TECHNIQUE DESCRIPTION

Smoking Fish

Introduction

In a survival situation, when you're in the open, there's no way you can keep fish good for a longer time. One way to keep fish is to smoke it. In this activity you're teaching the participants how to clean fresh fish and smoke it in a primitive way. Of course you'll be eating the fish… ☺

Background information

The process of smoking

The fish will be smoked into closed tins with beech chips inside and the total tin will be put into the fire. A lot of heat is going to the chips but the chips won't burn. For fire, all three parts of the fire triangle (fuel, oxygen and heat) are necessary. Because of the lid, the tins are closed and no oxygen can come to the chips. The process what will happen is 'gassing', the chips will turn into gas instead of burning. This hot gas can enter the inner tin through the holes and is responsible for the smoking of the fish.

food conservation

When no cooling / freezing possibilities are available, there are several ways to preserve food in primitive situations. Food decay is based on several mechanisms:

1. Living cells contain vesicles with specific proteins, enzymes, which will burst open if the cell dies. These enzymes are capable of breaking off the 'bricks' of a cell. After this, it's easy for the body to break down and remove the dead cells. When a body dies, all the cells will break down because of the enzymes and the structure and quality of the meat will decline. Enzymes are sensitive for temperature and for warm blooded animals only will work at a temperature of 35 to 40 degrees Celsius. So, if you cool (or better freeze) meat, the enzymes won't work and the meat will be preserved. For fish the working temperature of the enzymes is much lower, ca. 5 degrees Celsius. If you keep fish in the fridge, you won't preserve fish but help the enzymes to decline the quality. Therefore, to preserve fish you have to freeze it (enzymes won't work below 0 degrees) or you have to heat it (enzymes will be destroyed when heating and the break down mechanism will stop).
2. On non-sterilised food, always bacteria's and mould are present, good and bad ones. Multiplication of the bad bacteria's will give large amounts and can lead deceases when eating (e.g. salmonella on chicken meat). Bacteria's also can change substances from food. Sometimes we use that mechanism (e.g. fermentation to alcohol, yield for bread, etc.). But also poisonous substances can occur. Therefore it's no use to preserve food where already bacteria's have changed substances, the food is already spoiled. Preservation only works if you do it before bacteria's have the chance to do their work.

The process in 1. leads to a lot of proteins. Because bacteria's grow best on proteins, the process of 2. will be stimulated after a cell dies. The best way to preserve meat is to reduce or better stop both processes!

Here is a list of used ways to preserve food:

1. **Cooling**: used for vegetables and meat of warm-blooded animal. The processes will be reduced but not stopped!
2. **Freezing**: suitable for all kinds of meat except foods. Both processes will stop completely but because of the forming of ice crystals the structure of food will be changed as well (e.g. vegetables will become infirm, etc.). Vitamins will be preserved during freezing.
3. **Salting or acidifying**: because of the high concentration of salt, micro organisms will be killed. This method is suitable to preserve food for a very long time (e.g. gherkins, herring, meat, eggs, etc.). The taste of the food will be changed enormous of course.

4. **Cooking / heating**: micro organisms will be killed and enzymes destroyed. Food will be preserved for sometimes. But new bacteria's can easily colonise the cooked food because the cells are destroyed and the content of the cells is easily to reach for bacteria's. When cooked, food is only preserved for a little while. Taste and structure will change by cooking.
5. **Cooking under pressure and closed**: when cooking under pressure the temperature can rise till 140 degrees Celsius. If perfectly closed from the environment (e.g. in tins / glass), food is unreachable for bacteria's and preserved for a very long time. Taste and structure will be changed.
6. **Smoking**: by smoking food (e.g. fish), the inside will be heated and microorganisms are killed. Because the smoke is poisonous and will impregnate the skin of the fish. Colonization by new bacteria's has become almost impossible as long as the skin keeps intact and will not be damaged. When damaged, colonization will go very fast. So for good conservation, try to keep the skin of the smoked fish intact! Further, taste will change because of smoking but a lot of people like the taste of smoke

Smoking fish

Step 1: cleaning the fish

1. Cut with a sharp knife a little cut (only through the skin) from the anus to the head.
2. Open the fish and put one finger under the intestines.
3. Rip politely the intestines from the anus
4. Pull all the intestines loose from behind the mouth, do **not** remove the head of the fish!
5. Through away all intestines into container provided.
6. Further, scrap the skin off the fish
7. Make a cut halfway the side of the fish and gently scrape the flesh to the top and bottom side

Step 2: prepare the fish for smoking

1. Push the tent peg through the head / eyes of the fish, support gently with your fingers.
2. Weave / cover / fix the fish with iron wire so that, if the head might break from the body, the fish still hangs on the peg (be sure the wire is also over the peg, not only around the fish).
3. Take two pegs, one with 3 fish and one with 2.

Step 3: smoke the fish

Explain about the method of smoking fish (see background information). Be sure that there are enough red ashes in the fire, do not make a large fire with loads of flames. Let the participants help with all the preparations.

1. Take the big tin and fill the bottom with ca. 5 cm (2 inches) with beech chips
2. Poor a little water onto the chips (1/4 cupful)
3. Put the smaller tin (with the holes) in the big tin (be sure the lid of the big tin still fits and there is space between the lid and the top of the small tin).
4. Put the smaller lid on the small tin and fill the gap between both tins with 2 more inches (5 cm) of chips totally around. Be sure no chips will fall into the small tin.
5. Remove the lid of the small tin.
6. Hang the pegs with the fish in the small tin.
7. Put the lid on the big tin and place the big tin on the ashes.
8. Wait for 30 to 45 minutes, once in a while look and feel at the fish.
9. Meanwhile, explain / tell about the backwoods methods for food conservation (see background information). Make it a vivid discussion ☺
10. If the flesh is totally white (not gray / soft / wet), take the tin of the fire and the fish out of the tins.
11. Let the participants eat from the fish, 1 fish for 2 participants.
12. Remove the small tin out of the big tin, the burned chips can be put in the fire. The top of the chips won't probably be burned and can be used again.

Safety:

- Be careful with flammable clothing.
- Be careful with flammable materials on the soil.
- Be sure you know how to use a fire extinguisher.
- Be careful with eating the fish for good taste (food poisoning) and little bones.
- Contact Team Leader for first aid (plasters) and serious injuries
- Let the participants, who cleaned the fish, wash their hands!