Sampling Procedure and Control Charts

G.BHARATH,ASSISTANT PROFESSOR

FOOD TECHNOLOGY

K.S.RANGASAMY COLLEGE OF TECHNOLOGY

(Autonomous)

Defining the Population and Sample Frame

Population

Complete set of items under study, e.g., all widgets produced in a batch.

Sample Frame

List from which samples are drawn, such as production records or inventory logs.

Example

Batch of 10,000 widgets produced on Monday serves as population.

Probability Sampling Methods

Simple Random Sampling

Each item has an equal chance for selection.

Systematic Sampling

Select every kth item, e.g., every 10th widget.

Stratified Sampling

Population divided into subgroups sampled proportionally.

Cluster Sampling

Randomly select clusters from groups of items.

Example: Stratify by machine, sampling 10 widgets from each subgroup.

Non-Probability Sampling Methods

- **Convenience Sampling**
  Samples readily accessible to the inspector.
- **Judgment Sampling**
  Experts select representative items carefully.
- **Quota Sampling**
  Sample reflects known population proportions.
- **Snowball Sampling**
  Participants recruit additional ones; less relevant here.

Use with caution as bias risks are higher compared to probability sampling.

Sample Size Determination

1 **Factors Affecting Sample Size**

Variability, confidence level, and margin of error.

2 **Formulas**

n = (z*σ/E)^2 for means; n = (z^2 * p * (1-p)) / E^2 for proportions.

3 **Example**

5% margin of error, 95% confidence, sigma = 1.

4 **Tools**

Statistical software and online calculators assist selection.

Types of Control Charts

Variables Charts

X-bar and R charts for continuous measurements like diameter.

Attributes Charts

p-chart and c-chart track proportions and counts of defects.

Example

Track widget diameter and defect rates using different charts.

Example Formula

Constructing Control Charts

UCL = X-double-bar + A2 * R-bar; LCL = X-double-bar - A2 * R-bar for X-bar chart.

Center Line

Calculate mean or proportion as chart's base.

Control Limits

Compute upper and lower limits, usually ±3 standard deviations.

Interpreting Control Charts

Actionable Signals

Points outside control limits indicate out-of-control process.

