



FAMILY NET VESSEL COMPOST TECHNOLOGY: A SOLUTION FOR MANAGEMENT OF KITCHEN WASTE

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Rapid urbanization, population growth and increase in food consumption rate led to increase in municipal solid waste (MSW) generation in India. Per capita generation of MSW in small towns and cities ranges from approximately 0.17 kg to 0.62 kg per person per day with a mean of 0.4 kg per capita. About 40% of MSW is considered to be biodegradable, of which only 14% (9.1 Mt) were composted in 2010 and is expected to reach 15 Mt by 2030 (Manna *et al.*, 2017). Biodegradable MSW mainly comprise of kitchen waste (KW) discharged from households and waste generated out of industrial activities. Recent data on worldwide generation of KW shows that India is in third position after China and United States in generating KW (figure 1).

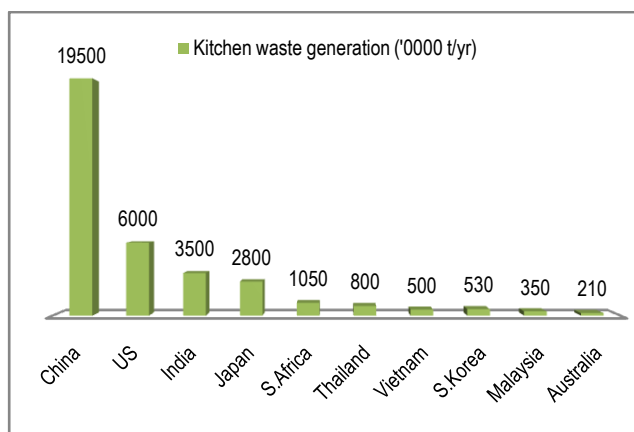


Figure 1. Kitchen waste generation from several countries (redrawn from Hafid *et al.*, 2017)

KW contains high moisture content which when mixed with other municipal wastes creates odour, nuisance, produce leachate and obnoxious gases in the landfill sites (Yang *et al.*, 2019). KW is characterised by high organic and

biodegradable materials and consists of about 60% carbohydrates, 20% protein and 10% lipid (Pleissner and Lin, 2013). Thus, a strong technology is needed to segregate kitchen waste at source level and convert it into stable and nutrient enrich compost.

For recycling of kitchen waste into valuable compost ICAR-Indian Institute of Soil Science, Bhopal, has developed the concept of Family Net Vessel Compost (FNVC) technology using earthworms (figure 2). The technology makes use of three epigeic earthworm species viz., *Eisenia fetida*, *Eudrilus eugeniae* and *Perionyx excavatus*.



Figure 2. FNVC at ICAR-IISS campus residential area

In this technology, the vessel is made of a nylon net (90cm length and 35cm diameter) and a plastic basket placed inside the vessel. In the basket, about 100-150 nos. of adult epigeic



earthworms of three species in equal numbers is kept along with small pieces (3-5 cm length) of KW and a layer of well decomposed cattle dung spread over the waste. Whole material is covered with jute bag and kept moist by adding water regularly to maintain the moisture. The capacity of the FNVC is about 10-15 kg KW. It can be hung in the available space of the house or on the branches of the tree planted around the house with the help of nylon rope.

Domestic waste generated by a family (4 members) each day, is added to the vessel for about 10 days till 10-15 kg mass is attained and left for decomposition for another 20 days. After 30 days the vermicompost gets ready for field application (figure 3). It was observed that a family of four members has to keep 3 FNVC units for continuous recycling of domestic waste. Nutrient level of the compost prepared using this technology in the institute was organic carbon to total nitrogen ratio of 10-12:1; 1.2% total nitrogen, 2.0% total phosphorus and 0.8% total potassium.



Figure 3. Compost prepared using FNVC at the ICAR-IISS

FNVC is an efficient technology and can be easily adopted to convert kitchen waste into valuable compost thus, discouraging the practice of dumping the waste on a large scale. This technology has also been demonstrated to various agricultural stakeholders and also e-published through a four minutes video in YouTube

(https://www.youtube.com/watch?v=q-TI3xk_90A). It has been distributed to selected farmers and state government officials of India for wider application (figure 4).



Figure 4. Distribution of Family Net Vessel Compost technology to (a) Farmers (b) State government officials

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