Alternative water resources for cress growth

Aim The aim of this study was to identify possible sources of alternative water available on the campus. The information revealed from the gardenershowed that 20 hectares of land was watered per day, and that a whole m^2 was covered completely by 5ml of water per day. If 1 hectare= 100, 000 m^2, then 20 hectares was equivalent to 200, 000 m^2. Therefore 5 x 200, 000 = 1 million ml

= 1000 liters of water per day was used to water Rosey grounds.

Hence, study was conducted by growing and observing the growth of cress seeds to identify and utilize the water source to irrigate the school grounds as an answer to conserve resource and energy targeting global warming issues.

Sample

Water from different sources around the school was collected as samples for the study.

Sample 1 Tap water with few minerals generally untainted served as control,

Sample 2 Kitchen water from Rosey kitchens contained suma force, a powerful degreaser used to clean the floors,

Sample 3 Shower water from girl's campus contained various shampoos, conditioners and shower gels made up of degreasers,

Sample 4 Rosey fountain which was nothing but tap water cycling back consisted of minerals from soil and fallen foliage,

Sample 5 Laundry room water contained Bio X enzyme washing powder,

Sample 6 Rosey pool water contained mild amounts of chlorine,

Sample 7 Sewage water included remnants of human waste but still was relatively clean.

Apparatus

300 ml beakers x 7

Yoghurt pots x 14

Cotton

25 ml measuring cylinder

15 cm ruler

Thermometer

Cress seeds (English Special)

Methodology

1) 14 yoghurt pots in an equal manner - each with cotton up to the rim with approximately two pinches of cress seeds was set.

2) 300ml of each water sample was used to water seeds of two pots for the accuracy of results.

3) Sample watered seeds were left to germinate maintained at same temperature, light conditions and same location for one week.

4) All pots were watered with 10ml of corresponding sample water on every alternative day at the same time.

5) All observations were monitored throughout the week and at the end of the week, results were recorded and apparatus were cleared.

Results

The observations recorded through out the week are tabulated as follows and a corresponding graph is also plotted.

Water sample

Length of cress

after 3 days (cm)

Length of cress

after 7 days (cm)

Tap water

1

4

Kitchen water

0. 7

2. 7

La combe

0. 2

0. 2

Fountain

3. 5

3

Laundry

2

3

Sewage

1. 5

2. 5

Pool

2

3. 5

Observations

Growth

The cress growth in terms of number recorded maximum in fountain water and minimum in la combe water samples. In terms of height, the growth pattern was more in tap water and least in la combe shower water. The

recordings are tabulated as in the following order

Growth in height

Growth in Number

Tap water (maximum)

Fountain(Maximum)

Pool water

Laundry and pool water

Laundry

Sewage

Fountain

Tap

La combe(minimum)

Kitchen

La combe(minimum)

Analysis of results

The growth of cress in fountain water was more probable due to the presence of extra nitrogenous nutrients that aids in luxurious growth. The presence of enzymes in washing powder of laundry water also facilitated nitrogen acting as building blocks for the plant growth. The pool water with less chlorine content facilitated the growth as well. The more concentration of degreasing agents and chemicals in other samples such as la combe shower and Rosey kitchen water inhibited the plant growth and probably resulted in the death of the plant.

Hypothesis

Germination of seeds is dependent on three factors-temperature, water and oxygen. After germination, they photosynthesize to grow. The equation for

photosynthesize is

$6H_2O + 6CO_2 \text{ ----------> } C_6H_{12}O_6 + 6O_2$

WATER + CARBON DIOXIDE -------> ENERGRY + OXYGEN

Tap water act as better medium for the growth of the cress seeds as its neutral pH provides optimum growing environment. The Rosey kitchen and La combe water samples containing degreasing agents provide minimum growing environment, the reason being that these degreasing agents remove fats from the phospholipids bilayer of the plant membranes leading in the rupture of cells and ultimately resulting in death of the plant. The cress grown in tap and also fountain water almost indicate same growth probably due to the presence of mud samples the fertilizers used to grow grass in the fields rich in nitrogenous fertilizers acting as vital nutrients aiding the faster growth of the plants,.

Laundry water sample containing degreasing agents also are enzymes. They either affect the plants by destroying the cell walls or facilitate the plant growth with their amino acids in their enzymes. The plants in pool water sample show average growth probably due to acidic effect of chlorine content which inhibit the growth rate. Finally, the growth of plants in filtered sewerage water was equivalent to that of tap water probably due to the potential amount of human waste acting as fertilizer.

Estimate of errors

Human error

The exact measurement of the cress was not possible as the plants were not exactly straight and many times the height varied between 2mm divisions.

Random error

Not all the plants were of same height. Hence, average height was recorded.

Due to unforeseen reasons, the seeds could not be watered for 3 days resulting in death of most plants. Hence, approximately 2 pinches of seeds in each pot were placed resulting in uneven number of seeds. In addition, there were more fluctuations in the temperature, which probably affected the photosynthesizing ability of the plants.

Improvements

For the preciseness of the results instead of sowing equal quantity of seeds, sowing number of seeds would be more accurate. Ensuring proper watering of seeds is very essential and growing under controlled constant internal conditions results in accurate results.

Conclusion

By analyzing the results obtained it can be concluded that though the growth of cress seeds varied with different water samples possibility of recycling all water sources can be considered.