bacteria, seafood and you

COOPERATIVE EXTENSION SERVICE

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SEAGRANT

Bacteria, Seafood and You

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What are bacteria? Where are they found? How do they grow? Why are some hazardous and some not? Why are food inspectors concerned about them? How can they be controlled?

You, as a food handler in a seafood processing plant, should be concerned with these questions. You need to know what bacteria are, how they contaminate food and what you can do to keep bacteria out of foods so your plant will have a high quality product at all times.

The purpose of this bulletin is to help you understand bacteria and what they can do to the seafood in your plant.

Bacteria are extremely small, one-celled organisms. We often hear the word "germs" used to describe bacteria, but a better word is "microorganisms." Besides bacteria, there are other kinds of microorganisms; they are:

1. MOLDS
2. YEASTS
3. VIRUSES

Since bacteria are the microorganisms of major concern in a seafood plant, this bulletin is about bacteria; however, many of the principles discussed are true for the other microorganisms.

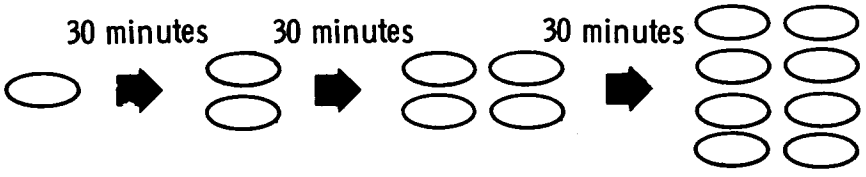
Some Important Facts About Bacteria

An individual bacterium is so small it is impossible to see without the aid of a microscope. In fact, it may take 25,000 bacteria, placed end to end, to extend just one inch.

In addition to being small, bacteria are almost everywhere. In food plants, they are not only found on equipment, utensils, clothing and raw materials, but they are also found on and in you. Yes, you! On your hands, your face—in fact, every part of your body has bacteria.

Most bacteria can reproduce very rapidly. Some can duplicate themselves every 20 minutes under the right conditions.

Let's look at what this means. Let's say that we start with only one bacterium in a food. The food and its temperature are ideal for the bacteria to grow. Under these conditions, this bacterium—as well as its offspring—could be expected to reproduce every 30 minutes. At this rate, after 30 minutes, there would be two bacteria; after one hour, there would be four; after an hour and a half there would be eight, and so on.



Up to this point, the growth does not seem unusually fast; however, if this same growth rate were allowed to continue, there would be more than one billion bacteria after 15 hours! And all from one bacterium.

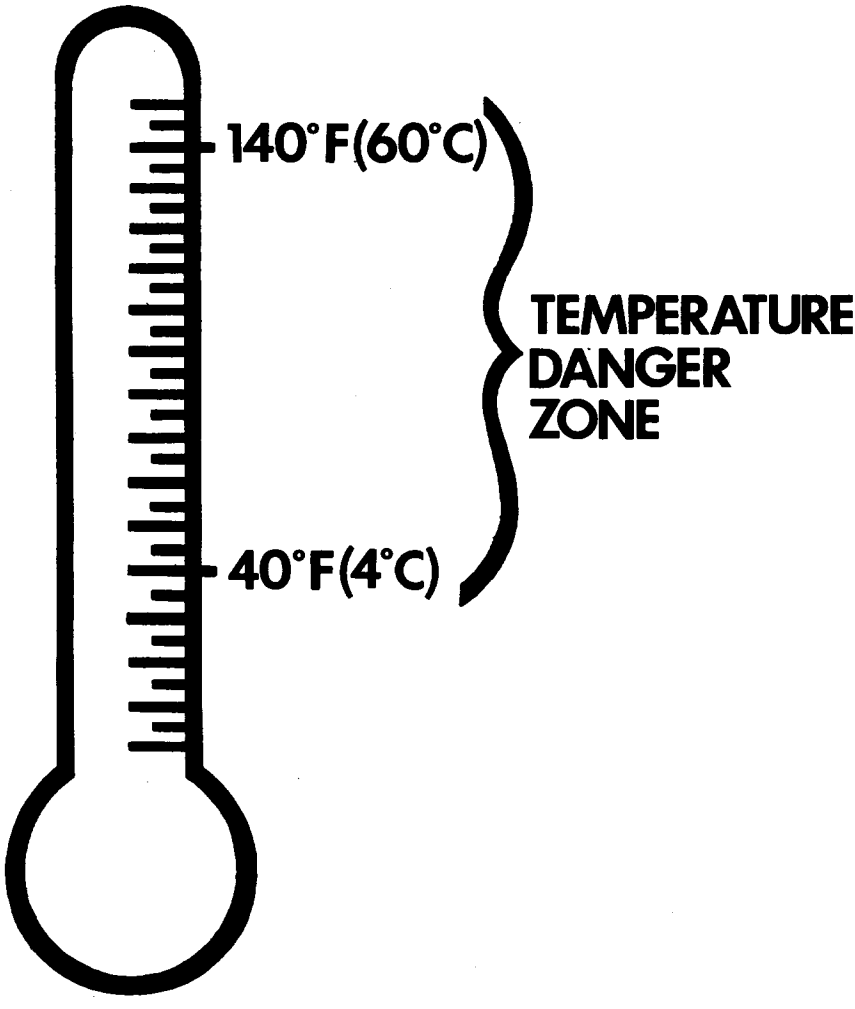
Most foods, especially seafood, contain hundreds, thousands, and in some cases, millions of bacteria. So a food having an already high number of bacteria would spoil quickly if something were not done to stop or slow such explosive growth.

