

- Q. a) Discuss importance of preservatives and anti-oxidants in food.
- b) What are the gamma rays? Explain their applications.

## Defining Preservatives.

A preservative is a substance or chemical, added to food to fight spoilage caused by micro-organisms.

Preservatives are important in various ways.

Preservatives are important in food in multiple way, like

1- Preventing food deterioration.  
Food preservatives protect food from deterioration. It kills or inhibit the growth of microbes causing food spoilage.

2) Increasing shelf-life of food.  
Food preservatives, by protecting it, increases the shelf life of food items.

3) Assisting in Food-supply.  
Preservatives are necessary to protect food items for their supply from one place to another.

4) Making food available throughout the year.  
Food preservatives make food available throughout the year. It makes possible the availability of seasonal food items.

5) Cutting down on food waste  
The surplus food without preservatives could be spoiled by micro-organisms. That spoiled food is wasted. Thus, adding food additives prevent food wastage.

Most commonly used food additives preservatives are Sodium Benzoate, Nitrites, Sodium Sorbate and so on.

# Defining Anti-oxidants

Anti-oxidants are certain chemical molecules that neutralize harmful free radicals in food.

## Importance of Anti-oxidants in Food.

Anti-oxidants are significant in food, as

1) Prevent diseases caused by free-radicals.

Anti-oxidants are helpful in preventing diseases like cancer and certain heart diseases caused by free radicals.

2) Support Eye Health.

Anti-oxidants pertain positive impacts upon eye health. As these reduce risk of eye concerns like cataracts.

3. Aid in Brain Function.  
Anti oxidants remove free-radicals; these radicals have potential to damage brain tissues. Thus, anti oxidants assist in proper brain functioning.

4. Support healthy aging process.  
Diet rich in anti-oxidants can prevent or even reverse aging process. As these protect body from harmful substances.

5. Keep the Skin healthy  
Anti oxidants keep the skin healthy by preventing discoloration and aiding in collagen production.

Most Common Anti-oxidants are: Vitamin C, Vitamin E, Selenium and Cerotenoids.

## b) Defining Gamma Rays.

Gamma Rays are the electromagnetic radiations of the shortest wavelength and highest energy.

The wavelength of these rays on electromagnetic spectrum is  $10^{-12}$ , while these have frequency of  $10^{20}$ .

## Applications

Gamma rays are used in many fields like,

In medicine:

These are used in radiotherapy for treating cancer and tumour.

In industry:

Gamma rays are used to sterilize industrial equipments in industries.

In Agriculture.

These rays are used in the tools to detect internal defects in agricultural products.

In Food Industry

Gamma rays are often used to preserve food items for a longer period of time.

In Nuclear Physics.

These are used to produce valuable data about the structure of the nucleus of the atom.

overall good answers!!