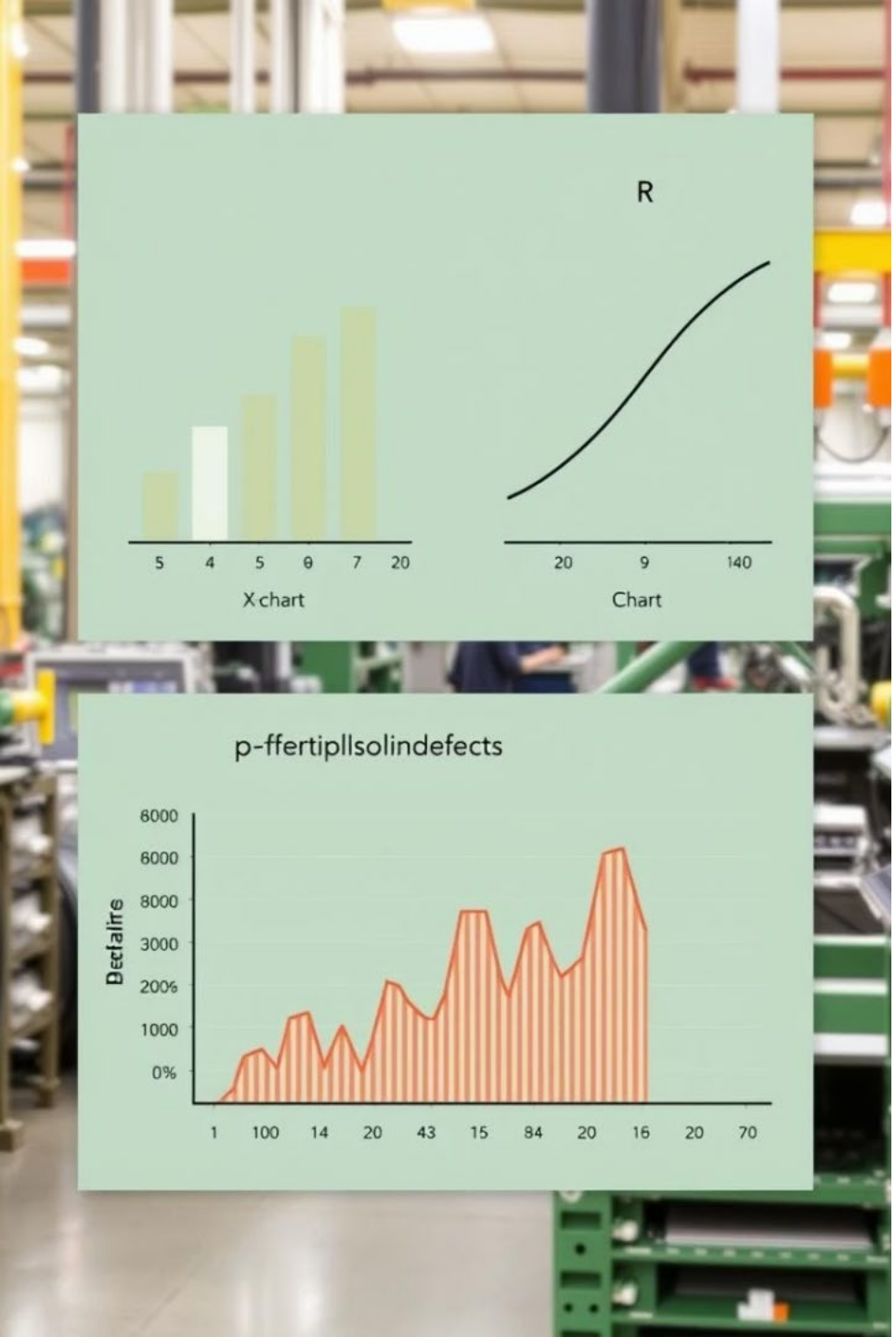
Trends and Patterns

Sequences or cycles may show systematic variation.

Run Tests

Identifies non-random patterns requiring investigation.

Eliminate assignable causes to restore process control.



