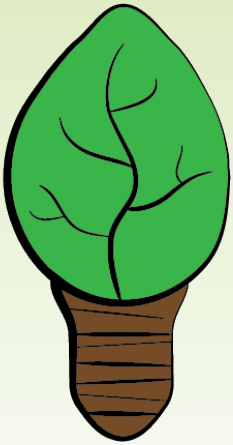
Solar Food Dehydrator
User Manual



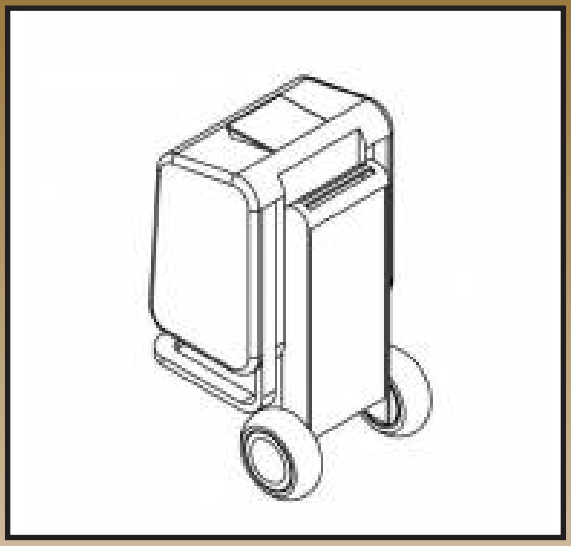
The Greengineers

Introduction:

Dehydration is one of the most advantageous methods of food preservation: It is simple, fast, and healthy. The use of a food dehydrator contributes to reducing waste: No need to throw any fresh fruit away anymore! Instead, preserve your food and embrace the diversity of dried fruit and vegetable.

The solar dehydrator is designed to extract moisture from fruit and vegetable. The device is built to work in an autonomous manner. The process of drying is enabled by a constant airflow and a controlled temperature and level of humidity. All the innovative technical features are powered by solar energy, so as to make the product sustainable.

Our dehydrator is both efficient and eco-friendly, and will introduce you to alternative cuisine in a way you will enjoy.



Components & Funcionalities:

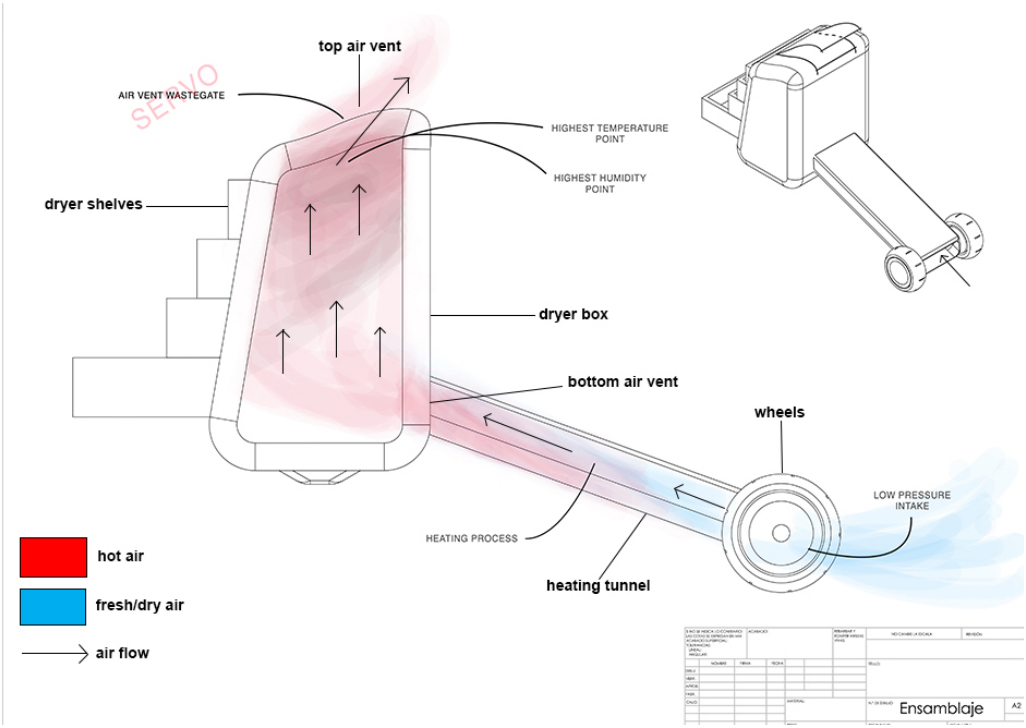
The dehydrator is conceived in such a way that each component has a specific function, which contributes to the drying process:

