Nurtured by compost produced in a workshop at the Tzu Chi Xintian Recycling Station, these vegetables thrive. Taiwanese generate about six thousand tonnes (over 13 million pounds) of kitchen waste a day. Only about 30 percent of that is recycled. A group of Tzu Chi volunteers braved foul smells and insects as they experimented with kitchen waste to fine-tune the process of composting. Now their efforts are bearing fruit.

According to Taiwan's Environmental Protection Administration, people in Taiwan generate about 13 million pounds of kitchen waste per day such as fruit and vegetable scraps and leftover cooked food. People may simply cook more than they can eat, and the leftovers either go directly into the garbage, or they are first consigned to the refrigerator and then later get thrown out.

Tzu Chi has engaged in recycling for two decades. Realizing the benefits kitchen waste recycling can bring, a group of volunteers at the Xintian recycling station in the Tzu Chi Tanzi Complex in Taichung, central Taiwan, have taken on the challenging task of making compost out of kitchen waste, despite having no experience whatsoever.

In the recycling station stands a workshop dedicated specifically to this purpose. Volunteers gather there every day to cut up scraps that have been delivered to the workshop from the kitchens of nearby Tzu Chi facilities, including the Tzu Chi Taichung office, and from individuals who care enough about Mother Earth to take action.

In food waste recycling, volunteers cannot wait till tomorrow to process what has come into the workshop today. What arrives at the workshop each day gets completely worked on that same day because food spoilage does not wait for anybody or anything. Twenty-four teams of volunteers take turns working in the workshop.

"Recycling kitchen waste involves much more than simply piling up scraps," said Lin Shu-jiao (□□□), one of the founding members of the workshop. "Though it is a messy process with many nuances, in about 40 days troublesome garbage is converted into soil-nurturing organic fertilizer."

As soon you walk into the workshop, you see buckets filled with food refuse placed on a long stainless steel table. Volunteers on either side of the table cut or shear the contents of the

buckets into uniform sizes appropriate for the type of food. “We’ve found that cutting food waste into pieces too slender or too big is actually detrimental to the composting process,” Lin said. “Proper, uniform sizes work best. Air circulation in compost bins boosts the ability of microbes to break down the refuse more quickly. And the more varied the kitchen waste, the higher the quality of the compost.”

There are many other wrinkles or characteristics in the composting process that were not at first discernable to the volunteers. For example, too many pineapple rinds make it harder for a compost heap to decompose, but the richer enzyme content makes the compost especially fragrant. Though egg shells do not break down easily, they do somehow help with the composting process. Even things as hard as corn cobs can be broken down in composting if they are split lengthwise into quarters or thinner and then cut into pieces about five centimeters long.

Also, it turned out that in composting, cooked and raw food scraps do not mix too well, and cooked food needs to be rinsed in water to rid it of excess cooking oil and salt. Processed food, such as tofu and imitation meat, is acceptable so long as it does not contain too much salt (which is added to processed food as a preservative).

Once raw scraps have been cut to size, cooked scraps have been rinsed and drained of water, and all the other preparation work has been completed, the ingredients are ready for the compost heaps.

In the back of the workshop, there are four long shelves on which a total of 120 large 88-liter (23-gallon) green plastic containers are neatly lined up. At about 15 centimeters (6 inches) above the bottom of each container lies a layer of screen—chicken wire wrapped in a mesh fine enough to keep out mosquitoes—that serves as a separator between food scraps and liquid. The scraps are held above the screen so that microorganisms can break them down while the resulting liquid drips through the screen and collects at the bottom of the container.

The compost heap

In addition to food scraps, a compost heap needs to have two more items: microbe booster and rice chaff, two ingredients that volunteers need to purchase from a local farmers’ association at nominal prices. The need to use the specified items is the only major difference between this featured compost approach and the typical way of yard waste composting.

Keep the microbe booster and chaff separate, and make a third item by mixing two parts microbe booster and one part rice chaff (“mixture”).

Ingredients in a compost heap are put down in layers, much like making lasagna. Each layer in

the heap is about five centimeters (two inches) thick. First put down a layer of rice chaff as a foundation. On that, put a layer of mixture, and then a layer of food scraps. After a total of seven layers each of mixture and scraps, the heap is topped with a layer of microbe booster and finally a layer of rice chaff.

Cooked food is best kept as a separate layer and put in the middle of the heap; extra microbe booster is required to handle the additional moisture. Put down the ingredients loosely; do not compact the heap because air is an important ingredient in composting. Lin noted that the chaff sucks excess moisture out of the scraps.

