Product Testing
Types of Tests

• Chemical
  – Food composition
  – Food quality/stability
  – Food safety

• Microbiological – pathogens and spoilage

• Physical
  – Structure
  – Functionality
Chemical Tests – General Compositional

- Proximate analysis (Moisture, crude lipid, total ash, protein nitrogen). May also include (crude) rather than total dietary fiber
- Calculate total carbohydrate (sometimes measure simple sugars separately)
- Calculate total calories
Chemical Tests – Nutrient Content

• Nutrient analysis - vitamins and minerals.
• Total dietary fiber,
• Total fat & fatty acid profile (PUFA, saturated fat, trans fatty acids)
• Cholesterol
• Calories per serving (4-carbs 4-protein 9-fat)
• Calories from fat
• Amount of:
  fat  saturated fat
  trans fat
  cholesterol
  sodium
  total carbohydrate, dietary fiber, sugar
  protein
  vitamin A  vitamin C
  calcium  iron
• Vitamins required or permitted in standardized food
  • e.g. thiamin, riboflavin, niacin in enriched flour
  • Folate in enriched foods (health claims)
Voluntary components

- PUFA
- MUFA
- Potassium
- Soluble fiber
- Insoluble fiber
- Sugar alcohol
- Other carbohydrate
Voluntary components

- Vitamin D, E, K
- Thiamin
- Riboflavin
- Niacin
- B6
- Folate
- B12
- Biotin
- Pantothenic acid
- Phosphorus
- Iodine
- Magnesium
- Zinc
- Selenium
- Copper
- Manganese
- Chromium
- Molybdenum
- Chloride
Chemical Tests – Food Safety

- Toxicological (natural toxins – aflatoxin, patulin)
- Heavy metals (lead, mercury)
- Pesticide residues
- Dioxin
Food Quality Analyses

- pH (also food safety)
- Flavor attributes (sugar, flavor, enhancers)
- Bioactive components
- Stability – oxidative stability/rancidity
  - Browning
  - Water activity/hydroscopic tendencies
Microbiological

- Total aerobic plate counts
- Yeast and mold
- Pathogens
- Spore germination and survival
- Process validation (thermal and high pressure processes)
Physical Tests

- Functional properties – spread, flow/resistance to flow, volume displacement
- Osmotic pressure (freezing point depression)
- Cell/tissue structure – microscopy (SEM)
- Force/deformation tests
  - Rheological tests – viscosity
  - Amylograph – change in viscosity with time and temperature
  - Texture analysis – puncture, shear, compression