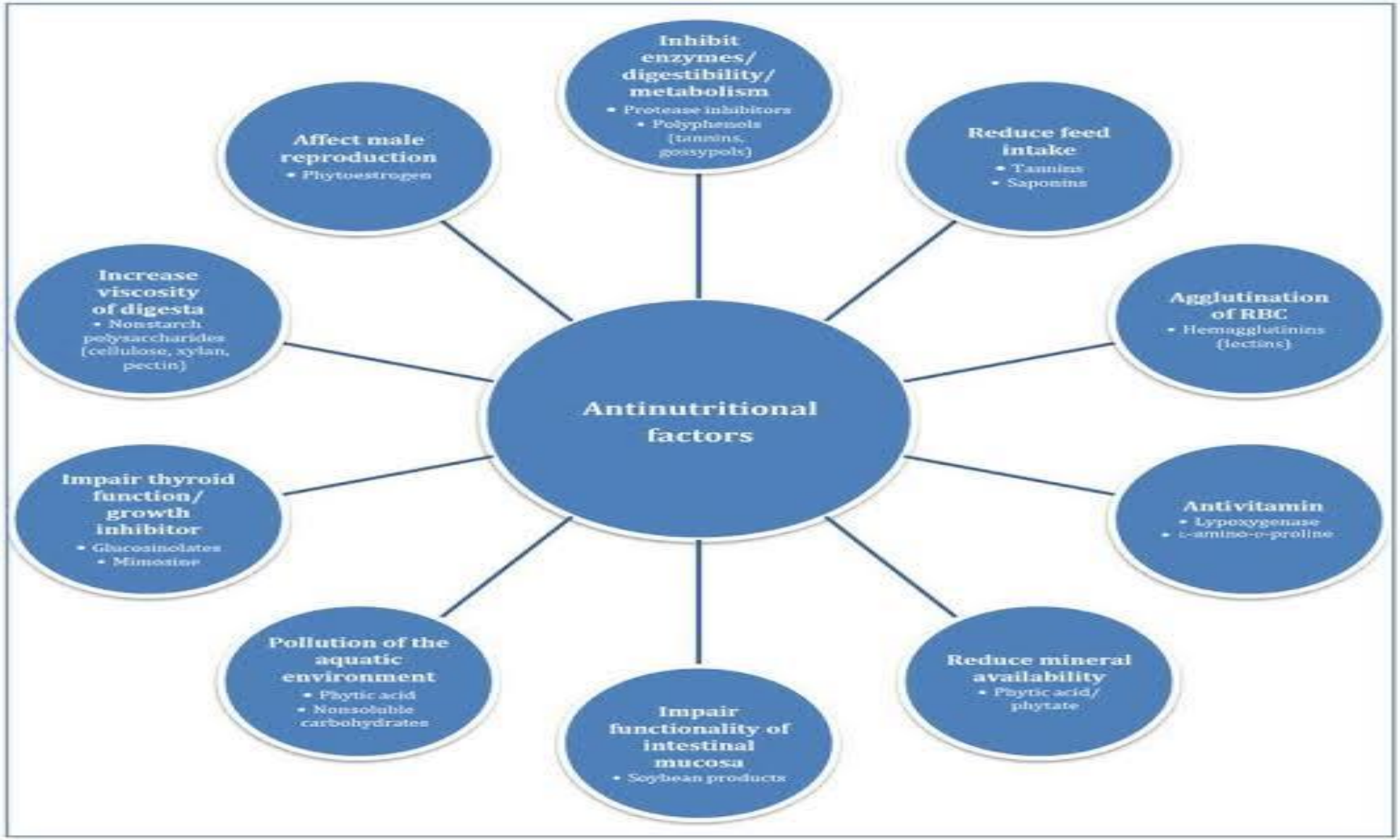
Anti-nutritional factors in oilseeds

- Oilseeds, like other plant-based foods, contain various anti-nutritional factors that can affect the absorption and utilization of nutrients. Here are some common anti-nutritional factors found in oilseeds:
- **Phytates :** found in oilseeds such as soybeans, peanuts, and sesame seeds.
- **Tannins**: Found in oilseeds such as sesame seeds and sunflower seeds.
- **Lectins**: Present in soybeans and peanuts, lectins.
- **Protease Inhibitors**: Found in soybeans, peanuts, and other legumes.
- **Oxalates**: Present in certain oilseeds like sesame seeds.

