Bacteria's Role in Food

Summary
Information about microorganisms and their role in food biotechnology and food microbiology.

Main Core Tie

Food Science
Strand 4

Background for Teachers

Microorganisms - (Source: FOOD SCIENCE, SAFETY AND NUTRITION Curriculum Guide: National FFA Foundation, Unit 4.) Just what are microorganisms? They are small, living forms of life which cannot be seen with the naked eye. Bacteria, yeasts, and molds are three common types of microorganisms. People often confuse and, almost always, misunderstand functions of microorganisms which are just as real and alive as students are in a classroom. Microorganisms eat and grow; they reproduce and die.

Bacteria, yeasts, and molds can be found everywhere. Scientists have gathered them from clouds above mountain tops and in the deepest parts of the ocean. They are present on animals, people, floors, doorknobs, and even in the air we breathe.

How small are microorganisms? Molds can be seen with only slight magnification and the use of an ordinary magnifying glass. Yeasts must be viewed through a microscope that magnifies several hundred times. Bacteria can best be seen when studied with a more powerful microscope that enlarges at least 1,000 times.

A microscope capable of magnifying 500 times must be used in order to see a single bacterial cell. However, if that cell is allowed to grow on suitable food or solid media, it will reproduce rapidly into a colony consisting of millions of cells. The colony is visible to the naked eye.

Microorganisms have a direct impact on our daily lives. Some are helpful. They aid our bodily processes by helping to break down complex foods into simpler substances.

Intended Learning Outcomes

Microorganisms affect quality, safety, production, processing, and utilization of food and food products.

Instructional Procedures

See attachments below:
The students will do a PREASSESSMENT to determine their current knowledge about three main types of microorganisms. The teacher will introduce the use of scientific equipment such as: microscopes, balance beam scales, pick glasses and slides, petri dishes, etc. The students will grow bacteria cultures on agar in petri dishes and do a plate count:
a. Use the BACTERIAL GROWTH ACTIVITY and the proper equipment.
b. Use the CHEC module FOOD PROCESSING TECHNICIAN 20 available from: CHEC Systems, Inc.
1740 North Research Parkway
Utah State University Research Park
P. O. Box 4206
Logan, Utah 84323-4206
The students will participate in a YOGURT-making lab to show HOW BACTERIA PRODUCE LACTIC ACID.

The students will prepare an Oriental dish using mushrooms, rice, vegetables, vinegar, sugar, and soy sauce. (See: ORIENTAL RECIPES.) The recipes provided in the resource materials are only a suggestion. The teacher may use any recipe of choice provided that it contains the food items listed. After preparing the dish, they will complete a worksheet (ORIENTAL RECIPES WORKSHEET) and identify examples of fungi, food fermentation, and the role of microorganisms in the dish prepared. The students will participate in a BACTERIAL FERMENTATION TASTING LAB by making REUBEN SANDWICHES. Note that the sauerkraut, pickle, and olives all involve bacteria in the process of fermentation that produce their special flavors.

If possible, tour a cheese-making factory or let students sample different cheeses and discuss the role of bacteria in cheese making.

As an enrichment activity, the students will investigate and report on jobs, careers, and professions built around microorganisms in our lives. Examples are: bacteriologist, food processing technician, food safety inspector, County Board of Health, etc. The students will participate in a SUMMATIVE EVALUATION - SURVEY A SUPERMARKET to identify ten different types of foods that use fermentation in their productions.

Assessment Plan

The students will participate in a summative evaluation by working in pairs to reflect upon and identify the new concepts learned in this unit.

NOTE TO TEACHER: This should be pass/fail, and all answers are acceptable as each student probably has a different background.

Authors

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