

Paper No.: 03

Paper Title: FOOD MICROBIOLOGY

Module – 06: Extrinsic factors affecting microbial growth and survival in foods



CONTENTS

1. Introduction

2. Extrinsic Factors

2.1 Storage temperature

2.2 Relative humidity

2.3 Gases

2.4. Activities of other microorganisms



INTRODUCTION

The ability of microorganisms to grow or multiply in a food is determined by the food environment as well as the environment where the food is stored.

- 1. Intrinsic factors :** Factors related to the food itself like nutrients, water activity, pH, redox potential etc.
- 2. Extrinsic factors:** Factors in the environment and external to the food, which affect both the microorganisms and the food itself during processing and storage.

Extrinsic factors include:

- Storage temperature
- Relative humidity
- Gases and
- Activities of other microorganisms



EXTRINSIC FACTORS

Extrinsic factors important in microbial growth in a food include the environmental conditions in which it is stored .

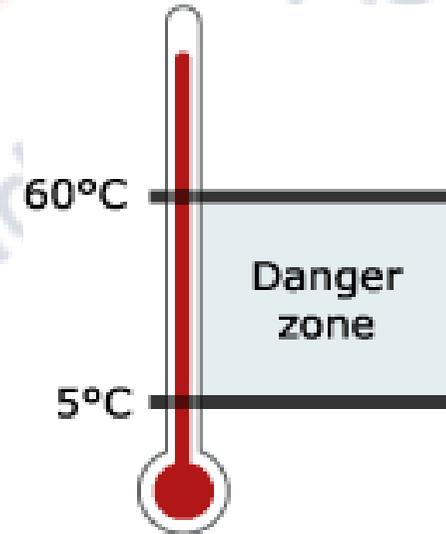
These include :

- ❑ Storage temperature
- ❑ Relative humidity
- ❑ Gases and
- ❑ Activities of other microorganisms



STORAGE TEMPERATURE

- ❑ Foods are exposed to different temperatures from time of production until the time of consumption.
- ❑ Microbial growth is accomplished through enzymatic reactions which is depended on temperature.
- ❑ Microbial Groups: Psychrophiles, Mesophiles and Thermophiles
- ❑ Every 10°C rise doubles the catalytic rate of enzyme and every 10°C decrease reduces it to half.



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RELATIVE HUMIDITY

- Relative humidity is a measure of water activity of the gas phase.
- High RH influence the water content of food and high water content promote microbial growth.
- When food stored in high relative humidity, dormant spores of bacteria or fungi to germinate.
- Once they are actively growing, they produce water as an end product of respiration.
- Hence they increase the water activity of their own, this favors the growth of high water activity requiring bacteria and increase in spoilage of food.
- Therefore, dry conditions are considered better for food storage as than moist conditions.



GASES

Presence or absence of gases affects microbial affects type of microbial populations.

- ❑ Carbon dioxide regulates cell growth of certain bacteria.
- ❑ If partial pressure of carbon dioxide increases over a critical level, metabolic activity will be retarded.
- ❑ Delaying effect of Carbon dioxide increases with increase in concentrations.
- ❑ Carbon dioxide is used in packaging of some food items in order to control the growth of microbes.



ACTIVITIES OF OTHER MICROORGANISMS

Presence or absence of other microbes affects microbial type of microbial populations.

- Microbial competition in food.
- Some microbes produces antimicrobial substances such as antibiotics, organic acids, alcohol, bacteriocins.
- Those metabolites inhibit the growth of other microbes.

THANK YOU