Bacteria are living organisms, and because they are living, they need food, water and a favorable temperature to survive and grow, just as you do. In fact, many bacteria seem to thrive under the same conditions as humans. If any one of the basic necessities—FOOD, WATER or a FAVORABLE TEMPERATURE—is taken away or restricted, bacteria growth can be slowed down or stopped. Of these, TEMPERATURE is the easiest and most practical one for us to control in a seafood processing plant.

The growth and reproduction rates of bacteria generally increase as the temperature rises above 40° F (6° C). In fact, temperatures between 40° F (6° C) and 110° F (42° C) are ideal for growth and reproduction of many bacteria that cause spoilage and disease. Even at temperatures as high as 140° F, some bacteria are active. This is why temperatures between 40° F and 140° F are often referred to as the TEMPERATURE DANGER ZONE. So, while processing seafoods, the temperature of the seafood must be kept below 40° F as far as practical.

In summarizing, we see that:

1. An individual bacterium is invisible to the unaided eye.
2. Bacteria are everywhere in a seafood plant.
3. Bacteria grow at explosive rates under the proper conditions.
4. Generally, bacteria are most active in the temperature range of 40° F to 140° F.



What does all this mean and what does it have to do with Seafood?

To begin with, not all bacteria are alike. They come in different sizes and shapes. Also, different types of bacteria have different effects upon foods. Most bacteria may be placed in one of three general categories:

1. USEFUL BACTERIA
2. SPOILAGE BACTERIA
3. PATHOGENIC BACTERIA

It is important that we understand the role of each.

Man has known about the effects of USEFUL BACTERIA and other useful microorganisms, such as yeast, for thousands of years. Some of

the most important food and medicine items are produced as a direct result of useful microorganisms. Bread, cheeses, vinegar, alcohol and medications are just a few of these items. However, bacteria have no useful effect in fresh seafood.

SPOILAGE BACTERIA, on the other hand, cause many of the bad flavors and odors found in food kept too long under poor storage conditions, or kept too long under refrigeration. These bacteria are not necessarily a health hazard, but large numbers indicate poor handling and/or poor storage conditions. In seafood, they cause a poor quality product with a short shelf life, because seafood are particularly susceptible to the undesirable effects of spoilage bacteria.

PATHOGENIC BACTERIA are a health hazard. These bacteria can cause serious infections, poisonings and diseases in man. In fact, some of the most poisonous substances known to mankind are produced by pathogenic bacteria. Seafood may be contaminated with pathogenic bacteria from the environment from which it is harvested. In addition, food handlers may be carriers of pathogenic organisms and may contaminate seafood.

Basically, there are two ways that pathogenic bacteria may transmit disease to man:

1. FOOD POISONING
2. FOOD INFECTION

FOOD POISONING is caused by certain bacteria growing and producing poisons in food before it is eaten. When the food is eaten, so is the poison, and illness may follow. In this case, illness is caused by eating the poison, not by eating the bacteria.

