The Effect of Grey Water in Hydroponics as an Environmental Conservation Method for Land, Water, and Cost

Abstract
In a world with rapid growth in world population and increased urbanization, sustainable agricultural communities will be crucial in feeding the world. Grey water, or the water that goes into the sewer system after human use, can be used in many ways for gardening and agriculture. This research project begins the process of research and development for grey water in agriculture and ointment. This study will help ensure the sustainability of the agricultural community. Grey water is beneficial for agriculture due to the high concentrations of beneficial nutrients. Grey water can be propagated through hydroponics and be more beneficial than traditional agriculture. This research project will begin to prove the benefits of grey water in agriculture and its potential for sustainability. Grey water will be used to grow wheat in hydroponics, with the hypothesis being that grey water will be as beneficial as tap water and traditional water. This project will assess the differences in plant growth and nutrient uptake when using grey water compared to tap water in a hydroponic system. The results of this experiment will help determine if grey water can be used for agriculture and if it can be a sustainable method of growing food.

Introduction/Background
Water scarcity is a major problem hitting the farming communities with finding large amounts of water for growing crops and crop size at an alarming rate because of droughts and high temperatures. The controlled group for this experiment was the tap water and the experimental group was the grey waste water. The controlled variables were the type of water and the nutrient solution. The variable was if grey waste water was used to grow wheat then the wheat plant would grow the same, if not better than with tap water because of the high amounts of nitrogen, phosphorus, and potassium found in the grey waste water. With the controlled group after 6 days the wheat had grown 4.1 cm, 8 days the wheat had grown 4.4 cm, and 10 days the wheat had grown 4.8 cm. The experimental group after 6 days the wheat had grown 4.6 cm, 8 days the wheat had grown 5.1 cm, and 10 days the wheat had grown 5.8 cm. This shows that grey waste water had some noticeable differences between the controlled group and experimental group's plant growth.

Hypothesis
Grey water in hydroponics using grey waste water as well as regular water? Growing food with hydroponics using grey waste water and regular water? Grey water is beneficial for agriculture due to the high concentrations of beneficial nutrients. Grey water can be propagated through hydroponics and be more beneficial than traditional agriculture. This research project will begin to prove the benefits of grey water in agriculture and its potential for sustainability.

Results

The experimental variables included the average temperature in the controlled group was 19.45°C and in the experimental group was 19.38°C (Figure 1). The average relative humidity in the controlled group was 25.15% and in the experimental group was 25.96% (Figure 2). The average illuminance in the controlled group was 575 lux and in the experimental group was 579 lux (Figure 3). The average pH in the controlled group was 7.4 and in the experimental group was 7.2 (Figure 4). The average root length of the wheat plants was 28.13 cm in the controlled group and 32.7 cm in the experimental group (Figure 5). The average plant height was 121.5 cm in the controlled group and 127.5 cm in the experimental group (Figure 6). The average wheat height (cm) using soil with tap water compared to soil with grey water with standard deviation (cm) is shown in Table 3. The results show that grey waste water has some noticeable differences between the controlled group and experimental group's plant growth.

Discussion / Conclusion
Grey waste water could also be replaced with Black water (sewage waste water) to see if they have the same result. Improvements that could be made were better sealing in the tubes and the ends of the hydroponics system. Another improvement would be cutting off the plant height and putting a cover for the buckets. Could plants grow in hydroponics using grey waste water as well as soil or regular water? Grey water will be used to grow wheat in hydroponics, with the hypothesis being that grey waste water will be as beneficial as tap water and traditional water. This project will assess the differences in plant growth and nutrient uptake when using grey water compared to tap water in a hydroponic system. The results of this experiment will help determine if grey water can be used for agriculture and if it can be a sustainable method of growing food. Grey water should not be replaced with Black water (sewage waste water) because they have the same result. Grey waste water could also be replaced with Black water (sewage waste water) to see if they have the same result.

References / Literature Cited