Control Chart Examples

X-bar and R Chart

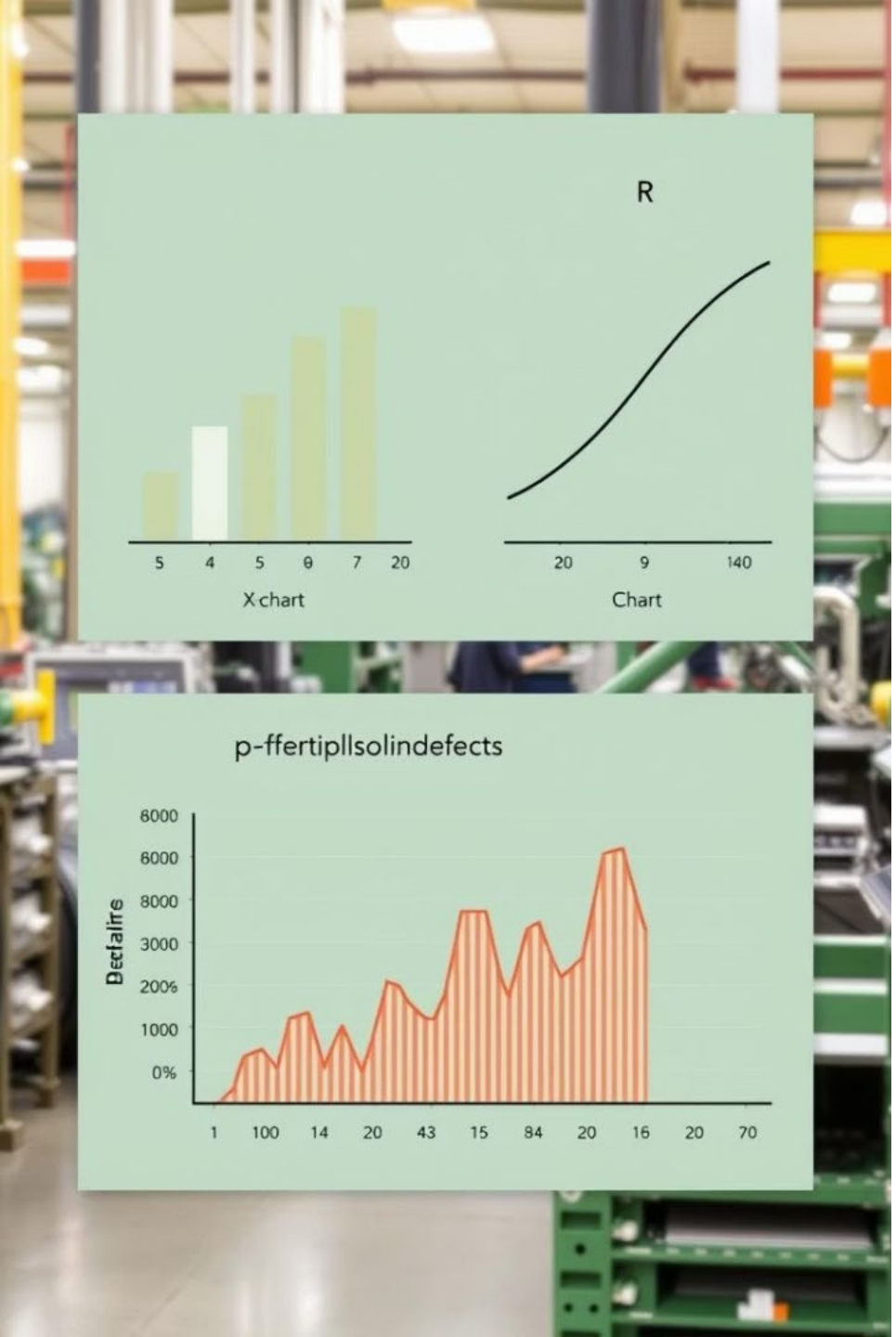
Shows increasing trend in widget diameter over time.

P-Chart Spike

Sudden rise in defective rate after machine maintenance.

Corrective Actions

Adjustments post-maintenance resulted in defect reduction.



Control Chart Examples

X-bar and R Chart

Shows increasing trend in widget diameter over time.

P-Chart Spike

Sudden rise in defective rate after machine maintenance.

Corrective Actions

Adjustments post-maintenance resulted in defect reduction.

Thank You !

K.S.RANGASAMY COLLEGE OF TECHNOLOGY

(Autonomous)

Tiruchengode - 637 215. Namakkal Dt. Tamil Nadu. India

www.ksrct.ac.in

/ksrct1994

Formulated Foods: Dietary and Therapeutic Applications

G.BHARATH,ASSISTANT PROFESSOR

FOOD TECHNOLOGY

K.S.RANGASAMY COLLEGE OF TECHNOLOGY

(Autonomous)

Formulated Foods: Dietary and Therapeutic Applications

Formulated foods are designed to precisely meet nutritional needs. They play a key role in health by addressing dietary gaps and aiding medical treatments across various populations and conditions.

What are Formulated Foods?

Engineered Profiles

Foods designed with balanced macronutrients for specific requirements.

Enhanced Nutrients

Includes vitamins, minerals, and bioactive compounds for health benefits.

Optimized Texture and Taste

Texture and flavor modified for better digestibility and acceptance.

The Science of Formulation

Lifespan Nutrient Needs

Formulations based on Dietary Reference Intakes and Recommended Dietary Allowances.

Bioavailability Focus

Maximizing absorption and metabolism of nutrients.

Processing Techniques

Using emulsification and encapsulation for nutrient stability.

Shelf-Life Optimization

Ensuring product stability during storage and us

Formulated Foods in Specific Diets

Infant Formulas

Nutrition tailored for newborn growth and development.

Gluten-Free Foods

Support celiac disease and gluten sensitivity management.

