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VALUE ADDITION





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Value addition

Value addition

At the most basic level, a value added product simply means any product or action that helps you raise the value of your products or that enables you to increase your profit margin.



25/- per kg



70/- per litre



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Why value addition:

- Reduce post harvest loss thereby increasing the availability of the food.
- Benefits to farmers and to consumer.
- Better nutrition.
- High employment.
- Increase in export trade and foreign exchange.
- Improvement in quality of life.



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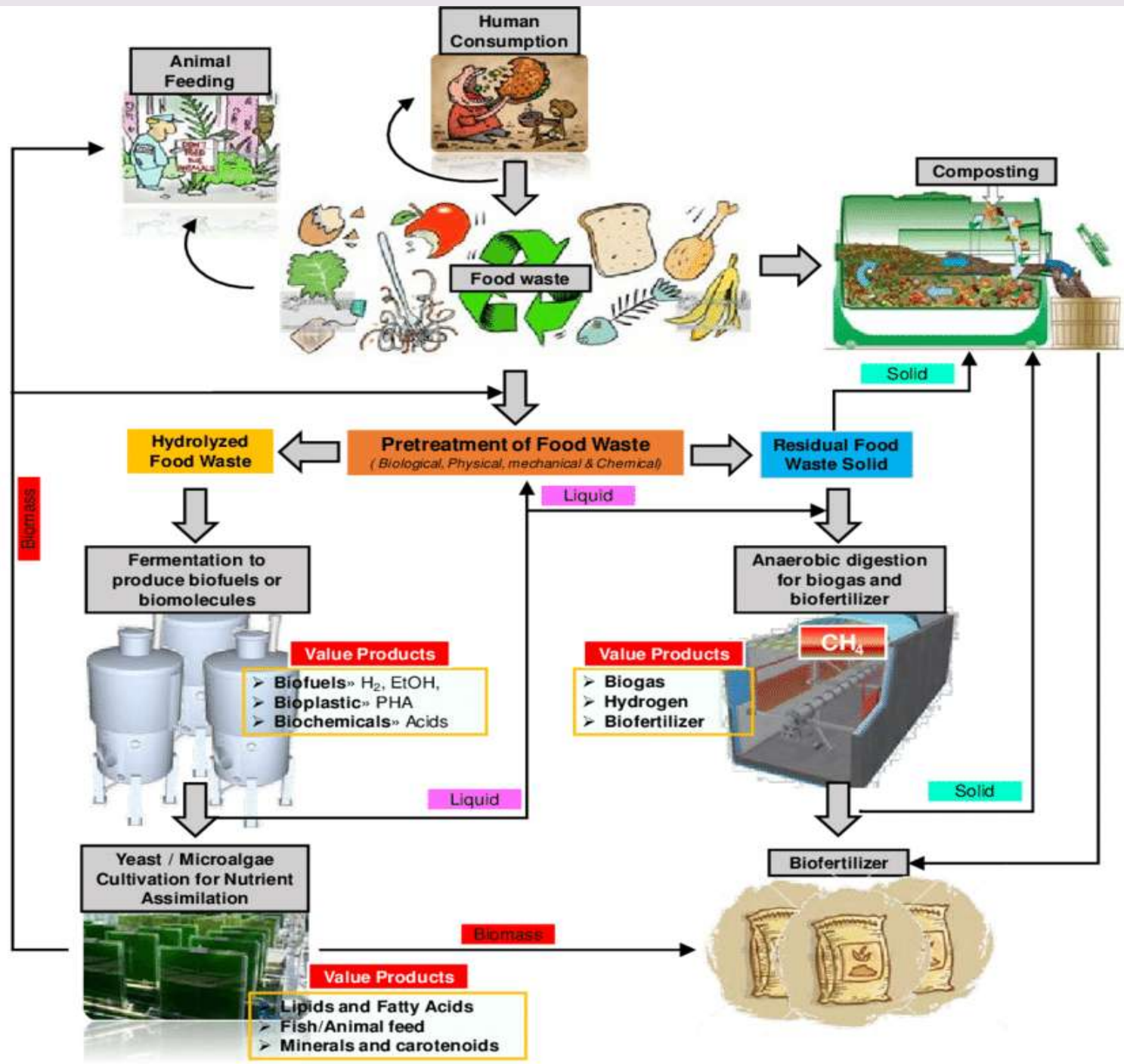
Methods of value addition

- Value addition by harvesting at proper stage.
- Value addition by cleaning, grading and packing.
- Value addition by processing of fruits.
- Value addition by prolonging shelf life.
- Value addition in processing waste.



