CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)
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Project Number
35738

Project Title
California Water Crisis: Landfill to the Rescue!

Abstract

Objectives/Goals
The purpose of this experiment is to reduce the use of water on farms to help the farmers during the on going water crisis in California.

Methods/Materials
Materials:
1: 40 quart sized pots 2: 3 cubic feet potting soil 3: Water 4: Cut pieces of jute 5: Unused baby diapers (for sanitary purposes) 6: Styrofoam packaging peanuts 7: Moisture sensor
8: Green bean seeds 9: Measuring cup 10: Bucket to make desired soil + additive mixtures
General Project Method:
In this project, the cross-linked polymers found in everyday waste materials - Styrofoam, Jute, & Diapers - are directly added to the soil to see their effectiveness for moisture control and plant growth. Each experiment is repeated two times to confirm statistical validity of the data. Results are then compared to control soil samples without any additives. Various additives were mixed in soil in different ratios, and they were compared to the control - without any additive. In addition, green bean seeds were added to a second batch of the mixtures to study the impact of these additives on plant growth.

Results
Pots with diaper additive consistently showed high moisture contents. Four out of nine seed pots with the diaper additive sprouted and had grown into healthy seedlings by the end of 2 weeks. Pots with the jute additive had inconsistent moisture content, but maintained a high moisture content. Three out of nine of the seed pots had sprouted and showed healthy seedling growth by the end of 2 weeks. Pots with the Styrofoam additive barely showed differences in contrast to the control samples. The water resistant property of this polymeric additive may have caused it to not hold moisture content in the soil. None of the nine of the seed pots for Styrofoam sprouted.

Conclusions/Discussion
In conclusion, my hypothesis that cross-linked polymers can help improve the water retention in soil was proved correct. Mixing moderate amounts of cross-linked polymers in soil can help reduce the amount of water requirement in a farm, which in turn can help California in its water crisis and reduce the amount of landfill trash.Long term effect of cross-linked polymeric additives on fertility of the soil need to be tested. Varieties of cross-linked polymers may have different water retention capability. Different crops require varying amount of water through its growth cycle. This will require accurate control on the additive concentrations.

Summary Statement
Cross linked polymers in landfill materials can help conserve the amount of water needed to grow a plant.

Help Received
Teacher encouraged; Parents provided resources.