Today an urban Indian citizen generates nearly 250 kg per year of wet waste from kitchen. Municipal corporations are only able to compost 0.21% of this wet waste. To overcome this huge deficit, households and apartment societies are increasingly starting to engage in composting at the source.

Being an environmentalist, I too realised that we have also become a part of the common crowd who only talk but do not walk the talk.

That’s when I decided to dig up a small pit in our backyard and started to dump all the kitchen waste such as leftover food and garden waste including dried leaves into it. However, our grand plan suffered a major setback when the open pit became a favourite roaming place for rats who started to spill the leftovers and made the entire place extremely untidy. The rats also entered our house and it took a lot of effort to get them out. But I was not going to give up so soon.

Challenged by the constant annoyance, I pushed the idea to buy a new compact well-ventilated steel composter from my
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Dad’s friend, who is the owner of a composter manufacturing start-up. This helped to resolve the rat problem.

However, the struggle was not over and a new problem of worms was observed inside the composter. Unlike soil, the metallic body of the composter was not suitable for absorbing the moisture present in the kitchen waste, leading to growth of worms in wet compost conditions.

To permanently end this malaise, I then decided to create a moisture sensor so that the moisture level is maintained optimal all throughout the composting process. Luckily this time we did not face any new challenge in the composting process and the solution is ready for use.

One of the significant challenges in composting at source is to maintain the stability of the biochemical process. This is required to eliminate bad odour, increase nutrient content and prevent the organic waste from becoming phytotoxic when incorporated into the soil.

Among all the physical and chemical factors that affect this process, moisture is one of the most important. Low moisture content results in slow microbial activity, low temperature during thermophilic stage and increase in pest population. On the other hand, high moisture content results in anaerobic conditions and increase in air polluting gases also resulting in bad odour. The optimum moisture range is 55% to 65% wet basis moisture content.

Traditionally, composting educators have been using the “squeeze test” to determine the moisture content. If no water can be squeezed from the compost, it is dry and if water trickles out without squeezing, it is wet. Although this test works well in small scale composting units, it is tough to monitor when the scale grows larger.

To overcome this, we have designed an electronic device using a pair of soil moisture sensors to indicate the moisture content. This will help compost users to either add moisture if it is too dry or add dry leaves to reduce moisture if it is too wet.

The device is made using two sensors (soil moisture sensor EC 1258). Each sensor (S1 and S2) is a kind of potentiometer, which gives different voltage output at different moisture content present in the compost. The threshold of each sensor can be set to the desired value (between 55% to 65% in our case). This threshold is compared by the comparator with the voltage across the probes and accordingly the output LED (L1 and L2) on the sensor will glow or not.

The threshold of S1 is set at a lower moisture content level (55%) while the threshold of S2 (65%) is set at a higher moisture content.

We have used this instrument successfully in an actual small-scale compost. If the sensor indicated DRY, we added water to moist the compost until the sensor indicated CORRECT. If the sensor indicated WET, we added dry leaves until the sensor indicated CORRECT. In this manner, the moisture content in the compost was controlled throughout the eight-week period resulting in stabilized organic residue and no bad odour during the process.

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