Vegan/Vegetarian Options

Ensure adequate protein and micronutrient intake without animal products.

Sports Nutrition

Enhance athletic performance, recovery, and endurance.

Infant Formulas: A Closer Look

Types

- Cow's milk-based
- Soy-based
- Hypoallergenic

Essential Nutrients

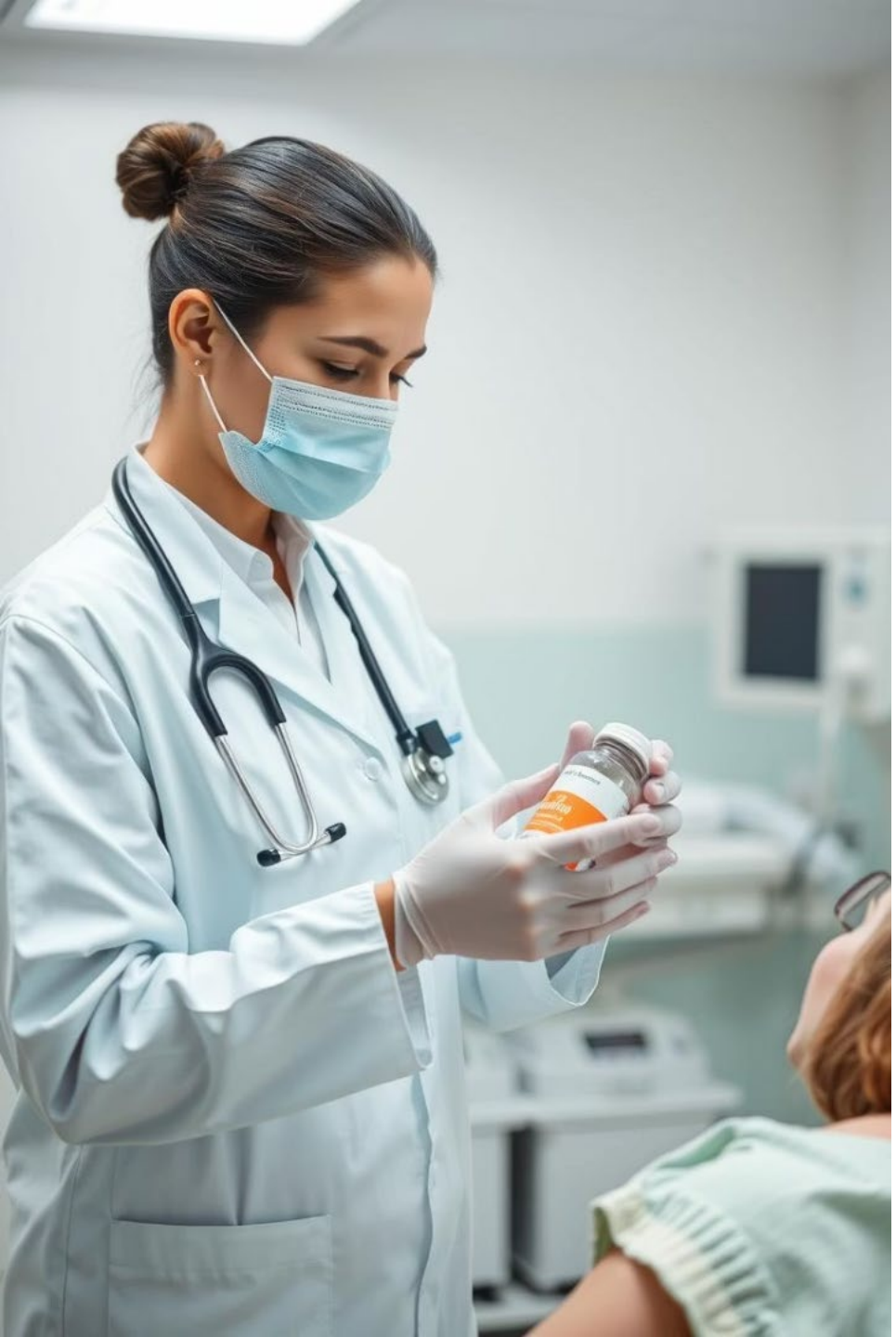
- DHA and ARA fatty acids
- Prebiotics for gut health

Regulation

FDA oversight under 21 CFR Part 107 ensures safety.

