

## 1. Definition and Classification of Food

# Module 1 · Introduction to Human Food, Nutrition & Physiology

Unit 1 · Introduction to Food and Nutrients

# Chapter 1 · Definition and Classification of Food

### 1 · What is "Food"?

Food is "any substance—solid or liquid—that supplies the body with energy-yielding macronutrients, essential micronutrients, water and other bioactive compounds required for growth, maintenance, and regulation of life processes". In addition to its physiological role, food fulfils psychological (pleasure, comfort), social (culture, celebration) and economic functions.

# **Key terminology**

**Food** - the material eaten or drunk for nutritional support.

Nutrient - a specific chemical component in food that has a defined physiological function.

**Diet** - the habitual pattern of foods consumed.

**Dietetics** - the science of applying nutrition principles in health and disease.

# 2 · Why Classify Food?

Systematic classification helps

- design balanced diets and guidelines (e.g., ICMR-NIN 2024),
- educate the public and health-care professionals,
- facilitate food policy, safety, storage and trade,
- guide research on diet-disease relationships.

# 3 · Major Classification Systems

Basis of classification	Classes / Levels	<b>Explanation &amp; typical examples</b>
Origin	• Plant • Animal • Fungal & microbial	Cereals, legumes, fruits vs. milk, meat vs. mushrooms, <i>Saccharomyces</i> yeast.
Chemical composition	• Carbohydrate-rich • Protein-rich • Fat- rich • Mixed	Wheat flour (CHO), fish (protein), ghee (fat), nuts (mixed).
Predominant physiological function	• Energy-yielding • Body-building • Protective/regulatory	Carbohydrate & fat-rich foods; protein-rich foods; vitamin-mineral-rich fruits & vegetables
Food-group system (ICMR- NIN "My Plate for the Day", 2024)	8 core groups: cereals & millets; pulses & legumes; milk products; fruits; vegetables (GLV, other vegetables, roots/rhizomes); meat/fish/eggs; nuts & oil-seeds; fats/oils/sugars	Ensures macro- and micronutrient adequacy for a 2000 kcal pattern
Degree of industrial processing (NOVA)	1 Unprocessed & minimally processed 2 Processed culinary ingredients 3 Processed foods 4 Ultra-processed foods	NOVA highlights links between ultra- processed foods and obesity & NCD risk
Perishability	• Perishable • Semi-perishable • Non- perishable	Milk, meat (perishable); potatoes, apples (semi); rice, pulses, sugar (non-perishable)

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Basis of classification Season/Availability Sensory characteristics Classes / Levels

Seasonal vs. perennial

Colour, flavour, texture

**Explanation & typical examples** 

Mango vs. rice

e.g., pungent foods (chillies), astringent foods (unripe banana)

### 4 · Deep-dive Explanations

### 4.1 Origin

- **Plant foods** are primary producers converting sunlight to chemical energy. They supply fibre, phytonutrients and, in the case of pulses, high-quality protein.
- Animal foods provide complete proteins, vitamin B<sub>12</sub>, highly bioavailable iron and zinc, but may come with higher saturated fat.
- Fungi & microbes (e.g., mushrooms, fermented foods) contribute vitamins such as ergosterol-derived vitamin D<sub>2</sub> and probiotic benefits.

#### 4.2 Chemical Composition

Macronutrient-dominance influences energy density and metabolic fate. Carbohydrate foods are metabolised chiefly for ATP production, whereas proteins furnish amino acids for tissue synthesis and neurotransmitter precursors. Lipids deliver essential fatty acids (LA, ALA) and fat-soluble vitamin transport.

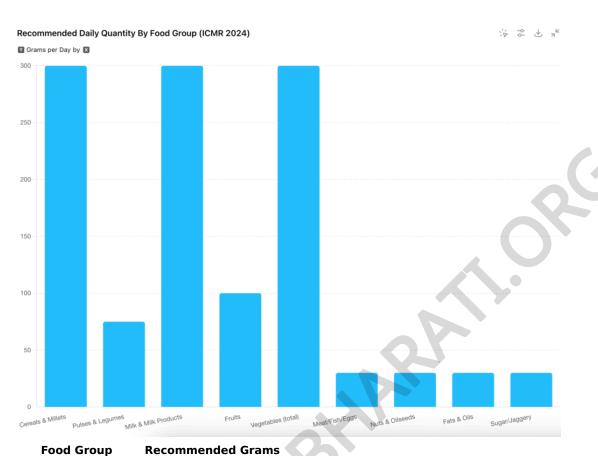
### 4.3 Physiological Function

This traditional three-way split (energy-body-building-protective) is invaluable for nutritional counselling, particularly among vulnerable groups like children and pregnant women.

### 4.4 ICMR-NIN Food-Group System

The **2024 Dietary Guidelines for Indians** translate nutrient requirements into eight richly varied groups. Half the plate is vegetables & fruit, one-third cereals/millets, with modest but vital portions of pulses, milk, nuts and animal foods.

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**Cereals & Millets** 300 **Pulses & Legumes** 75 Milk & Milk Products 300 **Fruits** 100 **Vegetables (total)** 300 Meat/Fish/Eggs 30 **Nuts & Oilseeds** 30 Fats & Oils 30 Sugar/Jaggery 30

See the interactive table above and accompanying bar chart above for gram-level recommendations for a 2000 kcal reference diet (ICMR-NIN, 2024).

# 4.5 NOVA Processing Levels

Introduced by Carlos Monteiro, NOVA focuses on the *extent and purpose* of processing rather than nutrient numbers. Level 4 ultra-processed products (soft drinks, packaged snacks) often contain cosmetic additives, have higher glycaemic load, and are linked to excess energy intake independent of macronutrient profile.

## 4.6 Perishability & Storage

Knowledge of perishability guides safe storage, reduces waste and informs preservation techniques such as refrigeration, canning, drying and irradiation. Semi-perishable cereals like wheat flour require moisture-proof containers and low humidity; perishable leafy greens demand temperatures <5 °C to retard microbial spoilage.

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# 5 · Applied Perspective

ScenarioClassification UsedUtilityDesigning a hospital menu Function + Food-groupEnsures adequate protein for wound healing (body-building) & micronutrient-dense protective foods.Disaster relief rationingPerishability + Nutrient densityEmphasis on non-perishables (rice, pulses) fortified with vitamin-mineral premixes.Public-health campaignsProcessing level"Cut back on ultra-processed snacks" resonates better than listing nutrients.

### 6 · Key Take-aways

- 1. **Food** is more than nutrients—it embodies culture, economics and psychology.
- 2. **Multiple classification lenses**—origin, chemistry, function, processing, perishability—are complementary and context-dependent.
- 3. ICMR-NIN's "My Plate for the Day" translates nutrient science into practical, culturally relevant food groupings.
- 4. The **NOVA system** reminds us that *how* food is processed matters for health outcomes, not just nutrient counts.
- 5. Understanding perishability is essential for food safety, storage economics and sustainability.

### **Self-Check Questions**

- 1. Explain how the same food (e.g., peanuts) can fall into different classes under separate classification systems.
- 2. Discuss two public-health advantages of shifting staple cereals to millets in the Indian context.
- 3. Classify the following items under NOVA and justify: a) Homemade curd b) Potato chips packet c) Raw broccoli.

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