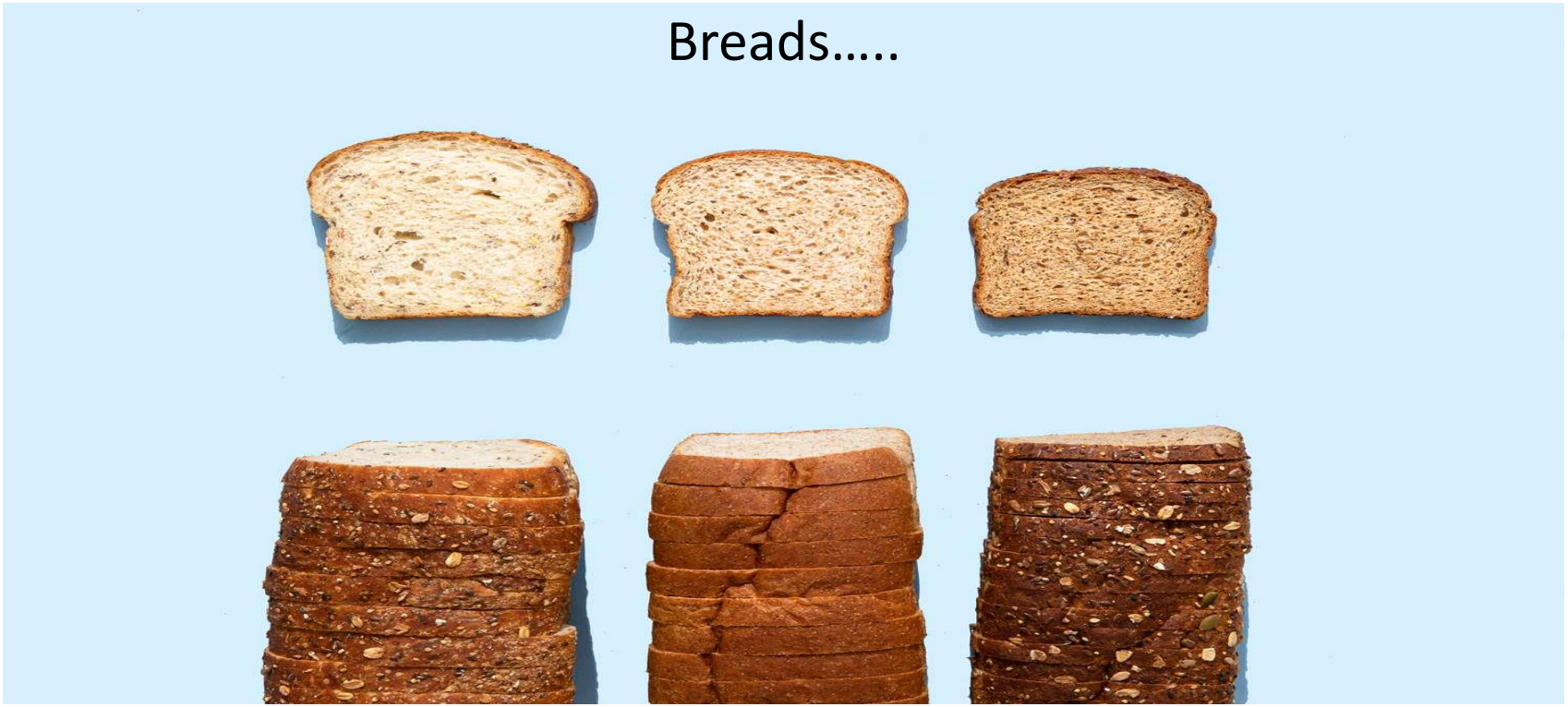
- **Saponins**: Found in soybeans and peanuts.
- **Glucosinolates**: Found in mustard seeds and rapeseeds (canola).
- **Cyanogenic Glycosides**: Present in certain oilseeds like linseed (flaxseed).
- **Allergens**: found in oilseeds like peanuts and soybeans can cause adverse reactions in sensitive individuals, impacting their overall nutritional status.

Proper processing techniques, such as roasting, boiling, fermenting, and mechanical extraction, can help reduce the levels of these anti-nutritional factors in oilseeds, improving their nutritional quality and safety for consumption.

Affects of antinutritional factors:



VALUE ADDED FOOD GRAIN, PRODUCTS LIKE BREADS, BISCUITS, CAKES .