Market

Global value exceeds $25 billion, growing 5% annually.



Therapeutic Uses: Medical Foods

Definition

Formulated for specific dietary management of diseases.

Examples

- PKU formulas for phenylketonuria
- Renal formulas for kidney disease
- Diabetic formulas for glucose control

Supervision

Used under medical guidance for safety and efficacy.

Enteral and Parenteral Nutrition

Enteral Nutrition

Nutrients delivered directly to the gastrointestinal tract.

- Used when oral intake is insufficient but GI tract is functional

Parenteral Nutrition

Nutrients delivered intravenously, bypassing the GI tract.

- Used in bowel obstruction, malabsorption, or severe malnutrition

Market Size

Estimated over $8 billion annually worldwide.

Disease-Specific Formulations

Diabetes

Low glycemic index formulas to control blood sugar.

Renal Disease

Manage electrolytes with low phosphorus and potassium con

Cancer

High protein, high calorie formulas to support treatment.

Inflammatory Bowel Disease

Elemental diets to ease malabsorption and reduce inflamma

The Future of Formulated Foods

Personalized Nutrition

Custom formulations based on genetics and lifestyle.

Ingredient Innovation

Novel proteins, prebiotics, and probiotics improve health.

3D Food Printing

Custom textures and nutrient profiles for individual needs.

Challenges and Considerations

Regulation

Complex rules require careful compliance and clear labeling.

Consumer Acceptance

Trust and perception impact market success.

Cost & Accessibility

Pricing often limits reach, especially in low-income groups.

Ethical Issues

Infant formula marketing raises concerns about influence on breastfeeding.

Thank You !

K.S.RANGASAMY COLLEGE OF TECHNOLOGY

(Autonomous)

Tiruchengode - 637 215. Namakkal Dt. Tamil Nadu. India

www.ksrct.ac.in

/ksrct1994

WORLD TRADE ORDER:FUNCTIONING AND CODEX

G.BHARATH,ASSISTANT PROFESSOR

FOOD TECHNOLOGY

K.S.RANGASAMY COLLEGE OF TECHNOLOGY

(Autonomous)

What is the World Trade Order?

Established 1995

Consists of 164 member states governing international trade

Core Principles

- Non-discrimination
- Transparency
- Free trade

Key Agreements

- GATT
- GATS
- TRIPS

WTO's Role in Food Trade

SPS Agreement

Sanitary and phytosanitary measures to protect health

TBT Agreement

Technical barriers to trade ensuring product standards

Dispute Settlement

Resolves trade conflicts among member countries

Codex Alimentarius: The Food Code

Established 1963

Jointly by FAO and WHO for international food standards

Scope of Standards

- Hygiene
- Additives
- Contaminants
- Labeling

Purpose

Protect consumer health and promote fair trade practic

Key Principles of Codex

Science-Based

Standards rely on scientific evidence and research

Risk Assessment

Evaluates potential health impacts before setting standards

Transparency

Stakeholders participate in decision-making processes

Consensus-Driven

Decisions made by agreement among member countries

How Codex Standards Are Developed

- Proposal
  - Initiate new standards based on need or issues
- Preparation & Circulation
  - Draft standards circulated for member review
- Comments & Adoption
  - Gather feedback and finalize through consensus
- Committees
  - Eight committees cover specific food areas and requirements

Codex & WTO: A Symbiotic Relationship

WTO Recognition

Codex standards are official benchmarks for food safety

Compliance Benefits

Following Codex implies adherence to SPS measures

Trade Facilitation

Reduces technical barriers and eases food product trade

Case Study: Aflatoxins in Peanuts

Codex Standard

Limit aflatoxins to 15 µg/kg total in peanuts

EU Stricter Limits

4 µg/kg limit poses import restrictions

Trade Disputes

Efforts underway to harmonize and ease trade barriers

Challenges and Criticisms

- **Capacity Gaps**
  Developing countries struggle to implement Codex standards
- **Industry Influence**
  Concerns about corporate impact on decision-making
- **Need for Inclusivity**
  More transparency and participation required

Thank You !