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Value addition from waste



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Preservation.

- The science which deals with the methods of prevention of decay or spoilage of food, thus allowing it to be store in a fit condition for future use.





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Need for Food Preservation

- increasing availability of certain foods throughout the year.
- utilization of surplus crops and prevent wastage.
- saving money by preserving foods.
- easier to store, distribute and transport.
- meeting the needs of the people for food in secluded and difficult areas.
- maintaining or creating nutritional value, texture and flavour of food.



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Principles of preservation

- Prevention or delay of microbial decomposition.
- Prevention or delay of self decomposition of food.
- Prevention damage by insects, animals, mechanical causes, etc.



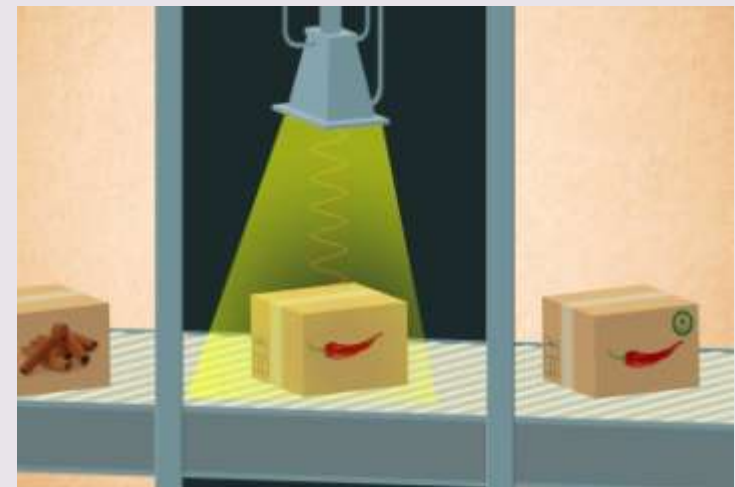


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Prevention or delay of microbial decomposition.

- Asepsis.
- Filtration.
- Drying.
- Anaerobic conditions.
- Chemicals.
- Antibiotics.
- Low temperature





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Prevention or delay of self decomposition of food.

- Blanching.
- Delaying chemical reaction.





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Prevention damage by insects, animals, mechanical causes, etc.



Mechanical damage and decay on stored pepper





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METHODS OF PRE SERVATION



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1.Asepsis.

- Maintaining of general cleanliness(washing/wiping) while picking, grading, packing and transporting of fruits and vegetables.
- Prevents entry of microorganism.





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Preservation by high temperature

- Application of heat to the foods leads to the destruction of microorganisms.
-
- The specific treatment varies with:
 - i) The organisms that has to be killed.
 - ii) The nature of the food to be preserved
 - iii) Other means of preservation that may be used in addition to high temperature.



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2.Preservation by high temperature



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Preservation by high temperature

- High temperatures used for preservation are:
 - a) Pasteurization temperature – below 100°C .
 - b) Heating at about 100°C .
 - c) Sterilization temperature above 100°C .



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Pasteurization

- kills part but not all the microorganisms present and the temperature applied is below 100o C.
- steam, hot H₂O, dry heat or electric currents are used.
- Product is cooled immediately after h





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Methods of pasteurization

- HTST method - High temperature and short time (above 70°C)
- LTH method - Low temperature and higher time (or) Holding method (60-70°C)





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Methods of pasteurization

1. Bottle or holding pasteurization : for preserving fruit juices at home.
2. Overflow method : juice is heated at 2.5°C higher than pasteurization temperature before sealing and 2.5°C lower after sealing.
3. Flash pasteurization: used in canning of natural orange juice. Juice is heated at 5.5°C above pasteurization and kept for 1 minute.



