CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
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Project Number
J0226

Project Title
How Does the Nigerian Pot-In-Pot Refrigeration System Perform in the Climate of Ramona, California?

Abstract

Objectives/Goals
This project was to test the efficiency of the Nigerian Pot-in-Pot Refrigeration System. I became aware of Professor Bah Abba's System from an article in Popular Sceince, Jan. 2001. I learned of this evaporation-driven refrigerator used in the desert of Nigeria and how a simple sytem can change lives of towns and even a country. Although it has been qualitatively shown to be a success in Nigeria, no one, including the originator of the system has scientifically gathered data to show the quantitative cooling ability.Therefore, this experiment set out to first build the system using products that could be located in San Diego. This accomplished, the system was tested and temperatures taken daily to quantitate the average temperature maintained and the maximum temperature delta during the warmest days.

Methods/Materials
5 large terra cota pots, 4 small terra cota pots, 1 large saucer/lid, 4 burlap sandbags,5-50 pound bags of Blast Silica Sand, 6 ACURITE thermometers, 1 roll chain link fencing.Pot#1- CONTROL POT, a large pot with burlap cover.Pot#2,#3,#4- small pot placed in large pot with sand in outer well. Burlap covers.Pot#5-Same as #4 with saucer for lid.Pots 3,4,5 saturated with water.For 30 days, temperatures were read at 6am, noon, and 6pm.

Results
At night, all pots reached a temperature equillibrium of the outside temperature. At noon the evaporation of the water in the pots that had the wet sand maintained a much lower temperature. On average, there was a 14 degree C difference bewteen the outside temperature and the system which had wet sand. This translates into a 23.5 degree F difference. In other words, when the outside temperature was 28 C (82.4 F) the pots that had the wet sand had a temperature of 15 C (59 F).

Conclusions/Discussion
The System has now been proven to be capable of lowering the temperature inside the pots sufficiently so that products such as food and medicine can be kept at lower temperatures. The question, "How does the Nigerian Pot-in-Pot System Refreigeration Perform in the Climate of Ramona, California?" can easily be answered. It performs very well.These results have been forwared to Professor Bah Abba in Nigeria, as well as my suggestion for improving the System with a lid to keep insects and animals out. He is thrilled to have a study done on his invention, and I am excited to have made such a good friend.

Summary Statement
To systematically and scientifically measure the performance of the Nigerian Refrigeration System.

Help Received
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