How to Compost:  
A Hands on Guide to Utilizing *Rice Straw* and Dairy Waste

What is Compost? Compost is the breakdown of organic material through microorganisms in a warm moist environment. Once organic material such as *Rice Straw* and Manure has undergone a 120-day composting period it can be considered a finished compost product. The microorganisms need both a carbon source (*Rice Straw*) and a Nitrogen source (Manure) in order to decompose. The proper Carbon:Nitrogen (C:N) ration should be in the range of 25-30:1 for composting *rice straw* and manure.

Aeration is a key component in composting, as the microbes need oxygen in order to continue breaking down the *rice straw* and manure. The pile needs to be turned at least twice a week in order to maintain a healthy microbe profile.

Moisture levels are another concern when maintaining proper microbe profiles in your compost. The moisture level should be between 50-60% at the beginning of the composting process in order to maintain microbes. This moisture level should not go below 30% or above 60% during the composting process.

Temperatures in *rice straw* and dairy manure mixed together for compost should reach 140º F within the first week. A range from 120º to 150º in temperatures should be maintained during at least the first 30 days of the process. For organic farmers to be able to use the finished product a temperature log must be maintained for 14 days with an average temperature being over 131º F and the compost must be turned at least 5 times during this two week period. **Most weed seeds are killed when a temperature of 130º for a period of 3 days.** *E. coli* and *Salmonella* are both denatured (killed) at the temperature of 130º.

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For further information please visit us at
[www.csuchico.edu/agr/compost](http://www.csuchico.edu/agr/compost)

Compost purchasing information available at CSUC University Farm

(530) 898-6343
Site Preparation:

Hard Surface

Cement, Asphalt, Hardened earth with a substrate are commonly used as a pad on which compost is made. A hard surface ensures easy access to piles with the windrow turner. Additionally as water is routinely added to the compost to maintain moisture, a hard surface prevents a muddy mess.

Equipment Needed:

Tub Grinder

A hay chopper/mixer, heavy duty enough to handle manure and rice straw is required for the initial combination of the straw and manure. The tub grinder is relatively easy to load, thoroughly mixes, and evenly distributes compost material to a desired uniformity.

Front End Loader

The large bucket on the front-end loader makes this machine ideal for loading manure and rice straw into the Tub Grinder/Mixer. If large rice straw bales are available, a Hay Squeeze is ideal for loading.

High Volume Water Available

The compost must remain at 60 % moisture for an expedient breakdown process. In the summer season or in dry climates water is added initially to the rice straw/manure mixture to obtain the proper moisture level.
Tractor and Windrow Turner

Turning the compost provides oxygen to the aerobic microbes, which need the air to break down the rice straw.

Thermometer

A thermometer is essential to maintaining compost quality. In the initial stages of compost formation, temperatures must be monitored very closely.

Water Application:

Soaker Hoses, a water truck, or a spray tank and nozzle attachment on the compost turner are helpful in maintaining the required moisture levels of 60% when composting in a windrow.

Screen

Depending on your manure source, your compost may be gravely and rocky after composting. A screen is very helpful in removing this litter.
Day 1 – Making Compost:

Start with raw materials, *rice straw* and dairy manure.

Use front-end loader or squeeze to put *rice straw* into the mixer/chopper (one big bale of rice straw) about 1800-2000lbs while PTO is engaged on mixer/chopper.

Add manure with front-end loader. Amount will vary depending on moisture content of manure. Keep adding manure until mixture is 50% *Rice Straw* 50% Dairy Manure.

Manure and *rice straw* is allowed to mix/chop until thoroughly mixed.

If the mixture is dry, water is then added to the tub grinder to achieve approximately 60% moisture in the compost.

Use Mixer/Chopper to make a windrow on a hard surface. Windrow size will vary with turner size and tub grinder capacity.

Repeat loads to make windrows as long as the hard surface foundation or until exhausting your feedstock supply.
Initial two weeks following compost production

- Take Temperature on a daily basis
- Maintain at least 131°F Fahrenheit for a 14-day period
- Maintain moisture at 60%
- Turn Compost approximately every other day

* Turn compost if temperatures get too hot (over 150°F) or too cool (below 131°F).

Remaining Time Composting

- Keep temperatures as close to 131°F as possible to maintain appropriate microorganisms in the compost for as long as possible
- Maintain temperature monitoring at least 3 times per week.
- Aerate (turn) windrow as needed to maintain temperatures between 131°F and 150°F Fahrenheit.
- Maintain Moisture at 60% by adding water to pile by soaker hose or water truck.

*Combine windrows when they have reduced in size to maximize space.

Cure Period

When temperatures have cooled and are no longer heating up, remove compost from hard surface windrows, and allow time for the cure period. When finished, bag or pile the compost for sale or field and garden application.
Visual Aids

Day 0 - Rice Straw and Manure

Day 45 – Rice Straw and Manure Compost

Day 120 – Finished Rice Straw and Manure Compost