

# **Role of fibre in human nutrition**

# Introduction

- Fibre is a class of non-digestible carbohydrates and lignin which is associated with numerous health benefits.
- Non-starch polysaccharide is the main components of dietary fiber.
- Pectin, gum, mucilage, cellulose, hemicelluloses and lignin.
- Dietary fiber comes from the portion of plants that is not digested by enzymes in the intestinal tract. Part of it, Some of the fibres are digestible by the enzymes of intestinal bacteria (e.g. pectins, gums).
- Different types of plants- have varying amounts and kinds of fiber.

# Dietary vs functional fibre

- Dietary fiber : consists of nondigestible carbohydrates and lignin that are intrinsic and intact in plants.
- Functional fiber : consists of isolated, nondigestible carbohydrates that have beneficial physiological effects in humans.

# Dietary fibres classifications

## Soluble Fiber

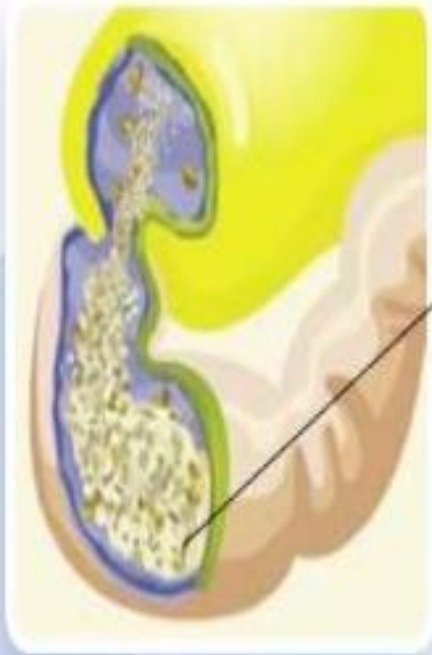
- Dissolves in water and may form a gel
- Pectin and gum are water-soluble fibers found inside plant cells.
- They slow the passage of food through the intestines but do nothing to increase fecal bulk.
- Beans, oat bran, fruit and vegetables contain soluble fiber
- Soluble fibre can help to lower cholesterol and regulate glucose levels as well as promote regularity.

## **Water insoluble fibers**

- Present in cell walls.
- Cellulose, hemicelluloses and lignin.
- Such fibres increase fecal bulk and speed up the passage of food through the digestive tract.
- Wheat bran and whole grains - the most insoluble fiber-vegetables and beans - are good sources

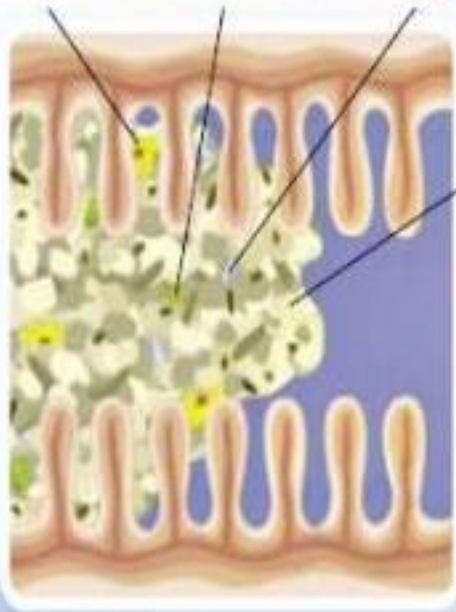
# How Fibre Works

- **Soluble and Insoluble**
- After soluble fibres are ingested, it absorbs water and turns into a gel which binds food, sugars, cholesterol and fats in the stomach and carries them through the digestive tract. Insoluble fibres passes through the system largely intact.



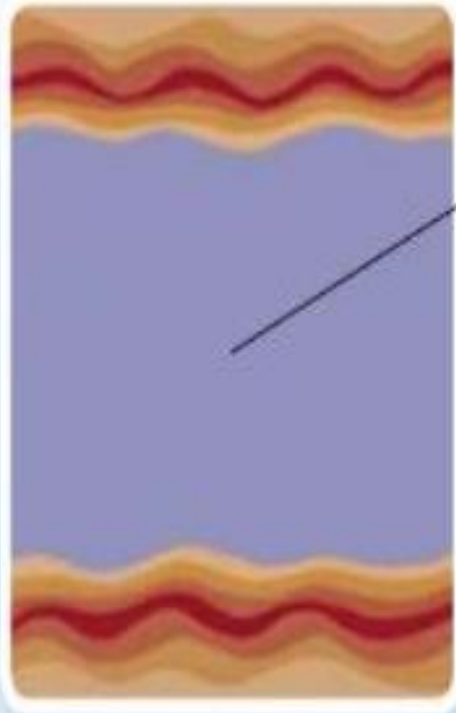
Soluble fiber mixes  
with fluid and partially  
digested food in the  
stomach

