Nutritional Significance of Cereals/Wheat

2020 Q2 B (a) (20 Marks)

- **PROTEIN (N)**:
  - 12% of wheat is composed of protein
  - It is Low Biological Value protein (LBV)
  - Wheat and other cereals are usually incomplete foods. i.e.
  - Lacking in one or more of the essential amino acids e.g. Wheat is low in lycine.
  - Gluten is a fibrous protein found mainly in wheat but to a lesser extent in oats and rye.

(D) Coeliacs are intolerant to gluten, it causes damage to the lining of the small intestine, cramping, bloating and stunted growth in children therefore coeliacs must avoid wheat, oats and rye in their diet.

- **CARBOHYDRATES (N)**:
  - Cereals are an excellent source of carbohydrates, approximately 74% of wheat is carbohydrate.
  - 65% starch and 9% fibre.
  - Most of fibre is removed when cereals are milled to
  - flour or processed.

(D)

- Starch provides an excellent source of energy for the body.
- Unprocessed cereals high in fibre help stimulate peristalsis and reduce the risk of constipation and diverticulitis.
- Oats have a low Glycaemic Index, delay hunger pangs (slow release of energy)

- **MINERALS (N)**:
  - Cereals are an excellent source of non haem iron which exists in the ferric state.
  - They also contain calcium , phosphorous which are macrominerals.

(D)

- Calcium and phosphorous are essential for the calcification process as they are laid down as calcium phosphate in developing bones of young children and teenagers.
- Iron must be in the ferrous form to be absorbed by the body therefore Vitamin C is needed to convert ferric acid to ferrous iron e.g. Bran Flakes/milk and orange juice.

- **VITAMINS (N)**:
  - Cereals are an excellent source of Vitamin B complex B (thiamin), B_2 (riboflavin),B_3 (Niacin)
  - The germ of cereals contains Vitamin E (Tocopherols)
  - All cereals lack Vitamin C

(D)

- B Vitamins are necessary for carbohydrate metabolism and nerve activity.
- Vitamin E acts as an antioxidant in the body to help reduce the risk of certain cancers.

- **LIPIDS (N):**
  - The only part of the cereal grain to contain lipid is the GERM
  - 2% approximately of wheat is composed of the germ, the lipid present is high in polyunsaturated fatty acids e.g. linoleic acid.

(D)

- Cereals are ideal for low cholesterol diets because of the very low amounts of lipids present and cereals like oats are good for low kcal diets.

CEREALS 2020
NUTRITIVE AND DIETETIC VALUE

- **Protein**: (N)
  - 12% of wheat grains are composed of protein.
  - It is low biological value protein with an LBV of 53%
  - Wheat is lacking in the essential amino acid lycine therefore it is an incomplete protein food.
  - Gluten is the main protein present in wheat and to a lesser extent in oats and rye (fibrous protein composed of two polypeptide chains glutenin and gliadin).

- **Carbohydrates**: (N)
  - 74% approximately of wheat is composed of carbohydrates (therefore an excellent source).
  - 9% fibre present in the outer husk and the remaining 65% starch present in the endosperm.
  - Endosperm is used to make white flour with a glycemic index.
  - Dats GI 55 and Bran GI 15 have low GI. (wheat/oat)

- **Vitamins:** (N)
  - Cereals are an excellent source of B group vitamins (particularly unprocessed cereals).
  - B_1 (Thiamin), B_2 (Riboflavin), B_3 (Niacin)
  - Fat soluble Vitamin E is only present in the germ.
  - Cereals lack Vitamin C.

- **Peristalsis:** (D)
  - Unprocessed cereals are an excellent source of fibre/ cellulose which is hygroscopic, it absorbs water in the colon and expands, stimulating peristalsis therefore preventing bowel disorders like Constipation and diverticulitis.

- **Coeliac Disease**:
  - Coeliacs cannot eat wheat, oats, or rye as they are intolerant to the fibrous protein gluten which is present in these cereals. If consumed by coeliacs an enzyme called transglutaminase changes the gluten into a chemical that causes an immune response. (Inflammation of the lining of the small intestine)