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FLASH PASTEURIZER

BOTTLE PASTEURIZER

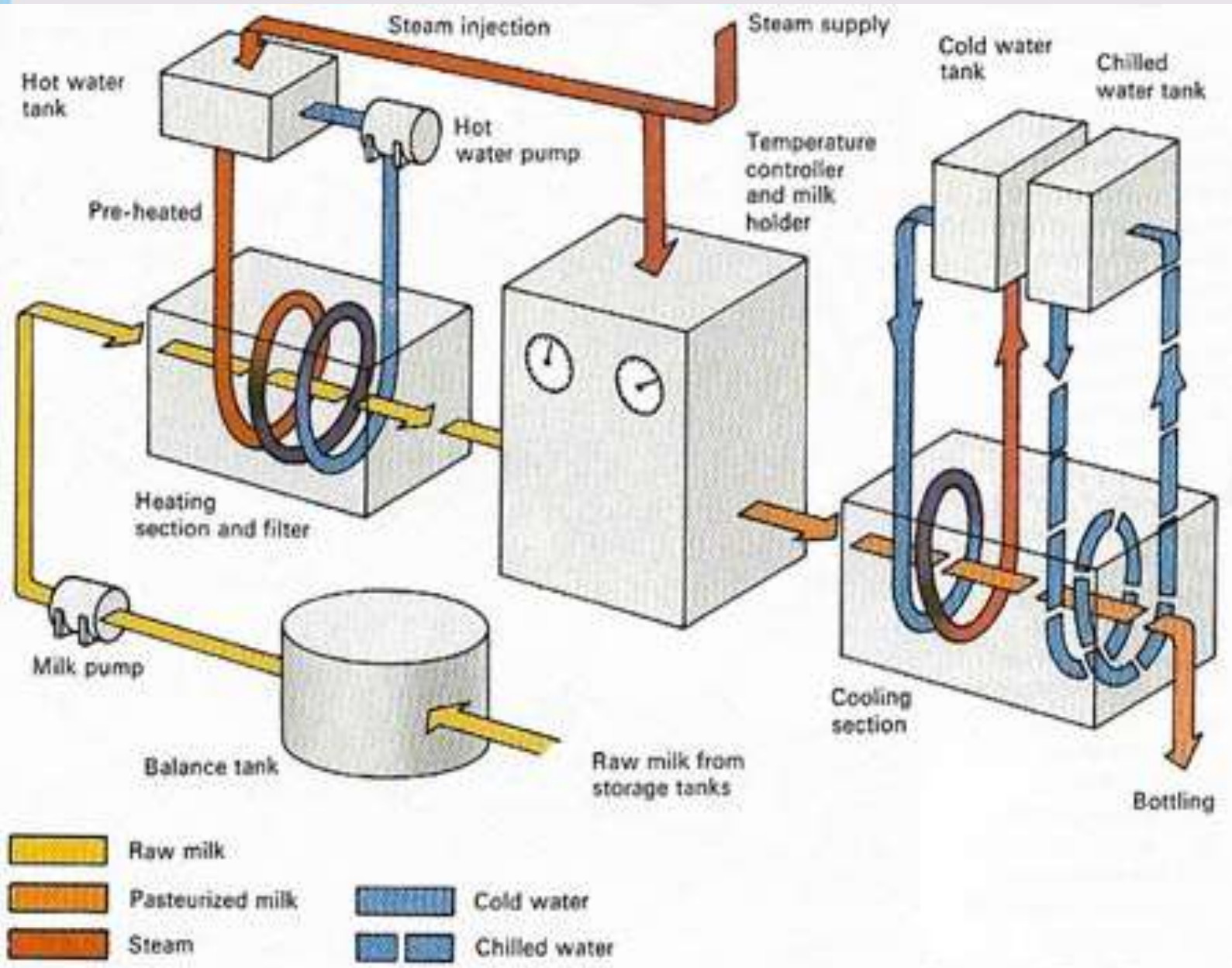




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Process





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Heating at about 100°C.

- Blanching fresh vegetables before freezing or drying involves heating briefly at about 100°C.





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Sterilization

- Temperature above 100⁰C.
- Microorganisms are completely destroyed.
- steam pressure sterilizers such as pressure cookers and autoclaves are used.
- Fruits and tomato products : 100⁰C for 30min.
- Vegetables : 30-90 min. at 116⁰C



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Sterilization methods

1. Aseptic canning : Cans are sterilized prior to filling.
2. Hot filling : hot product is filled into clean but not necessarily sterile containers.