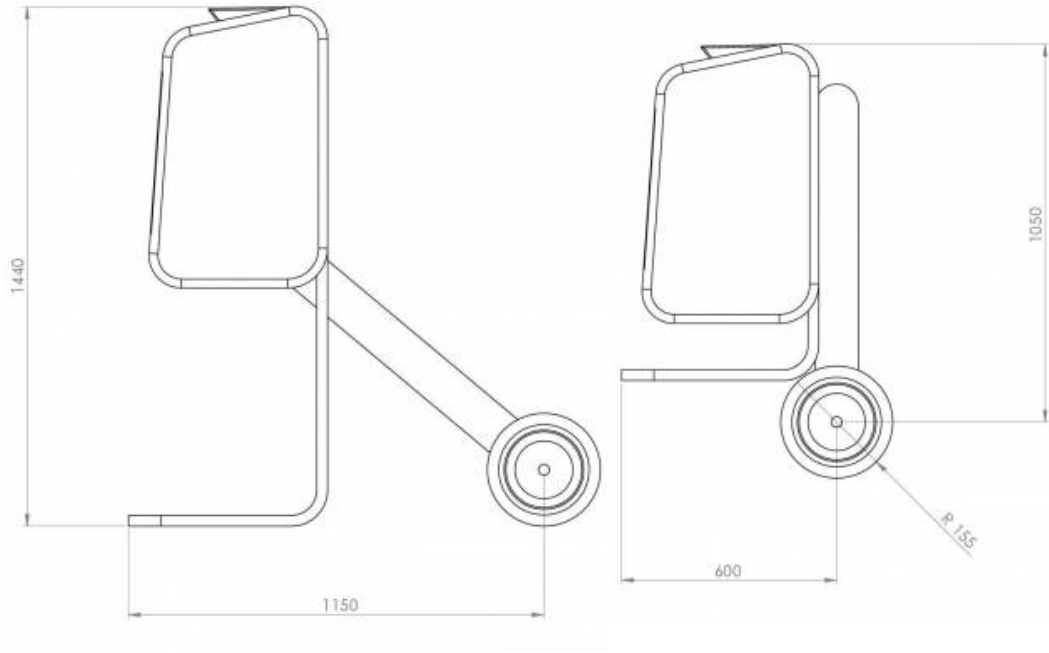
- Heating Tunnel: The metal plate mounted inside the tunnel is heated by the sunlight which passes though the glass surface. The metal then heats the fresh air that has gathered in the tunnel, and thereby makes it rise towards the bottom air vent.
- Dryer box: This central part of the dehydrator contains the dryer shelves. The air that passes trough the bottom air vent rises to the top of the box, through the shelves, extracting the moisture from the food. Once it has reached the top of the box, the air has a higher level of humidity and will therefor be rejected through top air vent.
- Control Unit: A humidity and temperature sensor measures the values inside the dryer box and displays them on an LCD screen mounted on the outside of the dryer box. Servo motors are installed at the vents, pogrammed to open and close them automatically depending on the values measured by the sensor, thereby controlling the air flow.

