# FDE 418
# FOOD QUALITY CONTROL
# LESSON-9

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# Food Color and Measurement Techniques

# Color

- ✓ How is the quality of food products measured ?
  - ➢ Different parameters for the collection of data
  - ➢ Color, texture, taste, and smell….
- ✓ Measuring color quality in food goes far beyond what the human eye perceives
- ✓ Color is the first characteristic that consumers rely on when testing quality of their food products
  - ➢ Sensory color analysis
  - ➢ Quantitative color analysis

# Color measurement

- ✓ A quick color check can help detect chemical and biologic process issues including;
  - pH levels
  - temperature variation
  - food color content
  - irradiation
  - refrigeration

# Factors affecting color

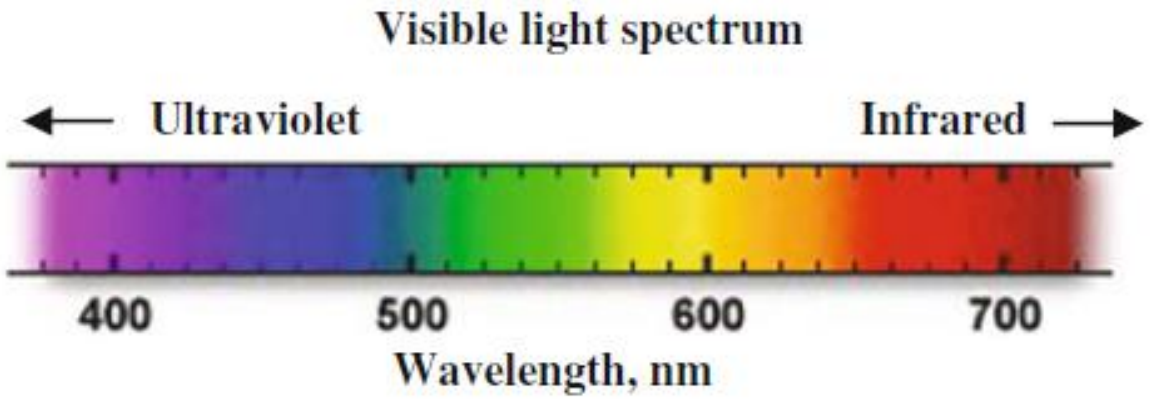
- ✓ Chemical composition
- ✓ Effect of lighting
  - ✓ *Correlated Color Temperature*
  - ✓ Warm white
  - ✓ Neutral white
  - ✓ Cool white
- ✓ *Color rendering index*

# Factors affecting color

- ***Color rendering index (CRI):*** the most useful measure of a light source's color characteristics
- A measure of a light source's ability to show object colors "realistically" or "naturally" compared to a familiar reference source, either incandescent light or daylight
- The closer a light source’s temperature is to 0 the oranger the light will look
- Closer to 10,000 will give a bluer cast

# Color

- ✓ Color can be defined as ‘’the element of art that is produced when light, striking an object, is reflected back to the eye’’
- ✓ Light is the basic stimulus of colors
- ✓ Visible light forms only a small part of the electromagnetic spectrum, with a spectral range from approximately 390 nm (violet) to 750 nm (red)



# Color measurement

✓Color can be measured instrumentally with colorimeters and spectrophotometers

✓The difference between spectrophotometers and colorimeters is :

- Spectrophotometer measures intensity of light through the completely visible spectrum
- Colorimeters are very useful in the quality control of foods, and give results normally correlated with visual measurements