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3.Preservation by cold temperature



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PRESERVATION BY LOW TEMPERATURE

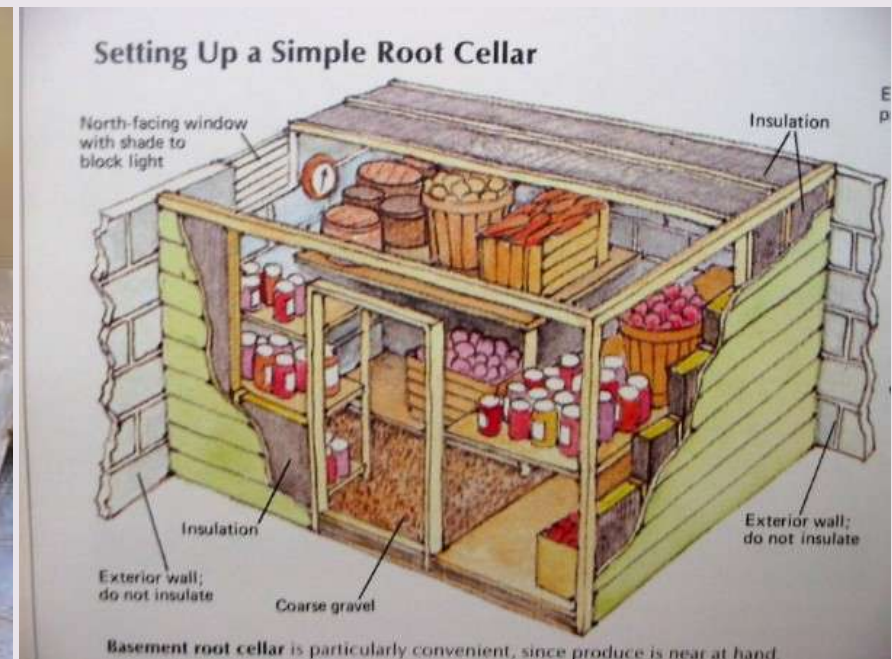
- Microbial growth and enzyme reactions are retarded in foods.
 - lower the temperature, the greater the retardation.
- Low temperature can be produced by:
1. Cellar storage (about 15o C).
 2. Refrigerated (or) chilling (0 to 5o C).



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Cellar storage

- The temperature in cellar is lower than 15⁰C.
- Example: Root crops, potatoes, cabbage, apples, onions etc.





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Refrigerated (or) chilling

- Temperature is about 0 to 5⁰C.
- By means of ice or mechanical refrigeration.
- Enzymatic and microbial changes in the foods are not prevented but are slowed considerably.
- eggs, dairy products, meats, sea foods, vegetables and fruits are stored for limited period of time.





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4.Preservation by chemicals



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Chemical preservation

- A preservative is a substance which is capable of inhibiting, retarding or arresting the growth of microorganisms.
- interferes with the mechanism of cell division, permeability of cell membrane and activity of enzymes.
- preserved squashes and crushes can be kept for a fairly long time even after opening the seal of the bottle.
- should not be injurious to health and should be non-irritant.
-



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chemical preservatives

- According to the FPO (1955).
 1. Sulphur dioxide.
 2. Benzoic acid



Benzoic acid



Sulphur dioxide.



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Sulphur dioxide

- Oldest antimicrobial agents.
- Preservation of juice, pulp, nectar, squash, crush, cordial and other products.
- It acts as an antioxidant and bleaching agent.
- retards non enzymatic browning.
- Sulphur dioxide has a better preservative action than sodium benzoate against bacteria and moulds.



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Sulphite salts

- sodium sulphite.
- sodium bisulphite.
- potassium sulphite.
- potassium bisulphite.
- sodium metabisulphite.
- **potassium metabisulphite(MOSTLY USED)
stable source of sulphur di oxide.**





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Recommendation

- According to FPO, the maximum amount of So₂ allowed is:
 - Fruit juice is 700 ppm.
 - Squash, Crush and Cordial 350 ppm.
 - RTS and nectar 100 ppm.



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Advantages

- Better preserving action against bacterial fermentation.
- retain the colour of the beverage.
- preserves the surface layer of juices.
- excess of SO_2 present can be removed either by heating the juice to about 71°C .





