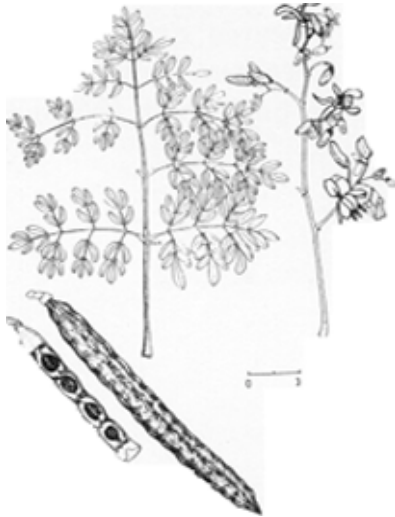


- Stir quickly one minute and then slowly for 5 min.
- Leave the container for one hour so the particles can settle on the bottom
- Pour the cleared water carefully into the PET bottles so they can be solar treated
- Do not use the bottom part where the particles have settled



“Drum stick tree” - leaf, flowers and seeds



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BOOKLET NO 5

HOW TO:

- MAKE CLEAN WATER BY**
- 1. USING THE SUNLIGHT**
 - 2. USING MORINGA SEEDS**



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How to make clean water using the sun

Idea

The idea is to spread a simple system for cleaning water which can be used when people do not have the possibility of boiling water.

Introduction

Clean water is a problem in many parts of the World, and many places people have to use water from rivers, lakes or rainwater collected in containers. This water is often full of disease creating microorganisms. The diseases are spread when people use the water for cleaning food or drinking. To avoid getting sick it is necessary to disinfect the water. This can be done in many ways:

- boiling it - this will kill nearly all microorganisms
- disinfecting with chlorine - this is done in many larger cities
- treating with radiation as this will also kill the microorganisms

For many people in developing countries getting enough firewood is a problem. Either it is a big task where especially the women use several hours a day to find it. Or for most people in the towns this is no



possible to disinfect water with the ultraviolet rays in the sunlight.

If the water contains many very small particles this method is not good. The light can not penetrate and ensure that all microorganisms are killed.

This kind of water is often found in rivers carrying fine clay particles from erosion upstream.

If it is not possible to filter the water and make it clear enough for solar disinfection the solution is to use moringa seeds.

Compounds in its seeds binds with the silt and clay so they settle at the bottom. With the particles many of the bacteria and other organisms will also settle.

Moringa is also a very useful tree because most part can be eaten and it gives good firewood. It is easy to grow and is found many places in Asia and Africa.

Instruction

How to clear water with moringa seeds

- Use one seed to clean 1 litre of turbid water
- Take off the wings and seed coats
- Powder the seed inside some cloth on a stone
- Put the powder in a bottle with water and mix well for some minutes
- Pour through a cloth into the water you want to clear
- Mix the water using a wooden tool or the cloth with the powder inside



To be sure that the water is clear enough to use make the following test:

- Fill the bottle with water
- Place it (normally - not lying) on top of a piece of paper with some 1.5 cm big letters
- Look through the opening from top through the bottom of the bottle
- If you can see the letters (read them) the water is clean enough to use
- If you can not read the letters you have to clean it first through a fine filter (cloth) or use moringa seeds to clean it (see below)

***** This method does not remove any chemical pollution from farms, factories, garbage dumps etc. from the water *****

How to make clear water using moringa -"drum stick tree" -seeds

Idea

The idea is to spread a system where moringa seeds are used for cleaning dirty water. This system is especially useful for cleaning river or lake water with many small dirt particles (turbid water).

Introduction

As mentioned in the first part of this booklet it is



possibility and they have to use money to buy firewood or charcoal.

This means that even when people know that they should boil all water used for drinking or cleaning foods and eating tools, it is often not done. This is why it is good to spread other simple methods, which could help people get safe drinking water and avoid many diseases.

This radiation method mentioned is used in many developed countries with special equipment. But ultraviolet rays in the sunlight are also able to destroy microorganisms. Some of these rays can go through glass or clear plastic bottles.

Research at Brace Research Institute in Canada has shown that 5 hours of normal sunlight will disinfect river water so it is safe to use for drinking.



This was where water was fetched before they got the handpump shown on the front page



Solar radiation does not kill all bacteria but it inactivates the bacteria causing diarrhoea, cholera and typhus. The system can be used even when the water contains many more microorganisms than normally. If the temperature gets over 50 degrees for just one hour many other parasites like worms and amoebae are also killed. This is why it is good to place the bottles on a black surface.

The method is not as efficient as boiling or chlorinating which kills all bacteria. It should only be used when the better methods are not possible. But if the water used is fairly clear and the correct steps are followed it is possible to get safe drinking water.

Instruction

How to clean water with sunlight

- Fill some clean clear plastic bottles (PET) with screw lid 3/4 with water - as clean as you can get
- Close and shake well (20 seconds) to get air into the water. The oxygen helps to kill the bacteria
- Fill up **completely** with more water and close well (no air inside as the bubbles will reflect the sun)
- Place the bottle **lying down** in a sunny place
- The warmer the better, so it is good to place them on a **black surface** - or paint half of the side black (black side **down**)



- After 6 hours of sunlight the water is disinfected
- If it is very cloudy leave the bottles for 2 days
- Place the bottles in a cool place or in water to cool
- Keep the water in the same bottles and use it. Do not fill it into other containers as they have not been disinfected.

To get a good result it is important that the bottles are PET bottles as they let more of the ultraviolet rays through. PET bottles are for example the clear Coca Cola plastic bottles. **Do not used coloured bottles (green, brown etc).** The ultraviolet light does not go through.

PVC bottles are not so good. (PVC does not burn easily. PET burns easily and smells sweet when burned) Avoid getting the bottles scratched so less light will get in. Change them when they are not clear any more or after using one year.

Glass bottles can also be used.



After 6 hours in the sun the water is safe to drink