

Solar Dryers



Basic Compendium

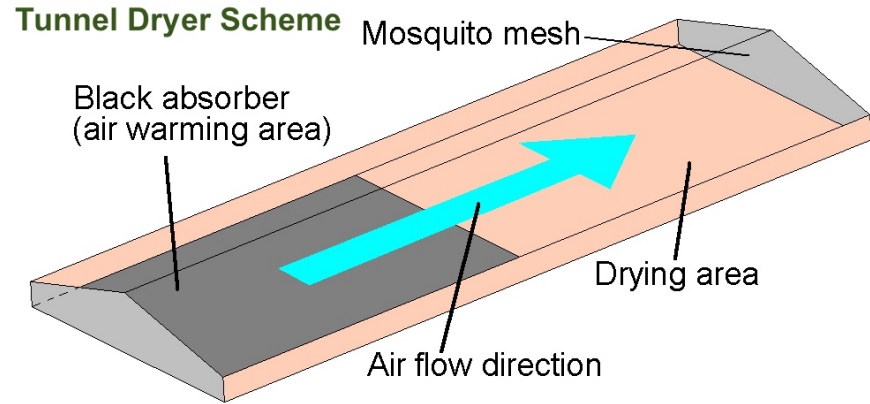


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Three Principal Types

- Cabinet Dryers
- Tunnel Dryers
- Countercurrent Dryers



What all Dryers have in common

- An air inlet
- A collector to heat the air
- A method to create a draught
- A drying compartment
- Mesh trays
- An air outlet

Cabinet Dryers

- Are usually designed for families and small farms
- Dry with a **natural** draught
- Are simple and cheap
- Protect the food from getting discoloured



Tunnel Dryers

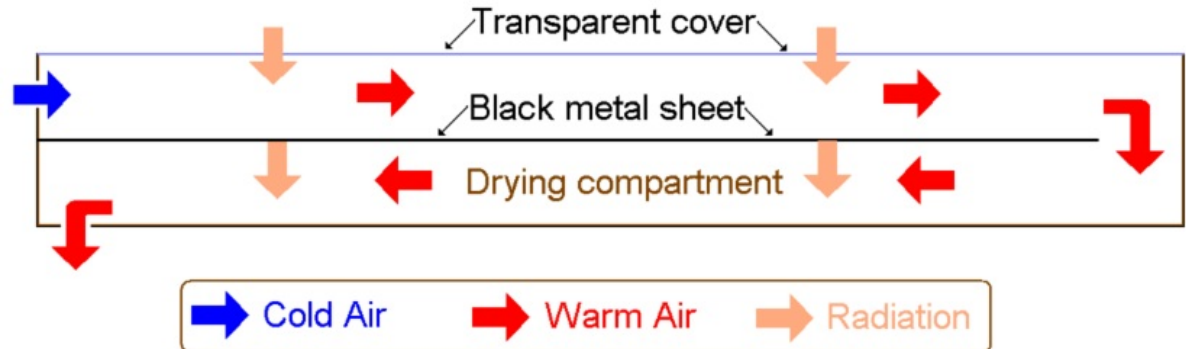
- Are usually designed for farms and food processing companies
- Dry with a **forced** draught
- Dry almost anything
- Food could become discoloured



Countercurrent Dryers

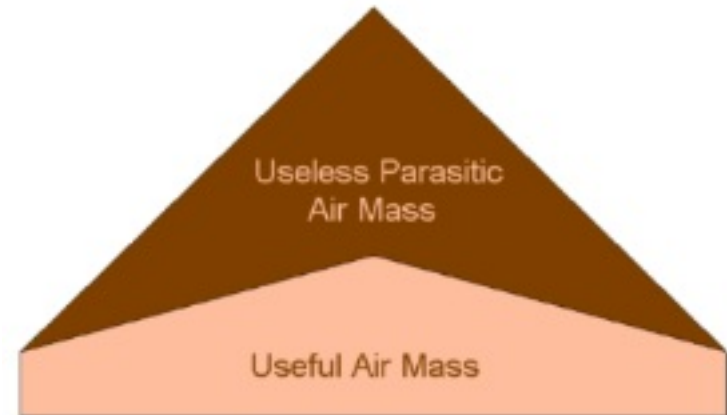
- Are designed for farms and industries
- Dry with a **forced** draught
- The food will not get discoloured