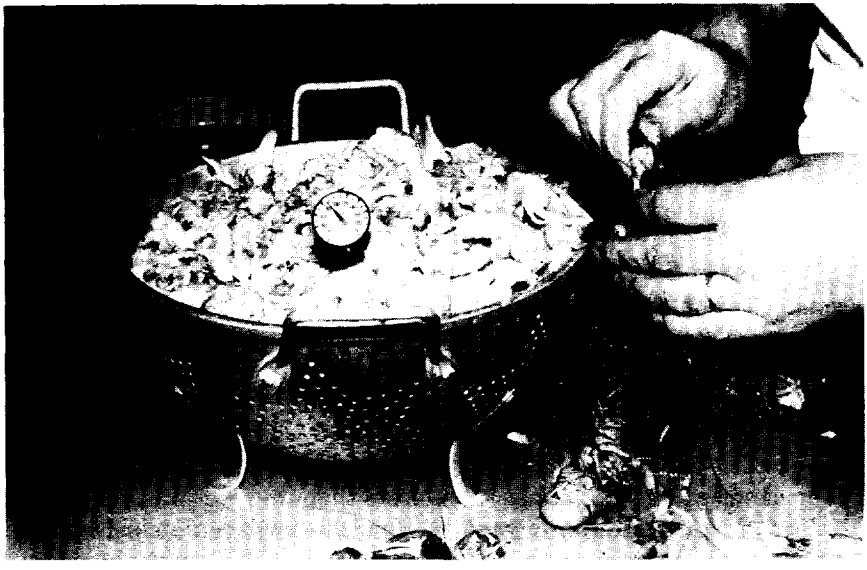
FOOD INFECTION, on the other hand, is the result of eating certain types of bacteria. These bacteria begin to produce poisons and diseases after they have entered your digestive system.

Two precautions are necessary: (1) keep perishable foods under proper storage conditions (usually below 40° F) at all times to slow the growth of bacteria and the production of poisons, and (2) prevent certain kinds of bacteria from getting into foods in the first place.

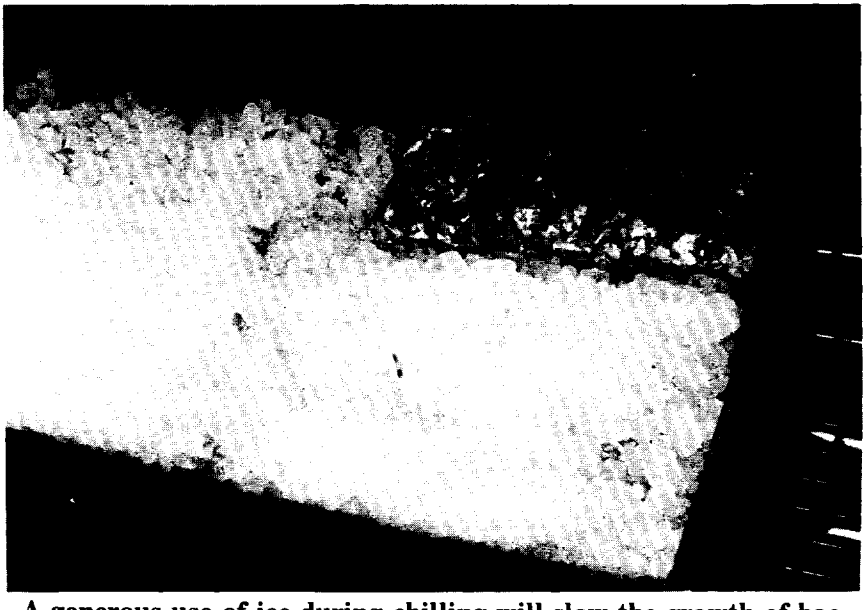
When sanitary and health personnel inspect a food plant, they will normally examine food samples for the potential presence of pathogenic bacteria. In addition, they will examine the food for the total number of bacteria in the food sample. A high total number of bacteria indicates that the food was not processed under sanitary conditions.

What can you do to prevent bacterial contamination of food?

It has been shown that the way workers in a processing plant handle the product will greatly influence the number of bacteria in that plant's



A pocket thermometer is a useful tool for determining the temperature of seafood during processing. Seafoods should be kept out of the temperature danger zone to control bacterial growth.



A generous use of ice during chilling will slow the growth of bacteria.

final product. Here are some things you can do to keep bacterial contamination down in the plant where you work.

Never report to work if you are sick. Even an infected cut on your hand, arm or finger or a boil anywhere on your body may serve as a source of bacteria. Be clean when arriving at work. Take a bath before reporting to work. Wash your hair often and keep your fingernails clean. Wear fresh, clean clothes every day, and keep these clothes as clean as possible throughout the day.

Hands can be a major source of bacteria. Bacteria can be easily removed or destroyed by washing and sanitizing the hands. Use plenty of warm soapy water and scrub briskly to loosen and flush away dirt. Most of the bacteria will be washed away with the dirt. The rest will be destroyed by dipping your hands in a sanitizing solution. However, if the dirt and soil particles are not removed by washing, they may protect the bacteria or make the sanitizing agent less effective. For some tasks, your hands must be sanitized more often than they are washed, especially at the picking or peeling tables. Hand dip bowls containing sanitizing solution or faucets providing a rinse of sanitized water should be available for this purpose.

