In food science and nutrition, **intrinsic** and **extrinsic parameters** refer to the factors that affect the **growth of microorganisms** (like bacteria, yeast, and mold) and the **preservation** or **safety** of food. These parameters are crucial in food storage, shelf-life, processing, and safety control.

Here's a breakdown of both:

□ Intrinsic Parameters

These are **natural characteristics of the food itself** that influence microbial growth.

1. **pH**
   - Affects acidity or alkalinity.
   - Low pH (acidic) inhibits many microbes (e.g., citrus fruits).
2. **Moisture Content (Water Activity, *aw*)**
   - Microorganisms need water to grow.
   - Drier foods (low *aw*) have longer shelf life (e.g., dried fruits, jerky).
3. **Nutrient Content**
   - Availability of proteins, carbs, fats, vitamins.
   - Foods rich in nutrients (like meats or dairy) support more microbial growth.
4. **Redox Potential (Eh)**
   - Measure of how oxidizing or reducing the environment is.
   - Aerobic vs. anaerobic microbial activity depends on this.
5. **Natural Antimicrobials**
   - Some foods contain natural compounds that inhibit microbes (e.g., garlic, onion, spices, cranberries).
6. **Biological Structures**
   - Natural barriers like shells, peels, skins (e.g., egg shells, orange peels) help protect from contamination.

□ Extrinsic Parameters

These are **external environmental factors** that can be controlled during storage or processing.

1. **Temperature**
   - Cold storage slows microbial growth.
   - Heat (like pasteurization) kills microbes.
2. **Relative Humidity (RH)**
   - Affects water activity on the food surface.
   - High RH can lead to mold growth on dry foods.
3. **Atmosphere (Oxygen Levels)**
   - Modified Atmosphere Packaging (MAP) can limit oxygen to slow down spoilage.
   - Vacuum packaging is a good example.
4. **Time**

- How long the food is exposed to specific conditions matters.
- Longer time in the danger zone (4–60°C / 40–140°F) = more microbial growth.

5. **Presence of Competing Micro flora**
   - Some beneficial microbes (like in fermented foods) can suppress harmful ones.

In Summary:

Parameter Type	Examples	Can Be Controlled?
Intrinsic	pH, water activity, nutrients	Harder to change
Extrinsic	Temp, humidity, packaging	Easier to manage