

Period 1  
Research Paper  
10/12/11

Introduction

Title?

Contaminated water is a growing problem in today's society. There are many different ways to purify water. Different ways include; boiling, chemical treatments, and filtration. There are plenty of ways to purify water yet water quality is still a problem. This problem is especially noticeable in third-world countries will limited or no access to a clean water source. The efficiency in removing E-coli from the water sample will be what I am measuring. This efficiency will be based on a number of different factors.

don't use 1<sup>st</sup> person

E-coli

The scientific name for E-coli is *Escherichia coil*. It is a common type of fecal bacteria. E-coli can often be found in the intestines of animals and humans. E-coli O157:H7 is the most common kind that causes disease. Some of its symptoms are bloody diarrhea, vomiting, and abdominal cramps. In severe case it can cause Hemolytic Uremic Syndrome. In this syndrome the bacteria causes the kidneys to start to shut down. Over time this can cause death in small children and elderly adults through kidney failure or disease.

E-coli is a communicable disease, a disease that can be spread form mammal to mammal, it can be easily passed in multiple ways. E-coli can be passed through direct contact of through eating or drinking after a person carrying the disease. It can also be passed through contaminated run off water containing the disease. The contaminated water can wash in to lakes, rivers, streams, and other water ways during precipitation. The water source can then in turn affect the water in wells and the water used for crops. Uncooked food and vegetables can also be a culprit as well as cross contamination. On the surfaces of the vegetables E- coli can grow and it can also grown is food that is not brought up to proper cooking temperature.

### Purification Methods

There are many different ways to filter contaminated water. All ways are relatively easy and do not cost much time or money. A few of the different methods of purification of contaminated water include; boiling, chemical treatments, and filtration. Also most of these methods can be used in both outdoor and indoor environments. Each of these methods has their own varying levels and efficiency and success.

The first method is boiling the water. Boiling water is not the most efficient method because of the time and energy it takes. Any water that has been brought up to a temperature of 70° C and held at that temperature for about 30 minutes will kill all pathogens in the water (OA Guide to Water Purification, 1998). If water is brought to a temperature of about 85° C all of the pathogens will die within a few minutes (OA Guide to Water Purification, 1998). This method is normally one of the easiest to achieve and most readily available to use in an outdoor situation.

Next there are the chemical treatment methods. The two common chemical treatments for water purification are iodine and chlorine chemicals put into the water. Both methods come in multiple forms for easy use depending on your situation. They can come in forms like crystals, tablets, and liquid drops. They are also common outdoors because of the availability and the short time that they take to purify the water.

Iodine is more effective than chlorine at killing *Giardia* cyst (OA Guide to Water Purification, 1998). Iodine cannot be used for individuals with iodine allergies or iodine restrictions. Chlorine is another chemical treatment option for water purification. It is not as

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effective as an iodine treatment because it has less potency towards microorganisms. Thus it is commonly used for individuals that cannot use iodine for medical reasons.

Finally there is the purification method of filtration. In a filtration system a water pump forces water through different types of filters with specifically sized pores that are designed to catch certain microorganisms. There are two major types of filters currently of the market. The two kinds of filters are membrane filters and depth filters. In a membrane filter thin sheets of material are placed together all particles bigger than the pores in which the microorganism it is designed to stop. In a depth filter a thick porous material such as ceramic or carbon have water passed through them to catch microorganisms.

### Conclusion

In this study I <sup>is</sup> ~~hope to find~~ <sup>ing</sup> ~~out~~ the most effective method or methods of water filtration are. This will be judged by how cost effective, readily available, and efficient in time and effort the different systems are. X will take a sterilized sample of water and artificially contaminate it with E-coli. Then X will run the samples through all the different filtration methods. Finally X will run test on the water to find the level of contamination in the water.

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