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Disadvantages

- It has a bleaching action.
- cannot be used for juices which are to be packed in tin containers.
- Gives a slight taste and colour to freshly prepared beverages.





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Benzoic acid

- It is only partially soluble in H_2O .
- sodium benzoate is commonly used.
- pure sodium benzoate is tasteless and odourless.
- 1 part of **sodium benzoate** is soluble in 1.8 parts of water at ordinary temperature.
- 0.34 parts of **benzoic acid** is soluble in 100 parts of water.



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Recommendation

- According to FPO its permitted level is:
 1. RTS and nectar is 100 ppm.
 2. squash, crush and cordial 600 ppm.





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Advanatges.

- It used in coloured products of tomato, jamun, pomegranate, plum, watermelon, strawberry, coloured grapes etc.
- Antibacterial action of benzoic acid is increased in the presence of CO_2 and acid.
- Benzoic acid is more effective against yeasts.





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Disadvantages

- Cannot be added in solid form.
- It may darken the product on the long run.
- Not that effective against moulds.





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5. Preservation by drying

- Removal of moisture to restrict microbial growth.
- Sun drying is the oldest method.
- Mango juice powder is usually prepared by this method.

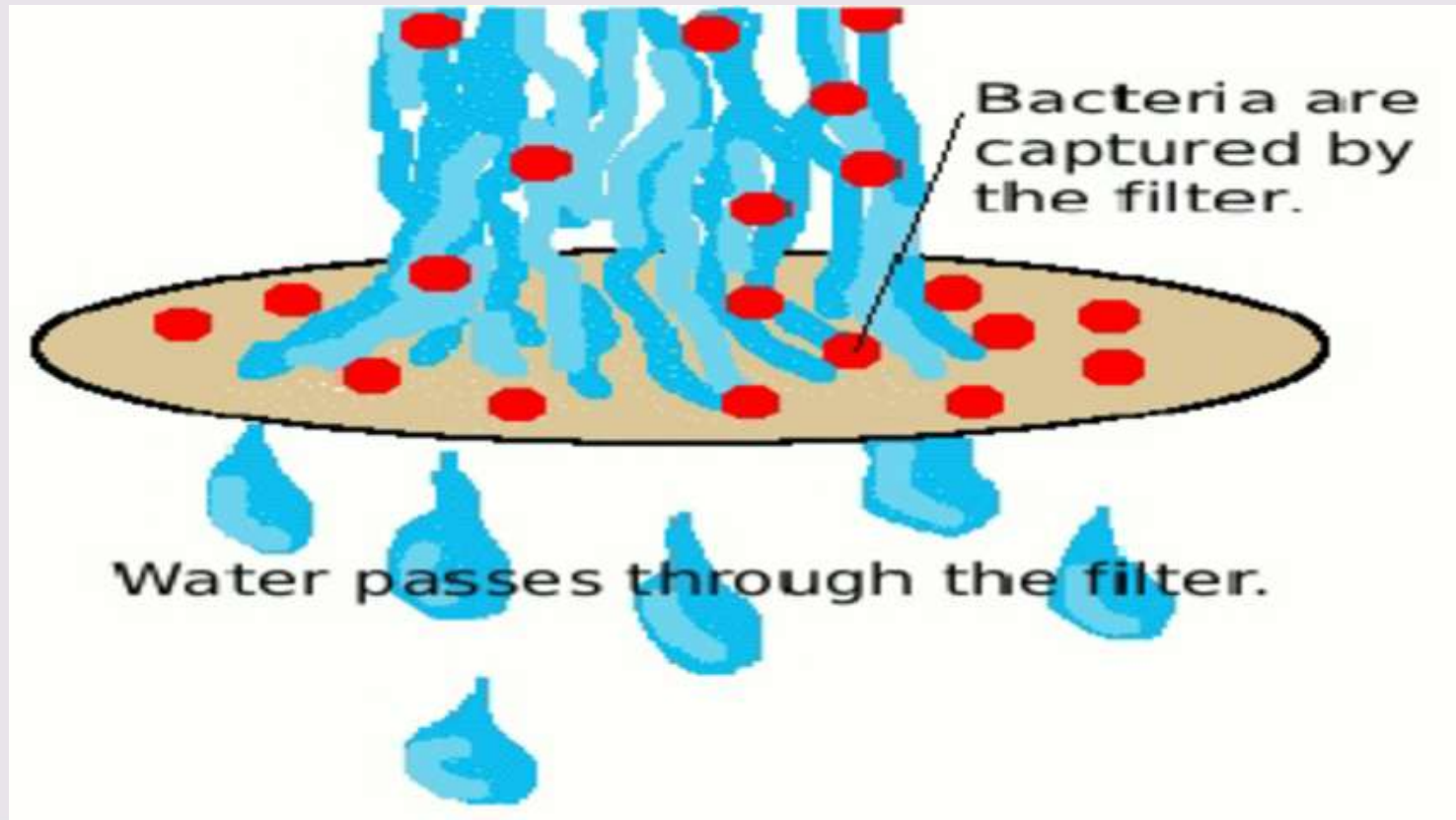




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6. Preservation by filtration

- Fruits juices are passed through to filter to retain microorganisms.
- It is used for soft drinks, juices and wine.





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7. Preservation by carbonation

- Dissolving sufficient CO₂ in a beverage.