Design & Features:

Besides the autonomous control unit, additional special features exist:

- Folding mechanism: When te device is not in use, the legs and the tunnel can be pushed back up, so as to gain space and mobility.
- Wheels: Once the dehydrator is folded, the wheels at the bottom of the tunnel, and the handel on the dryer box make it portable, like a small suitcase.
- Anthropometric concerns: The dehydrator is designed to be ajustable in height, light, and easy to handle for all ages.


top air vent
AIR VENT WASTEGATE
HIGHEST TEMPERATURE POINT
HIGHEST HUMIDITY POINT
dryer shelves
dryer box
bottom air vent
wheels
LOW PRESSURE INTAKE
HEATING PROCESS
heating tunnel
hot air
fresh/dry air
air flow
Ensamblaje
A2


1440
1150
1050
600
R 155

Drying your own food:

- Cut the fruit and vegetable into thin slices (0.5 cm to 1 cm thick).

- Place the dehydrator in a sunny spot of your garden or terrace (preferably a spot which is exposed to sunlight for most of the day) .

- Unfold the dehydrator to its stable position, as shown in the picture (Incline the heating tunnel and pull out the legs).

- Remove the shelves from the dryer box.

- Load the slices of fruit and vegetable evenly on the trays, then place them back inside the dryer box.

- Shut the front (glass) door of the dryer box.

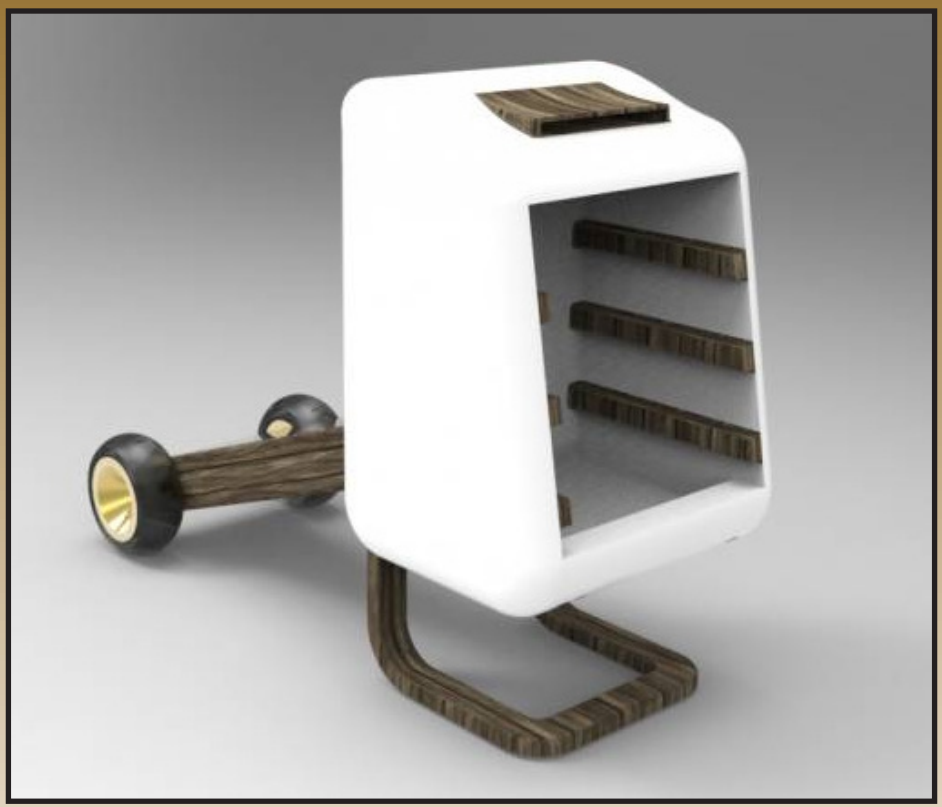
- Switch on the control unit and make sure both vents are open. The vents should open automatically once the control unit has been switched on.