GRAINS

GRAINS

Any food made of wheat, rice, oats, cornmeal, barley or other cereal grains is a grain product. Grains are divided into two sub

groups:

i. Whole Grains

ii. Refined Grains

WHOLE GRAIN

Whole grains contain the entire grain kernel, which are bran, germ and endosperm.

Examples of whole grains include:

whole wheat flour, bulgur (cracked wheat), oats, whole cornmeal and brown rice.

REFINED GRAINS

Refined grains are grains that have been milled.

This is done to give the grains a finer texture and improve their shelf of life.

Examples of refined grains include:

white flour, de-germed cornmeal, white bread and white rice.

Storage and Handling of Grains

Store grains in a dark, dry place and in a tightly sealed container to keep out moisture and insects.

Milled grains such as white rice that have had the germ removed will last for many months.

Whole grains are somewhat more perishable because the fat content of the germ can become rancid.

Breads

One of humanity’s oldest foods.

BREAD is a dietary product obtained from the fermentation and the subsequent baking of a dough mainly made of cereal flour and water, made in many different ways and sometimes enriched with typical regional ingredients.

BASIC INGREDIENTS

Flour

Salt

Water

Yeast

sugar

Conditions

Moisture = 12-14% (that is ideal for the prevention of the bacterial growth).

Fresh breads consists of around 40% of moisture so in order to preserve it UV or fungicides are used

pH= 4.5-6

Temperature = 28-30°C of dough after mixing and around 180-300°C for baking

water = water of medium hardness to be used as hard waters retards fermentation and soft water is slightly acidic

BISCUITS

INTRODUCTION:

Biscuit is a term used for a variety based food products. Of baked, commonly flour.

Biscuit (Europe) = cookie or cracker (North America)

in the Commonwealth Nations, “cookie” typically refers to only chocolate chip cookie. ISCUIT

In the United States and some parts of English Canada, a “biscuit” is a quick bread, usually unsweetened.

INGREDIENTS:

WHEAT FLOUR

WATER

SUGAR and GLUCOSE

FAT & OILS

SALT

INTRODUCTION:

Cakes normally combine some kind of flour, a sweetening agent, a binding agent, fats, a liquid, flavors and some form of leavening agent.

Cake is often frosted with buttercream or marzipan, and finished with piped borders and crystallized fruit.

Cake is often the dessert of choice for meals at ceremonial occasions, particularly weddings, anniversaries, and birthdays.

VARIETIES OF CAKES

CHEESE CAKE

RUSKE KAPE

YEAST CAKE

SPONGE CAKE

BUTTER CAKE

Value added food products

Value added food products

- Value added products are raw agricultural products that have been modified or enhanced to have a higher market value and/or a longer shelf life.
- Some examples include fruits made into pies or jams, meats made into jerky, and tomatoes and peppers made into salsa.

Donuts and Buns :

- ***Donuts***: Typically made from flour, sugar, eggs, and fat, donuts are fried and often coated with glaze, sugar, or icing. Value is added through the use of unique flavors, fillings, and toppings, as well as the convenience of ready-to-eat packaging.

- ***Buns***: These are a staple in many diets, often enriched with ingredients like whole grains, seeds, or added fiber to increase nutritional value. They can also be flavored or stuffed, adding more variety and appeal to consumers.

Pasta:

- Pasta products like spaghetti, macaroni, and noodles are produced from durum wheat or other grains.
- Value can be added through processes like drying, packaging, fortification with vitamins and minerals, or the creation of specialty pasta (e.g., gluten-free, organic, or whole grain…

Extruded:

- Extrusion is a process where ingredients are forced through a shaped die under high pressure and temperature.
- This technique is used to make products like breakfast cereals, snacks, and pet foods. Extruded foods are often flavored, fortified, or designed with specific textures and shapes to enhance their appeal.

Instant ready mixers:

- Instant ready mixtures include products like cake mixes, pancake mixes, and instant soups. These products are pre-mixed and require minimal preparation by the consumer, adding value through convenience and time savings. They often come with added flavors, spices, or even freeze-dried vegetables or meats to enhance the final product.

Puffed foods:

- Puffed foods are snacks like puffed rice, corn puffs, and puffed wheat. They are made by applying heat and pressure to grains, causing them to expand. These products are often seasoned or coated with flavors to increase their taste appeal. Puffed foods are valued for their light, crispy texture and are often marketed as healthier snack options.

Conclusion

- Value-added food products can command higher prices in the market because they often offer consumers greater convenience, improved quality, or unique features. For producers and processors, creating value-added products can be a way to diversify their offerings, increase profitability, and meet specific consumer demands.