JUST AGRICULTURE
multidisciplinary e-Newsletter

Fruit Microbiology in Fruits and Vegetables

Ashwini Chandanlal Uikey*, Bhavna[1]and Mrinalini Uikey[2]
*Research scholar Dept. of Horticulture (Fruit Science), College of Agriculture, RVSKVV- Gwalior
*Scholar Dept. of Horticulture (Vegetable Science), College of Agriculture, RVSKVV- Gwalior
*Scholar Dept. of Agronomy, College of Agriculture, PDKV-Akola

ARTICLE ID: 21

Abstract

Food microbiology studies the role of microorganisms in food. This includes aspects of the microbial ecology of foods and the use of microorganisms in the preparation of ingredients and foods. In addition, some microorganisms are a major challenge for public health because they can cause disease. The purpose of food preservation is to prevent spoilage and growth of pathogenic microorganisms and to prevent their growth, ensuring shelf life and health. Consequently, the food industry, governments and society have made continuous efforts to improve statistical sampling and microbiological methods to understand the mechanisms that influence the fate of microorganisms in food. It focuses on understanding how microbes interact with food and how this affects food quality, safety and shelf life. They play a key role in the food industry as food safety inspectors. Food microbiologists ensure that products meet government health and safety standards. Microbiology is important for food safety, production, processing, preservation and storage. Microbes such as bacteria, molds and yeasts are used to make food and food ingredients such as wine, beer, bakery and dairy products. Majority of the microorganisms in vegetables are saprophytes, such as lactic acid bacteria, coryniforms, coliforms, micrococci, spore-formers, and pseudomonas, which may be from the air, soil, and water. The natural acidity of the majority of fruits also acts as a barrier against many spoilage microorganisms, particularly bacteria. On the other hand, spoilage fungal species, which tend to be more abundant and produce more extracellular deolymerases, attack and spoil fruits and vegetables. For thousands of years, humans have used various physical methods of microbial control for food preservation. Common control methods include the application of high temperatures, radiation, filtration, and desiccation (drying), among others.

Keywords: Food Microbiology. Microbial, acidity, preservation, spoil, fruits & vegetables.

Introduction

JUST AGRICULTURE
multidisciplinary e-Newsletter

Microbiology is important to food safety, production, processing, preservation, and storage. Microbes such as bacteria, molds, and yeasts are employed for the foods production and food ingredients such as production of wine, beer, bakery, and dairy products. Food microbiology is the study of the microorganisms that inhabit, produce or contaminate food. Its purpose is based on detecting and determining the germ content, minimizing the risks of contamination and preventing outbreaks of food borne diseases. Food microbiology focuses on the general biology of the microorganisms that are found in foods including: their growth characteristics, identification, and pathogenesis. Specifically, areas of interest which concern food microbiology are food poisoning, food spoilage, food preservation, and food legislation. Louis Pasteur (1822-1895) was a French biologist who is often regarded as the father of modern microbiology because of his many contributions to science.

What is Food Microbiology and its scope?

Food microbiology is a branch of microbiology that studies a variety of microorganisms involved in the spoilage of food, manufacture of food, and transmission of diseases via food. Food microbiology focuses on the general biology of the microorganisms that are found in foods including: their growth characteristics, identification, and pathogenesis. Specifically, areas of interest which concern food microbiology are food poisoning, food spoilage, food preservation, and food legislation. Food safety is an important part of food microbiology as food continues to act as a mode of transmission of various infectious agents.

Food Microbiology in Fruits

JUST AGRICULTURE
multidisciplinary e-Newsletter

Various groups of bacteria have ability to grow on fruits and its juices. Bacteria are diverse in their metabolism row on fruit and produce different compounds. The main group of bacteria involved are: lactic acid bacteria.

Factors influencing fruit spoilage.

Spoilage of fruits occurs due to various physical and chemical damages, enzymatic digestion, but most significantly due to microbial activity. The spoilage of fruits due to microbial activity initiates when spoilage microorganisms invade the fruit.

There are various factors which are responsible for food spoilage such as bacteria, mould, yeast, moisture, light, temperature, and chemical reaction.

- Bacteria. They are the most abundant microorganisms found on the earth
- Protozoa
- Fungi
- Temperature
- Freezing
- Boiling
- Salting
- Sweetening

Causes of Spoilage

The food and water may be infected by germs. Flies carry germs. When they sit on our food, they pass on these germs to our food. There are various factors which are responsible for food spoilage such as bacteria, mould, yeast, moisture, light, temperature, and chemical reaction.

1. Bacteria

They are the most abundant microorganisms found on the earth. They are tiny in size and vary in shape. Some bacteria are useful also. They help to convert milk into curd.

Bacteria growth (Source: femininetouchblog)

JUST AGRICULTURE
multidisciplinary e-Newsletter

2. Protozoa

They are single-celled microorganisms that cause disease like food poisoning etc.

3. Fungi

They are found in damp and warm places and grow on the dead and rotting matter.

Fungi (Source: sciencedaily)

4. Temperature

Temperature is one of the major factors which is responsible for food spoilage. Grapes, apples and peaches house a greater variety of bacteria than vegetables.

Food Microbiology in Vegetables

The main causes include air, moisture, light, temperature, and microbial growth. Mostly, vegetables rot easily due to microbial damage. Microorganisms such as bacteria, yeast, and molds require water and nutrients for growth, energy, and reproduction.

The types of deterioration can include:

- Loss of Moisture.
- Loss of Stored Energy, e.g. Carbohydrates.
- Loss of Other Foods, e.g. Vitamins.
- Loss in Quality from Physiological Disorders.
- Changes in Texture, e.g. Softening.
- Physical losses through pest and disease attack.
- Fibre development.

JUST AGRICULTURE
multidisciplinary e-Newsletter



What are the effects of spoilage on fruits and vegetables?

Spoilage is any change occurring in fruits and vegetables, making them inedible for human. This change can be both safety and quality related. Microbiological quality changes in fruits and vegetables relate to color, flavor, texture, and aroma.

Management of Food Microbiology in Fruits & Vegetables:

The management of temperature, ventilation, and relative humidity are the three most important factors that affect postharvest quality and storage life of horticultural produce. Some fruits and vegetables turn brown when damaged or when their cut surfaces are exposed to air due to the presence of the enzymes phenolase, peroxidase and polyphenol oxidase. Their actions can be easily controlled by regulating the temperature and excluding moisture and air.