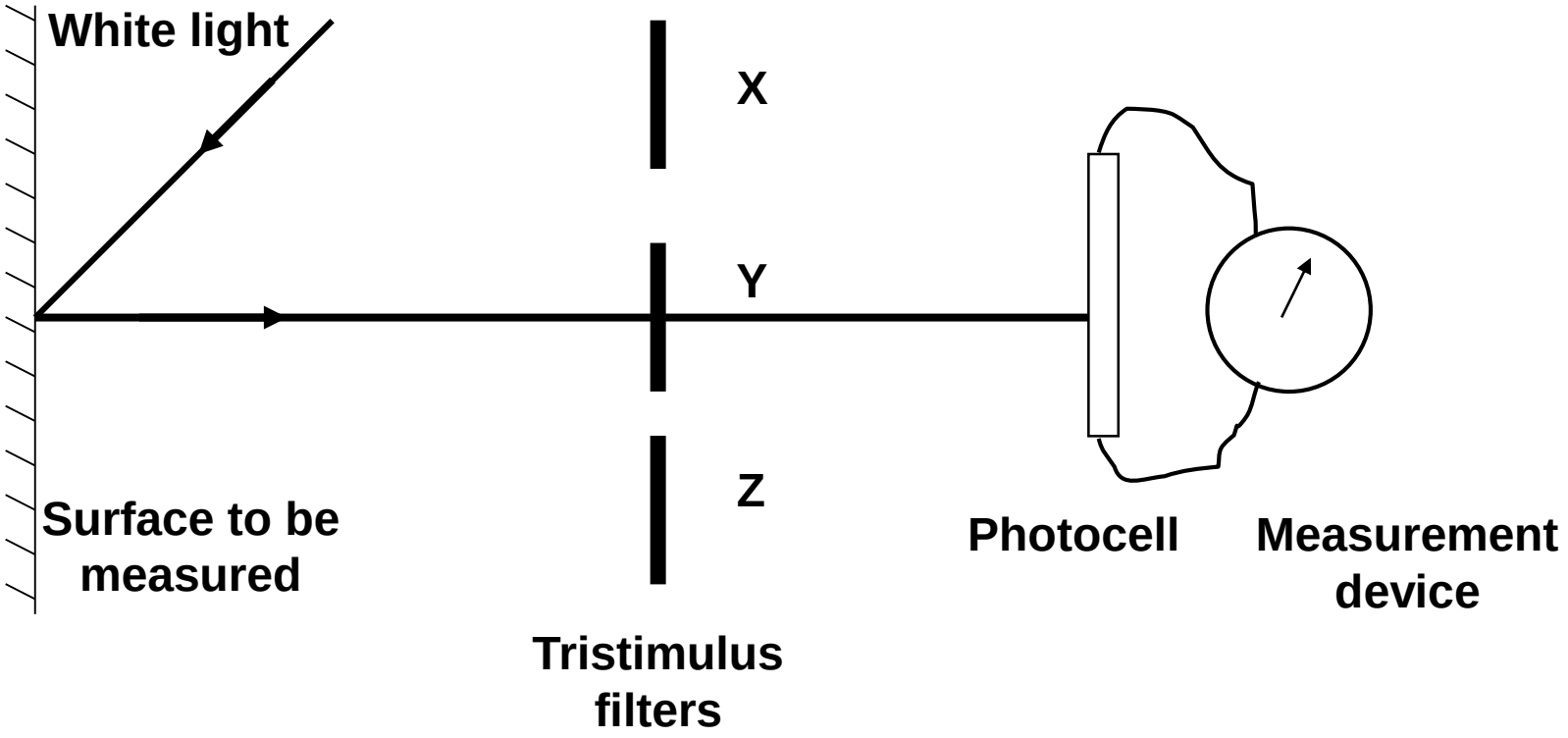
CM-3500d Spectrophotometer

CR-400 Series Colorimeter

# Tristimulus colorimeter

- ✓ Light source
- ✓ 3 glass filters (X, Y, Z )
- ✓ Photocell

# Essential components of Tristimulus colorimeter



# Color

- ✓ Each color has its own distinct appearance, based on three elements:
  - ✓ **Hue, chroma and value (lightness)**
- ✓ **Hue:** How we perceive an object's color— red, orange, green, blue, etc.
- ✓ **Chroma:** also is known as ''***saturation***''
- ✓ **Lightness:** The luminous intensity of a color — i.e., its degree of lightness — is called its ***value.*** Colors can be classified as light or dark when comparing their value

# Expressing Colors Numerically

## CIELAB (L*a*b*)

- ✓ When a color is expressed in CIELAB,
  - ✓ L* denotes lightness
  - ✓ a* denotes the red/green value
  - ✓ b* denotes the yellow/blue value

# Importance of Food Color Measurement Data

- ✓ To address a number of quality control standards in the food production industry
- ✓ To evaluate the quality of raw agricultural ingredients
- ✓ Determine batch to batch variations
- ✓ To monitor storage conditions, temperature changes during baking or roasting, and other changes during processing