NAME: EJEITA, ADIM
COURSE: GENERAL NUTRITION
18/SCI17/005
Food fortification and supplementation.
BIOTECHNOLOGY.

1. Write short notes on food fortification and supplementation

Food fortification or enrichment is the process of adding micronutrients (essential trace elements and vitamens) to food It can be carried out by food manufactures, or by governments as a public health policy which aims to reduce the number of people with dietary deficiencies within a population. The predominant diet within a region can lack particular nutrients due to the local soil or from inherent deficiencies within the staple foods; addition of micro nutrients to staples and condiments can prevent large-scale deficiency diseases in these cases
As defined by the World Health Organization (WHO) and the Food and Agricultural Organization of the United Nations (FAO), fortification refers to the practice of deliberately increasing the content of an essential micronutrient, ie. vitamins and minerals (including trace elements) in a food, so as to improve the nutritional quality of the food supply and to provide a public health benefit with minimal risk to health' whereas enrichment is defined as "synonymous with fortification and refers to addition of micronutrients to a food which are lost during processing

Types of food fortification.
There are different methods of food fortification
1. Commercial and Industrial fortification (wheat flour, corn meal, cooking oils)
2. Biofortification (breeding crops to increase their nutritional value, which can include both conventional selective breeding and genetic engineering)
3. Home fortification (example: Vitamin D drops

Examples of foods and beverages that have been fortified,

Iodised salt

Iodine deficiency disorder (IDD) is the single greatest cause of preventable mental retardation. Severe deficiencies cause Cretinism, Still birth and miscarriage. But even mild deficiency can significantly affect the learning ability of population. Today over 1 billion people in the world suffer from iodine deficiency and 38 million babies born every year are not protected from brain damage due to IDD. It is used to prevent goiters - The salt was tested for this in 1916.

Folate.

Folate (as a fortification ingredient, folic acid) function in reducing blood homocysteine levels forming red blood cells, proper growth and division of cells and preventing neural tube defects (NTDs). In many industrialized countries, the addition of folic acid to flour has prevented significant number of NTDs. Two common types of NTDs, Spina bifida and anencephaly, affect approximately 2500 - 3000 infants born in the US annually. Research trials have shown the ability to reduce the incidence of NTDs by supplementing pregnant mothers with folic acid by 72%

Niacin

Niacin has been added to bread in the US since 1938 (when voluntary addition started), a program which substantially reduced the incidence of Pellagra. Pallagra was seen amongst poor families who used corn as their main dietary staple. Although corn itself does contain niacin, it is not a bioavailable form does contain niacin, it is not a bioavailable form unless it undergoes nixtamalization (treatment with alkali, traditional in Native American cultures) and therefore was not contributing to the overall intake of niacin. Disease associated with niacin deficiency include; Pellagra which consisted of signs and symptoms called the three D's - Dermatitis, dementia and Diarrhea". Other may include vascular or gastrointestinal diseases. Common disease which

present a high frequency of niacin deficiency: alcoholism, anorexia nervosa, HIV infection, gastrectomy, malabsorptive disorde certain cancers and their associated treatments

Vitamin D

- Since Vitamin D is fat soluble vitamin, it cannot be added to a wide variety of foods. Foods that it is commonly added to are margarine, vegetable oils and dairy products. During the late 1800 after the discovery of curing conditions of Scurvy and beriberi had occured, researchers were aiming to see if the disease, later known as rickets, could also be cursed be food. Their results Showed that sunlight exposure and cod liver oil were the cure It was not until the 1930s that Vitamin D was actually linked to curing rickets. The discovery led to the fortification of common foods such as milk, margarine, and breakfast cereals. This took the astonishing statistics of approximately 80–90% of children showing varying degrees of bone deformations due to Vitamin D deficiency to being a very rare condition

Diseases associated with a Vitamin D deficiency include rickets Osteoporosis, and certain types of cancer (breast, prostate, colon and ovaries). It has also been associated with increased risk for fractures, heart disease; type 2 diabetes, autoimmune and infectious diseases, asthma and other wheezing disorders, myocardial infarction, hypertension, congestive heart failure and peripheral vascular diseases

Fluoride

- Although fluoride is not considered an essential mineral, it is useful in prevention of tooth decay and maintaining adequate dental health. In the mid-1900s it was discovered that towns with a high level of fluoride in the water supply was causing the residents' teeth to have both brown spotting and a strange resistance to dental caries. This led to the fortification of water supplies with fluoride in safe amounts (or reduction of naturally-occurring levels) to retain the properties of resistance to dental caries but avoid the staining cause by fluorosis (a

- conduction caused by excessive fluoride intake). The tolerable upper intake level (UL) set for fluoride ranges from 0-7mg/day for infants aged 0-6months and 10mg/day for adults over the age of 19.

Food Supplementation

Food supplements are highly concentrated vitamins and minerals produced by pharmaceutical manufacturs in the form of capsules, tablets or injections and administered as part of health care or specific nutrition campaigns.