K.S.RANGASAMY COLLEGE OF TECHNOLOGY

(Autonomous)

Tiruchengode - 637 215. Namakkal Dt. Tamil Nadu. India

www.ksrct.ac.in

/ksrct1994

Formulated Foods: Dietary and Therapeutic Applications

G.BHARATH,ASSISTANT PROFESSOR

FOOD TECHNOLOGY

K.S.RANGASAMY COLLEGE OF TECHNOLOGY

(Autonomous)

Formulated Foods: Dietary and Therapeutic Applications

Formulated foods are designed to precisely meet nutritional needs. They play a key role in health by addressing dietary gaps and aiding medical treatments across various populations and conditions.

What are Formulated Foods?

Engineered Profiles

Foods designed with balanced macronutrients for specific requirements.

Enhanced Nutrients

Includes vitamins, minerals, and bioactive compounds for health benefits.

Optimized Texture and Taste

Texture and flavor modified for better digestibility and acceptance.

The Science of Formulation

Lifespan Nutrient Needs

Formulations based on Dietary Reference Intakes and Recommended Dietary Allowances.

Bioavailability Focus

Maximizing absorption and metabolism of nutrients.

Processing Techniques

Using emulsification and encapsulation for nutrient stability.

Shelf-Life Optimization

Ensuring product stability during storage and us

Formulated Foods in Specific Diets

Infant Formulas

Nutrition tailored for newborn growth and development.

Gluten-Free Foods

Support celiac disease and gluten sensitivity management.

Vegan/Vegetarian Options

Ensure adequate protein and micronutrient intake without animal products.

Sports Nutrition

Enhance athletic performance, recovery, and endurance.

