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Review Article

THERMAL PROCESSING IN FOOD TECHNOLOGIES

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Mechanism of inactivation

Heat causes damage to macromolecular cell components; thus the main function of heat-induced stress proteins is to repair or destroy these damaged components so that they do not disrupt cellular metabolism. Many heat-induced stress proteins are protein chaperones that assist in folding and assembly of heat-damaged proteins (Yousef and Courtney, 2003). In addition to these changes, some bacteria also alter their cell membrane in response to heat by increasing the ratio of *trans* to *cis* fatty acids in the membrane. This structural change is thought to decrease fluidity caused by increasing temperatures (Cronan, 2002).

SOUS-VIDE TECHNOLOGY

Synonym: cooking under vacuum

Method: Top quality raw foods are selected and packed in aair impermeable thermostable pouches under vacuum and then heated to a temperature below 100°C for short period of time cooled to a temperature below 4°C there by the product has an extended shelf-life of 21 days

Advantage: Maintains sensory characters, reduced oxidative rancidity, flavour remain unaffected.

Disadvantages: Increased risk of anaerobic pathogens.

OHMIC-HEATING

Synonym: Joule heating, Di-Electric heating.

History: 1st developed by EA techs of UK and used for low acid foods, theory of operation 1st described by (Sastry and Palaniappan,1994)

Method: Conversion of electrical energy to heat energy by resistant flow of electric current through foods. There exists a linear relationship between conductivity and heat production, as the biological materials are the poor conductors of electricity heat is produced by resistant flow (Sastry and Palaniappan,1994).

Advantages: Rapid heating.

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Commercial status in food industry: FDA approves this technology, to process low acid foods. This technology is used in USA and Japan.

MICROWAVE HEATING

Synonym: Heating from inside out.

Method: Based on dielectric properties of food and frictional heating.

Process: Presence of substantial amount of water and salts which exists in the food as positive and negative ions. The rapidly oscillating microwave electric field produced from magnetron oscillator causes rapid movement of ions from positive to negative and back several million times where the ions collide which leads to frictional heat and the heat is uniformly distributed through out the food material by conduction and convection. Fan is used for uniform distribution of energy.

Advantages: Fast heating and relatively uniform heating used in production of dry-fruits without quality loss

Commercial status in food industry

Used in baking, cooking, puffing, vacuum drying, also for pasteurization and sterilization

References

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