- Creates anaerobic conditions and prevent browning and effect of microorganisms.
- Fruit juice beverages:1-8g/litre





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8. Preservation by sugar.

- Syrups with 66% or more sugar do not ferment.
- The main principle is **osmosis**.





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9. Preservation by fermentation.

- Oldest method of preservation.
- Foods are preserved in organic acids by microbial action.
- Wines, beers, fermented drinks, fermented pickles etc are preserved.
- 14% alcohol acts as preservatives in wine bottles.
- 2% acetic acid controls spoilage in most products.



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Fermented products



pickles



kimchi



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Preservation by salt

- 15-20% salt concentration is enough to preserve products.
- Salt in the form of brine is used in canning and pickling.
- Causes high osmotic pressure.
- Dehydrating food and microorganisms.
- Reduces solubility of oxygen in water.





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11. Preservation by acids

- Common acidic additives are vinegar (pickles, chutney, etc) and citric acid (squashes, jams, etc).
- 2% acetic acid prevents spoilage .





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12. Preservation by oil and spices

- A layer of oil top of a food produce create anaerobic condition for microorganisms.
- Turmeric, pepper and asafoetida have a little bacteriostatic effect.



Andhra Avakaya



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13. Preservation by antibiotics.

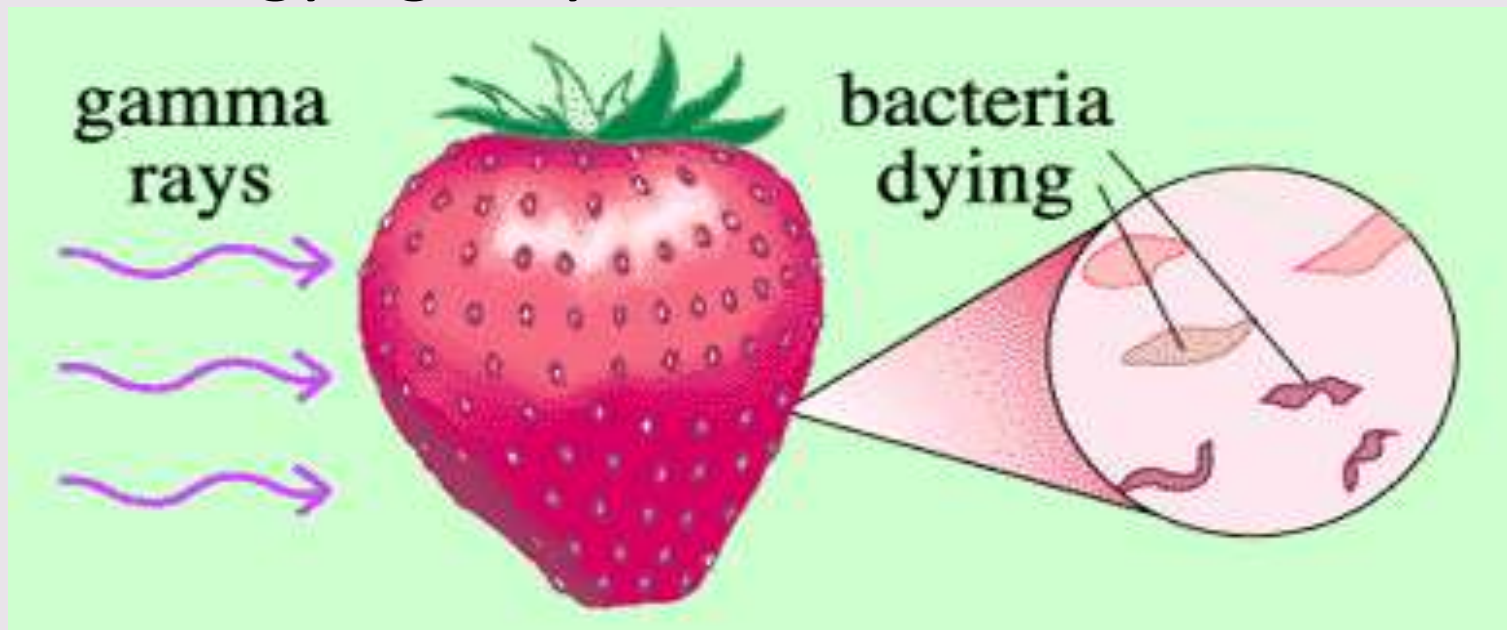
- Metabolic products of microorganisms with germicidal effects are antibiotics.
- Examples:
 1. Nisin – canning of mushrooms, tomatoes, milk products, etc.
 2. Subtilin (10-20 PPM)- asparagus, corn and peas.
 3. Pimaricin (antifungal)- treats fruits and fruit juices.



