Preservation of Food

By

Concentration

Module- 20
Lec- 20

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• Foods are concentrated for many of the same reasons that they are dehydrated; concentration can be a form of preservation but this is true only for some foods.
• Nearly all liquid foods which are dehydrated are concentrated before they are dried because
  ➢ In the early stages of water removal, moisture can be more economically removed in highly efficient evaporators than in dehydration equipment.
  ➢ Increased viscosity from concentration often is needed to prevent liquids from running off drying surfaces or to facilitate foaming or puffing.
  ➢ Some concentrated foods are desirable components of diet in their own right. For example, concentration of fruit juices plus sugar yields jelly.
  ➢ Many concentrated foods, such as frozen orange juice concentrate and canned soups, are easily recognized because of need to add water before they are consumed.

More common concentrated foods include evaporated and sweetened condensed –
• Milks
• Fruits and vegetable juices
• Nectars
• Sugar syrups and flavored syrups
• Jams and jellies
• Tomato paste and
  many type of fruit purees made by bakers, candy makers etc.

Benefits:
• Concentration reduces weight and volume and results in immediate economic advantages.
• It is prior to concentrate the liquid food before dehydration because in the early stages of water removal, moisture can be more economically removed in highly efficient evaporators than in dehydration equipment.
• Increased viscosity from concentration often is needed to prevent liquids from running off drying surfaces or to facilitate foaming or puffing.
• Concentrated forms have become desirable components of diet in their own right.

Methods of concentration

Solar concentration
• Uses solar energy
• Used to derive salt from seawater in earlier times
• Being practiced today in united states in man made lagoons
• Slow process and suitable only for concentrating salt solutions

Open Cattles
• Heated by steam
• Being used for some jellies and jams for certain types of soups
• High temperatures and long concentration times causes damage to food
• Thickening and burn on of product to cattle wall gradually lower the efficiency of heat transfer and slow concentration process
• Widely used in manufacture of maple syrup

Flash Evaporators
• Subdivides food material and brings it into direct contact with the heating medium to speed up concentration process.
• Superheated steam at 150°C is used
Some other methods

- Thin film evaporators
- Vacuum evaporator
- Freeze concentration
- Ultra filtration and reverse osmosis

Changes during concentration

Concentration processes that expose food to 100°C or higher temperatures for prolonged period can cause major changes in organoleptic and nutritional properties. Also these change are different for different food products. Two more common changes are

- Cooked flavors and
- Darkening of color

Some other changes

- Heat induced reactions
- In case of sugar, crystallization of sugar that can result in gritty, sugar jellies or jams.
- Crystallization of lactose due to overconcentration ‘sandiness’, in case of certain milks.
• Proteins can be easily denatured and precipitated from solution due to high concentration of salts and minerals in solution with protein.
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• The gelation of concentrated milk and other proteinaceous foods.
• Microbial destruction, largely dependent on temperature
References

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