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Quality changes during drying and storage

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Outline

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- Drying objective
- Effect of drying on food quality
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 - Color
 - Shrinkage, porosity and bulk density
 - Case hardening
 - Microbiological and chemical quality
 - Nutritional quality



Drying Objective

- To preserve the food from spoilage
- To reduce the weight and bulk of the food
- To make the food enjoy an availability and consumption pleasure similar to that of canned goods
- To develop “new” or “novelty” items such as snacks.



Effect of Drying on Food quality

Basis of reaction	Example and consequence
Physical	Moisture movement: causing drying and toughening of texture, hydration and softening of texture, aggregation
Chemical	Oxidation: causing oxidative rancidity, loss of colour Maillard reactions, causing discolouration, change in texture
Enzymatic	Polyphenoloxidase: causing enzymic browning Lipoxygenase: causing oxidative rancidity Lipase: causing lipolytic rancidity Protease: causing gelation and flavour and texture changes
Microbial	Growth of spoilage organisms: causing quality deterioration Growth of toxigenic organisms: causing food poisoning Presence of infectious organisms: causing food poisoning



Physical changes

Color

During drying, colour may change because of chemical or biochemical reactions. Enzymatic oxidation, Maillard reactions, caramelization, and ascorbic acid browning are some of the chemical reactions that can occur during drying and storage.

Shrinkage, porosity and Bulk density

Shrinkage is caused by structural collapse attributable to the loss of water. Changes in shape and size, loss of rehydration capacity, surface cracking, and hardening of food materials are among the most important physical phenomena associated with shrinkage.

Porosity and bulk density are important physical properties in dried foods. These two properties play an important role in rehydration of dried materials and their handling and packaging aspects.



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Microbiological and chemical quality

Reducing water activity below 0.7 prevents microbiological spoilage.

However, auto oxidation of lipids could take place at very low water activity values 0.2.

Nutritional Quality

Changes in protein

Changes in lipid

Changes in carbohydrate

Changes in vitamins



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Thank you