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14. Preservation by irradiation

- Sterilization by ionizing radiation (gamma rays, electronic beams, etc).
- Also known as cold sterilization.
- According to WHO and international atomic energy agency 1Mrad is not hazardous.

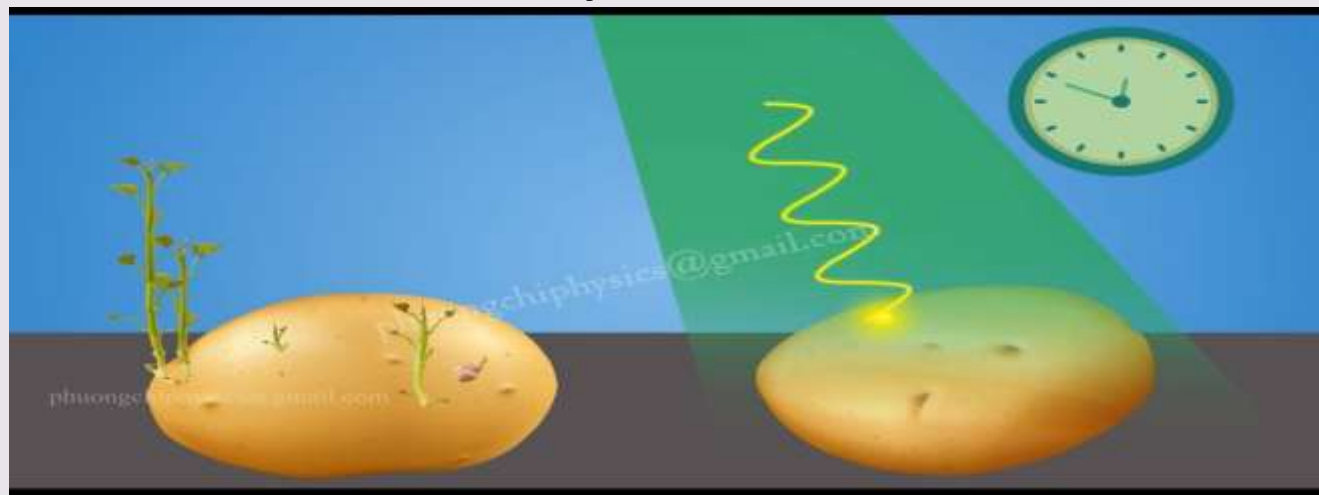




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Dosage for different organisms

- $10^3 - 10^7$ rad - kills microorganisms.
- $10^3 - 10^6$ rad – kills insects.
- $10^2 - 10^3$ rad – harmful to humans.
- $10^3 - 10^4$ rad – inhibits sprouting in potato, onion, carrot, etc.
- 3.0×10^6 rad – bacterial endosperms.
- 5.0×10^4 rad – yeast.





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THANK YOU