Scheme of a Countercurrent Solar Dryer



A draught is essential

In simple solar dryers (e.g. tent, green house shapes), turbulences and circulation of moist air are created. Moist air stays in the system. Also, a lot of unused air **(parasitic mass)** reduces the efficiency.



How to create a forced draught

- Usually, a 12V photovoltaic panel of 10 to 20 Watt peak can drive one or two fans.
- Any 12V fan is just perfect. You can use recycled fans of desktop computer power supplies.
- Mind the voltage and the direction of air flow.

What can be solar dried?

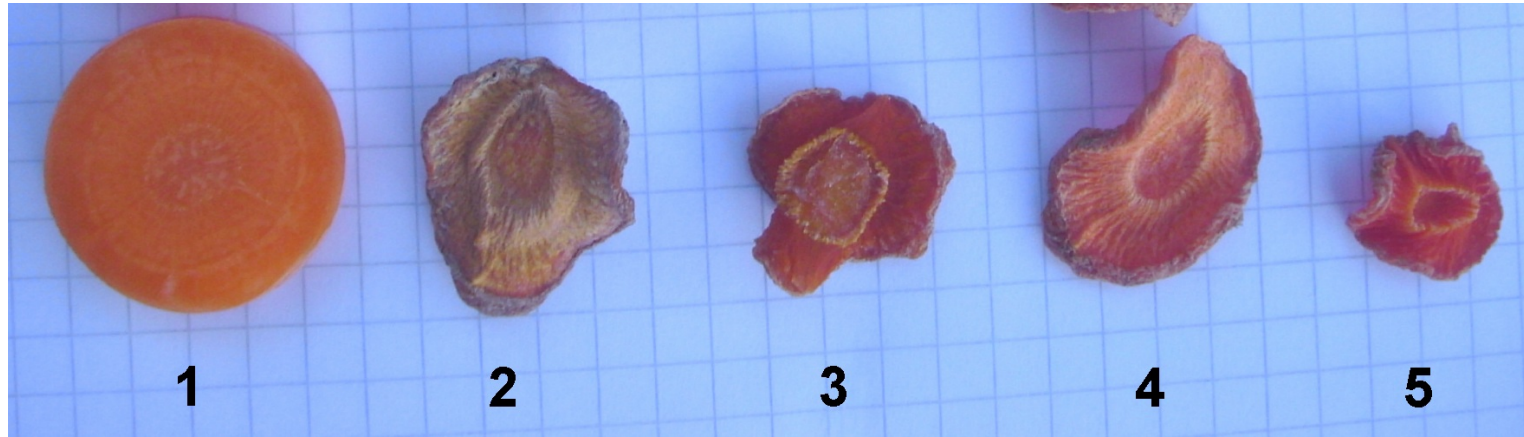
Almost anything. Some items get discoloured when exposed to the sunlight. The temperature shall not exceed 60°C, except for drying meat or briquettes.

Fish requires to be salted in a brine before drying and does neither need a high temperature nor a strong draught.

Advantages

- The temperatures in a solar dryer are significantly higher than during open-air operation.
- The draught carries the moisture away, rapidly.
- The food remains clean.

Various results



1. Fresh cut raw carrot slice, untreated
2. Untreated, dried in a tunnel dryer
3. Blanched, dried in a tunnel dryer
4. Untreated, dried in a cabinet dryer
5. Blanched, dried in a cabinet dryer

This could be important:
Untreated dried carrots taste like raw carrots, blanchd dried carrots taste like cooked carrots.

Summary

- The **heat pushes the moisture** to the surface of the fruits, vegetables, leaves, etc.
- The **draught carries the moisture** away.

Thanks for your attention