- The drying process will take 6 to 9 hours, depending on the type of fruit or vegetable that is drying, and on the weather.

- Check the temperature and humidity values regularly: They are displayed on the LCD screen. Make sure to check up on your food aswell.

- Once your food has dried, carefully remove the shelves once again, and collect you fruit and vegetable.

- Savour it as a healthy snack, or as an additional ingredient in your breakfast Müesli.



Tips:

- The dehydrator is water-resistant, however, it should be sheltered from rain if possible.

- To avoid excess humidity, it is advised to keep the dehydrator indoors during nighttime.

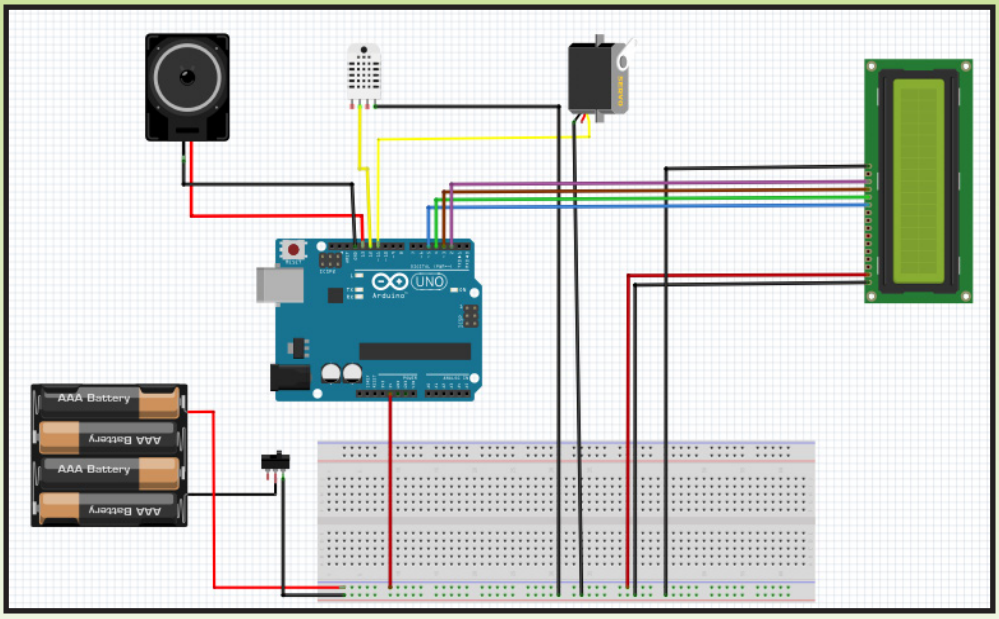
- The control unit consists of:
    1- Arduino Uno
    2- Connection Board
    3- Temperature & Humidity Sensor
    4- Servo Motor
    5- LCD Display
    6- Buzzer/Alarm
    7- Battery/Power Supply

- Components 1, 2 and 3 are placed in the outside box (control unit box), connected to the dryer box. If anything needs to be repaired or replaced, just open the lid of this box and remove the component in question. Make sure the entire control unit is off while doing so.

- Component 4 - the servo motor - is mounted at the top air vent.

- Component 5 and 6 - the LCD Display and the Buzzer - are mounted on the outside of the control unit box, so they can easily be seen and heard.

- The control unit can be powered by an external power suppy, in which case a power cable needs to be plugged into a external socket. The device is "solar energy ready": If a solar panel is available, it only needs to be connected to the battery (7) for the controls to work.


AAA Battery
AAA Battery
AAA Battery
AAA Battery
UNO
Arduino

For any help or services, don't hesitate to contact us!

Contact:

Léonore Hood
Rike Brunke
Adrian de la Torre
Hubert Nogal
Daniél Berényi
Murat Güsan

1141656@isep.ipp.pt

The Greengineers

Instituto Superior de Engenharia do Porto