Tutorial 5 : Effect of Processing on Food Quality

1. Food Processing : Between Nutritional Improvement and Health Risks (presentation 1)

Introduction

Food processing includes all operations applied to agricultural raw materials (heating, cooling, fermentation, drying, etc.) to produce food products that are safer, more stable, and more convenient. In Algeria, this transformation has greatly facilitated access to a wide variety of food products suited to the needs of modern consumers. However, it now raises concerns about the effects of certain industrial processes on nutritional quality and public health. This summary aims to present both the benefits and the risks, using examples from our everyday environment.

1. Nutritional Benefits of Food Processing

1.1 Preservation and Nutritional Enrichment

Some processed foods are fortified to prevent deficiencies:

- *Candia* or *Soummam* milk enriched with vitamin D and calcium targets the needs of children and pregnant women, helping to fight common deficiencies, especially in regions with low sunlight exposure.
- Infant cereals (such as *Nestlé* or *Blédina*, available in Algeria) are often fortified with iron and B vitamins, which are essential for growth.
- Locally sold margarines (e.g., *Fleurial* or *Crystal*) are enriched with essential fatty acids, especially omega-3, which support cardiovascular health.

1.2 Improved Bioavailability

Certain processes make nutrients more accessible to the body:

- Cooking couscous, a traditional dish, makes carbohydrates easier to digest, while tomato-based *chorba* releases lycopene, an antioxidant.
- Fermented milk (*Raïb*, *Danaa*, *Yop Soummam*) contains lactic cultures that improve lactose digestion, which benefits lactose-intolerant individuals.

1.3 Microbiological Safety

Processes such as pasteurization eliminate pathogenic germs:

- Local UHT milk (e.g., *Hamoud, Laiterie Batna*) has a longer shelf life and is safer than untreated raw milk.
- Pasteurized juices (*N'gaous*, *Ifri*, *Hamoud*) are safer than freshly squeezed street juices, which are often exposed to contamination (e.g., *E. coli*, *Salmonella*).

2. Nutritional and Health Risks Linked to Food Processing

2.1 Loss of Nutrients

Certain processes eliminate essential nutrients:

- Refined white bread, widely consumed in Algeria, is low in fiber and B vitamins compared to wholegrain bread.
- Canned vegetables (beans, peas from *Conserves Modernes*, etc.), available in stores, lose part of their vitamin C content due to sterilization.

2.2 Addition of Undesirable Ingredients
To improve taste and texture, the food industry sometimes adds problematic substances :

- Local sugary drinks (e.g., *Selecto*, *Lim Boost*, *Hamoud*) can contain up to 30g of sugar per can, exceeding WHO recommendations.
- Flavored yogurts (*Raïbi*, *Danaa*, *Nesquik milk*) are often sweetened and contain artificial flavors and colorings.
- Some Algerian chips and snacks (e.g., *Chifla*, imported *Pringles*) contain artificial flavors and colorants such as E102 or E110, which are sometimes controversial for children.

2.3 Formation of Toxic Compounds
Certain high-temperature processes generate harmful substances:

- *Boureks* or *fricassées* repeatedly fried in fast food outlets contain acrylamide, a potentially carcinogenic compound.
- *Merguez* and industrial sausages sold in supermarkets, which are rich in nitrites, can produce harmful nitrosamines when overcooked.

2.4 Modification of Food Structure
Ultra-processed products, low in nutrients but high in additives and empty calories, are increasingly common:

- Instant noodles like *Indomie* or *Jin Ramen*, widely consumed by youth in Algeria, are low in fiber and very high in sodium.
- Industrial biscuits (e.g., *Bimo*, *Saïda*, *LU*), often given as snacks, contain little useful nutrition but a lot of sugar and hydrogenated fats.

Conclusion
Food processing, especially in the Algerian context, has made it possible to ensure greater food safety and provide a variety of convenient products suited to the needs of different populations. However, it is important to distinguish between beneficial processes (fermentation, pasteurization, enrichment) and excessive or denaturing processes (refining, excessive additives, intensive cooking). Nutritional education and label reading are essential tools to help consumers make informed and balanced choices. Promoting a diet based on moderately processed and fresh or minimally processed foods should become a public health priority in Algeria.

2. The Many Faces of Food Quality: How Processing Shapes Our Choices.

(presentation 2)

Introduction

In Algeria, as elsewhere, the concept of food quality has become multifaceted. It no longer refers only to appearance or freshness; it also includes food safety, nutritional value, taste, convenience, and even ethical dimensions. The growing industrialization of the food sector is deeply altering consumers' selection criteria. This presentation explores the various aspects of food quality and shows, through local examples, how food processing influences our preferences.

1. Hygienic Quality: A Priority in a Hot Climate

Processing methods (pasteurization, sterilization, aseptic packaging) are essential to ensure food safety, especially in a country like Algeria where high temperatures promote microbial growth.
Local example: Pasteurized milk (*Candia* or *Soummam*, in sachets or bottles) is preferred over raw milk due to the risk of brucellosis or microbial contamination.

2. Nutritional Quality: Between Enrichment and Losses

Processing can either destroy certain nutrients (e.g., overcooked vegetables) or improve nutritional value through enrichment.
Local examples:

- Yogurts enriched with calcium or vitamins (*Danone Danao*, *N'Gaous*) appeal to mothers concerned about their children's health.
- Conversely, refined white flour (widely used in industrial traditional bread) has a reduced fiber and micronutrient content.

3. Sensory Quality: Attracting through Taste and Smell

Food companies enhance texture, color, or taste to meet local preferences.
Local example: *Tchin Tchin* or *Lay's* chips, flavored with chili or cheese, are very popular—especially among young people—despite their low nutritional value.

4. Usability Quality: Saving Time, Especially in Cities

Ready-to-eat or easy-to-prepare foods have become essential, particularly for urban families and busy workers.
Local examples:

- Ready meals in cans or vacuum packaging (canned couscous, *Driham* sardines, prepared lentils) are convenient and available in most minimarkets.
- Prepackaged industrial bread (like *Bimo*) is preferred for its longer shelf life.

5. Consistent Quality: Brand Loyalty

Algerian brands aim to standardize product quality to build customer loyalty.
Local example: The taste of *La Vache Qui Rit* processed cheese, made locally, remains consistent, reassuring consumers.

6. Emotional Quality: Appealing to Tradition and Memories

Products that evoke tradition, home, or childhood have a strong emotional appeal.

Local example: Brands like *Numidia* or *Hamoud Boualem* use nostalgia and Algerian heritage to attract consumers, especially during Ramadan.

7. Technological Quality: Durability and Logistics
Food processing allows the production of stable products that can be transported over long distances.
Local example: Juice in brick cartons (*Cevital*, *Ifri*, *Rouiba*) can be stored for several months without refrigeration thanks to thermal processing and packaging technologies.

8. Ethical and Environmental Quality: An Emerging Concern
Although this dimension is still underdeveloped in Algeria, awareness is beginning to grow, particularly among young people and informed consumers.
Local example: A few local initiatives offer organic products (e.g., honey or vegetables from artisanal producers at farmers' markets or online), but these products remain marginal due to their high cost and the lack of certified labeling.

Conclusion
Food processing in Algeria, as in other countries, is redefining food quality across several dimensions. While it addresses needs for hygiene, convenience, and shelf life, it also changes consumption habits—sometimes at the expense of health or nutritional quality. Gaining a better understanding of these mechanisms is essential to educate responsible consumers who can make informed choices in an ever-evolving food landscape.