Infant Formulas: A Closer Look

Types

- Cow's milk-based
- Soy-based
- Hypoallergenic

Essential Nutrients

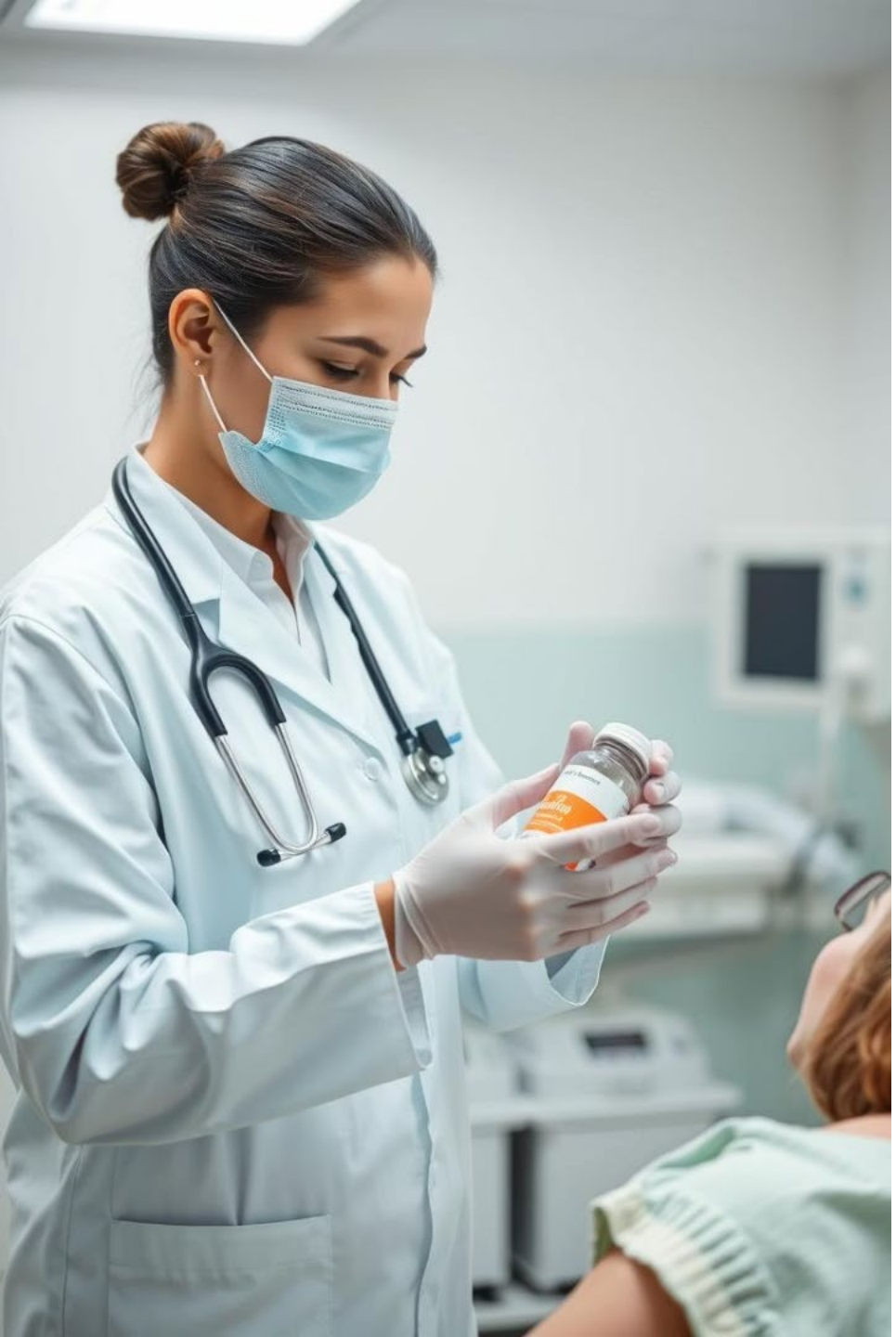
- DHA and ARA fatty acids
- Prebiotics for gut health

Regulation

FDA oversight under 21 CFR Part 107 ensures safety.

Market

Global value exceeds $25 billion, growing 5% annually.



Therapeutic Uses: Medical Foods

Definition

Formulated for specific dietary management of diseases.

Examples

- PKU formulas for phenylketonuria
- Renal formulas for kidney disease
- Diabetic formulas for glucose control

Supervision

Used under medical guidance for safety and efficacy.

Enteral and Parenteral Nutrition

Enteral Nutrition

Nutrients delivered directly to the gastrointestinal tract.

- Used when oral intake is insufficient but GI tract is functional

Parenteral Nutrition

Nutrients delivered intravenously, bypassing the GI tract.

- Used in bowel obstruction, malabsorption, or severe malnutrition

Market Size

Estimated over $8 billion annually worldwide.

Disease-Specific Formulations

Diabetes

Low glycemic index formulas to control blood sugar.

Renal Disease

Manage electrolytes with low phosphorus and potassium con

Cancer

High protein, high calorie formulas to support treatment.

Inflammatory Bowel Disease

Elemental diets to ease malabsorption and reduce inflamma

The Future of Formulated Foods

Personalized Nutrition

Custom formulations based on genetics and lifestyle.

Ingredient Innovation

Novel proteins, prebiotics, and probiotics improve health.

3D Food Printing

Custom textures and nutrient profiles for individual needs.

Challenges and Considerations

- **Regulation**
  Complex rules require careful compliance and clear labeling.
- **Consumer Acceptance**
  Trust and perception impact market success.
- **Cost & Accessibility**
  Pricing often limits reach, especially in low-income groups.
- **Ethical Issues**
  Infant formula marketing raises concerns about influence on breastfeeding.

Thank You !

K.S.RANGASAMY COLLEGE OF TECHNOLOGY

(Autonomous)

Tiruchengode - 637 215. Namakkal Dt. Tamil Nadu. India

www.ksrct.ac.in

/ksrct1994