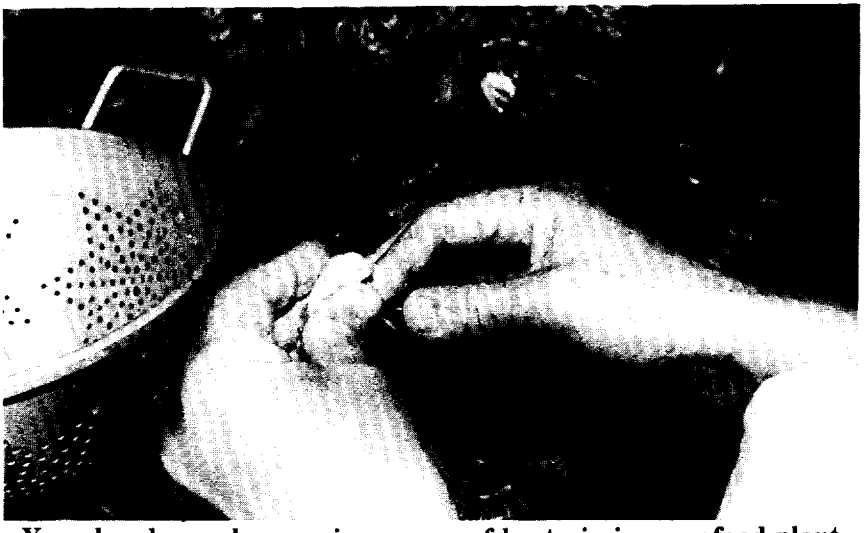
Always WASH and SANITIZE your hands before returning to the work station after a break. For example, when you leave your station to get a drink of water, wash your hands with soap and warm water and sanitize them before returning.

Washing and sanitizing your hands is especially important after going to the toilet. Failure to do this could result in very serious bacterial contamination in the food.

Avoid wiping your hands on soiled aprons or dirty towels. Do not use absorbent materials to handle seafood or allow seafood to come in contact with such materials. For example, if cotton gloves were used to pack cooked crabs, the gloves would quickly become saturated with juice from the crabs. Since these gloves cannot be sanitized, they would soon be contaminated with extremely large numbers of bacteria. Each crab handled with the contaminated gloves also would become contaminated.

When you cough or sneeze, always cover your mouth with your hand and turn your face away from the food processing line or table. This will probably contaminate your hands, so you should immediately wash and sanitize them.

Many times, hair has large numbers of bacteria on it. Unfortunately, hair is not always firmly rooted to our heads and faces. It is constantly being shed and lost. In order to keep it out of the product, wear a hear net or hat especially designed for that purpose while in the food processing areas.



Your hands can be a major source of bacteria in a seafood plant. Periodically wash your hands with soap and warm water and then sanitize them as necessary.

While in the food processing area always wear hair nets. These employees are also using clean nonabsorbent aprons to minimize contamination.

Always use proper methods for cleaning and sanitizing equipment and utensils before beginning the day's operation and after each day of operation. Clean-ups also should be scheduled during breaks.

If you need information on the types of cleaning and sanitizing materials available and how to use then, contact your Marine Advisory Agent or Cooperative Extension Service.

Do not allow the product to come in contact with any surface that has not been properly washed and sanitized. For example, product that has fallen onto the floor should be discarded as waste. In addition, cooked or

Proper cleaning and sanitizing of equipment and utensils on a regular schedule is an important part of controlling bacteria in a seafood processing plant.

processed seafoods should never come in contact—either directly or indirectly—with the raw or live seafood. For example, the individual who handles the live or raw seafood should not handle the cooked or processed seafood, just as containers used to hold live or raw seafood should never be used to hold cooked or processed seafoods.

Conclusion

So, remember that bacteria, although invisible to us, are real living organisms. Under certain conditions, bacteria may grow and reproduce rapidly, causing spoilage and contamination of food.

Remember also, that certain bacteria, when present in food, may cause disease or illness.

Most importantly, you, the food handler, are the key to preventing bacterial contamination of food. In fact, your hygiene habits while working on the job and even at home will often affect the quality of the product you handle. Poor handling practices may yield poor quality product.

In order to minimize contamination of food you should:

1. Never report to work sick.
2. Bathe regularly and wear clean, fresh clothes at work.
3. Periodically wash hands with soap and water, and then sanitize them as necessary.
4. Keep hair covered with net or hat designed for that purpose.
5. Be sure all equipment and utensils you work with are properly cleaned and sanitized before use.
6. Never let seafood products come in contact with contaminated surfaces such as floors.

As a food handler, you have a responsibility to all who will buy and consume your product, to produce it under conditions that do not foster bacterial growth and contamination.

If you want more information on this subject contact your local Marine Advisory Fisheries Agent or your County Agent with the Louisiana Cooperative Extension Service.

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