After a heap is made in a container, the container is left uncovered. The batch number and date are noted on a slip of paper that stays in a clear plastic pocket near the brim of the container. Leave the container in a place where air circulates easily. Now that the sowing is done, all one needs to do is wait for the harvesting.

The products

Very near the base of each green compost container is a faucet. Four days after a heap has been started, volunteers turn on the faucet to drain the liquid that has collected in the container. More liquid is drained out once every four days for a total of ten times, or 40 days from the start of the heap, after which the heap dries up—a sign that the compost is mature and ready for use.

Each time workers collect the liquid from a compost heap, they dissolve about a pound of brown sugar in 20 kilograms (44 pounds) of this liquid and stored the batch in a white container. Liu Pin-jun (□□□), another core volunteer at the workshop, said, “Brown sugar suppresses the odor from the compost liquid, helps with the fermentation process, and enhances the quality of the liquid fertilizer, which is ready in 21 days.”

The workshop usually cannot gather the liquid quickly enough to meet the demand. This liquid is in such high demand because it is quite a helper in any household.

The liquid, in full strength, has been shown to be a superior drain opener. Once an office toilet was so clogged up that even a plumber could not fix it, but after some of the liquid was poured into the toilet, it began flowing freely again, sparing the building owner the expense and agony of repair.

Unlike chemical drain openers, this natural clog opener is gentle; it does not corrode pipes or make them brittle. And because it is entirely natural, it does not pollute as chemical openers invariably do.

One quart of this liquid can also be diluted in 300 quarts of water to make a liquid fertilizer.

Both the liquid fertilizer and the solid compost are excellent soil conditioners that can give any gardener a green thumb. “The small vegetable garden outside the workshop serves as our best advertisement,” Lin said with a smile. The fruit plantation at the Tzu Chi Sanyi Complex about 30 miles to the north has started using these soil conditioners, and it has seen marked improvement in the quality of its produce.

According to the statistics that Lin is keeping, in the 33 months between April 1, 2007 and December 31, 2009, the volunteers at the workshop made compost heaps in 2,016 88-liter (23-gallon) containers, recycling about 40,320 kilograms (88,900 pounds) of kitchen waste. The heaps produced 1,210 20-kilogram (44-pound) bags of solid compost and 1,317 20-kilogram containers of liquid.

These numbers are for the food waste from the Xintian recycling station alone. They would be much higher if scraps brought in from other Tzu Chi facilities were also included.

Both products are used to enhance the landscapes at nearby Tzu Chi facilities. “They can also be purchased for prices substantially lower than comparable commercial products,” Lin explained. “The proceeds from the sales help defray the cost of microbe booster and rice chaff.”

The core player

Lin has been the key player since the workshop started operating in 2007 when some building space became available for such a mission.

Lin said that in fact recycling volunteers like her had long known about the troublingly high volume of kitchen waste, but they had not done anything about it sooner because there had been no suitable space.

Referring to the early days of the workshop, Liu Pin-jun, another key player, said, “We had no experience and we could not make any compost during the first six months. It was one failed batch after another. The smell was awfully offensive and insects were rampant. Many volunteers were disheartened.”

But she and Lin pressed on. They tweaked their methods every which way and learned from their mistakes. Now they have accumulated nuances that have enabled them to overcome the challenges of insects and odor. For example, they found that the compost buckets should be left uncovered so as not to attract insects.

Lin numbered every one of the 120 compost heap containers to facilitate quick referencing, and she keeps a logbook with precise records about each container. The log clearly shows when and what needs to be done to which container. With this information, volunteers can quickly and efficiently drain liquids or harvest compost. The logbook also helps to trace what works and what does not.

Now that the volunteers have worked out most of the kinks in their composting process, many

people have visited the workshop to learn. Volunteers from other Tzu Chi recycling stations come to learn from Lin and Liu, and they implement what they have learned at their own stations.

A family situation has prevented long-time core member Liu from staying with the workshop. However she did not phase out of the project before she had contributed greatly to its growth. Lin remarked that she needs to bring up another key helper soon.

Free kitchen waste disposal as part of public garbage collection has been available to people in Taiwan since 2001, but many people apparently are not taking the time or effort to separate their kitchen waste from other kinds of garbage. “Of the more than two million tonnes (2.2 million US short tons or 4.4 billion pounds) of kitchen waste generated a year in Taiwan, only about 30 percent is recycled,” Lin lamented.

Lin hopes that everyone will start recycling their food waste. Better yet, she hopes that people will cook just enough for their consumption so that there is no food waste to be recycled. If extra food is not cooked, then extra energy is not used for cooking, and extra food is not wasted.

Source: Tzu Chi Quarterly Fall 2010
Translated by Tang Yau-yang