Fat Cholesterol Sugar



In the small intestine, soluble fiber binds sugars, cholesterol and fat and slows their absorption into the blood stream





Insoluble fiber and psyllium move through the large intestine and promote regularity

## **2. Benefits of Fiber**

### **i) Prevent constipation**

- Insoluble fiber binds water, making stools softer and bulkier.
- Therefore, fiber especially that found in whole grain products is helpful in the treatment and prevention of constipation, hemorrhoids and diverticulosis.
- Diverticula are pouches of the intestinal wall that can become inflamed and painful.
- In the past, a low-fiber diet was prescribed for this condition.
- A high-fiber diet gives better results once the inflammation has subsided.

## ii) Lower cholesterol levels

- Low blood cholesterol levels (below 200 mg/dl.) have been associated with a reduced risk of coronary heart disease.
- The body eliminates cholesterol through the excretion of bile acids. Water-soluble fiber binds bile acids, and hence a high-fiber diet may result in an increased excretion of cholesterol.
- Some types of fiber appear to have a greater effect than others.
- The fiber found in rolled oats is more effective in lowering blood cholesterol levels than the fiber found in wheat.
- Pectin has a similar effect in that it, too, can lower the amount of cholesterol in the blood.

### **iii) Reduce the risk of some cancers**

- Dietary fiber may help reduce the risk of some cancers, especially colon cancer.
- This idea is based on information that insoluble fiber increases the rate at which wastes are removed from the body.
- This means the body may have less exposure to toxic substances produced during digestion.
- A diet high in animal fat and protein also may play a role in the development of colon cancer.

## **iv) Useful for losing weight**

- High-fiber diets may be useful for people who wish to lose weight.
- Fiber itself has no calories, yet provides a "full" feeling because of its water-absorbing ability.
- For example, an apple is more filling than a half cup of apple juice that contains about the same calories.
- Foods high in fiber often require more chewing, so a person is unable to eat a large number of calories in a short amount of time.

### 3. Sources of Fiber

- Dietary fiber is found only in plant foods: fruits, vegetables, nuts and grains. Meat, milk and eggs do not contain fiber.
- The form of food may or may not affect its fiber content.
- Canned and frozen fruits and vegetables contain just as much fiber as raw ones.
- Other types of processing, though, may reduce fiber content.
- Drying and crushing, for example, destroy the water-holding qualities of fiber.
- The removal of seeds, peels or hulls also reduces fiber content.
- Whole tomatoes have more fiber than peeled tomatoes, which have more than tomato juice.
- Likewise, whole wheat bread contains more fiber than white bread.

## 5. Adverse effect

- Although fiber is important, it is just one part of a properly balanced diet.
- Too much fiber may reduce the amount of calcium, iron, zinc, copper and magnesium that is absorbed from foods.
- Deficiencies of these nutrients could result if the amount of fiber in the diet is excessive, especially in young children.
- Fiber supplements are sold in a variety of forms from bran tablets to purified cellulose.

- Many laxatives sold as stool softeners actually are fiber supplements.
- Fiber's role in the diet is still being investigated.
- Various types of fiber have different roles in the body.
- For these reasons fiber supplements should be avoided.
- Eating a variety of fiber-rich foods is the best way to receive the maximum benefits from each type of fiber present in foods, and obtain necessary nutrients.



# Recommendations

1. Adding fibre to diet, remember to drink extra water as well. Fibre acts on its ability to absorb water and that helps to move it through the digestive tract.
2. Add fibre to your diet gradually. Increase the amounts of fruits, vegetables and grains as you decrease fat and sugar. This reduces added calories and maintains a feeling of fullness. Remember, a healthy diet is all about better food choices.
3. Reaching 32 grams of fibre every day can be made easier by adding a natural supplement to your daily routine.
4. Count them! The only way to know how much fibre you're eating is to keep track of what you eat.