Affordable and Readily Accessible Solar Dehydrator

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For over a year, the majority of households in Haiti have been without power. This is the cause of large amounts of food waste due to a lack of cheap and accessible methods of food conservation. In response to this problem, we propose a modified solar food dehydrator made up of cheap, everyday materials. Our prototype is composed of 2 parts: a panel to capture solar energy and a box that holds the food. Sun rays get into the panel box through a clear glass pane, where they are gets absorbed by a black metal sheet. Air comes through the bottom and is heated by radiation and convection. The heated air then travels through an insulated tube into an insulated box containing the food. The air dries the food, and the moisture released is evacuated through an exhaust pipe on top of the insulated box. The insulation prevents heat loss through walls of the box, thus improving efficiency. Both boxes are made of wood, and the insulated pipe is made of PVC lined with aluminum foil. The panel was fabricated in-house using a sheet of plywood, a 1 by 6 piece of wood, black paint, and a metal sheet that serves as a capacitor. This means it regulates the box temperature if there is temporary loss of sunlight. Our device successfully reached a temperature of 55 degrees Celsius, which is the perfect temperature for dehydration. We found that our device was capable of releasing heat 30 minutes after it was removed from the sun. We plan to improve our design by doubling the glass pane to introduce a layer of air in between that would allow for extra insulation. We will also be adding a temperature control system into our dehydrator because different foods dehydrate at different temperatures. Furthermore, we think a smaller form factor can improve portability and affordability.

Awards Won:
U.S. Agency for International Development: Third Award Agriculture and Food Security