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## Simple Sawdust Cookers

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Dale Fritz, a volunteer appropriate technologist who came to ECHO after years of experience in Afghanistan, built some simple stoves to heat our greenhouses with sawdust on a few cold nights this winter. They were modeled after “sawdust cookers” which run on dry sawdust, wood shavings, rice hulls, or similar materials, producing a moderate heat for an extended time.

A simple stove can be made from a gallon tin can with the top removed and a 1.5inch (3.8 cm) hole cut in the middle of the bottom. Insert a metal or PVC pipe or wooden pole vertically in the hole, and add dry sawdust in layers, packing it down firmly before adding more. Fine, highly compressed sawdust burns longer than coarse or loose material. When the can is full, carefully remove the pipe or pole straight out of the sawdust to form a flue. Twist it slowly as you pull to keep from knocking particles loose. Place the can on two bricks which touch on one corner. Air will enter the bottom hole and be drawn up the flue by the flame. Light some paper and put it under the flue to ignite the sawdust. The sawdust will burn from the redhot central core outward with an almost invisible flame.

Place two metal pieces across the top of the can on which to set the pot, while holding it high enough to maintain a draft for the flame. Dale found that the smoke could be reduced by cutting a 1.5inch hole in the removed top and replacing it on the stove after packing in the sawdust. To nearly eliminate smoke, cover the outside edges of the top with a small amount of soil or sand. This lid sinks down as the sawdust is consumed.

To make the stove burn longer, increase the stove’s diameter. Test stoves at ECHO 6 inches in diameter and 8 inches high (15 and 20 cm) burned for three hours, although toward the end the heat was not intense. A stove 16 inches in diameter and 20 inches high (41 and 51 cm) burned for over 8 hours. To make the stove hotter, use a taller container or join two cans together.

Regulate the rate of burning by opening or closing the base bricks to modify air flow. It is possible to extinguish the stove by cutting off the air flow on the top or bottom and relight the unused sawdust later, although rice hulls continue to smolder and cannot be reused. Other suitable fuels include chaff, coffee bean hulls, straw, or mixes of these materials. With some materials, ash will collapse inward and it may be necessary to gently clean out the bottom vent hole to maintain air flow.

Charlie Forst, who works with ECHO in Haiti, says that he used these cookers much of his four years in Zaire. “I saw them in use years ago by sawmill cooks in West Virginia. I often cooked breakfast in Zaire using rice hulls or coffee hulls. As long as

the material is dry, it can be packed in a few minutes and the fire lit. After breakfast I would put rice or beans on the stove and let it burn out.

"Usually you do not even see smoke, just an almost invisible blue flame. But a gummy black layer does appear on the bottom of your pan. I made my stove about 8 inches (20 cm) diameter and 16 (40 cm) inches high. They say there is nothing new under the sun. When visiting in one of the poorer sections of Kinshasa, Zaire I saw quite a few people using variations on the stove, using waste from casket makers or other carpenters."

It is also possible to construct a similar stove out of bricks, with vertical and horizontal flues, as illustrated in the diagram. Depending on the pots and other conditions, it may be more fuel efficient to place the support bars for the pot lower in the stove so the pot can be sunk into the stove, making better use the heat.

ECHO has published a Technical Note on Sawdust Cookstoves ([http://members.echocommunity.org/resource/collection/B7F86DC3-439D-4486-A7B4-1057664DB7E0/Sawdust\\_Cookstove.pdf](http://members.echocommunity.org/resource/collection/B7F86DC3-439D-4486-A7B4-1057664DB7E0/Sawdust_Cookstove.pdf)).