

**RESEARCH PAPER**

# Decentralized biodegradable kitchen waste management using microbial consortia 'KAU's composting inoculums' in urban and semi urban households of Kollam district through frontline demonstrations

P. I. Poornima Yadav\*, C. R. Manu and K. S. Meenakumari<sup>1</sup>  
Krishi Vigyan Kendra (K.A.U.), Sadanandapuram, KOLLAM (KERALA) INDIA  
(Email : poornimayadavpi@gmail.com)

**Abstract :** The total solid waste produced in Kerala (5 Corporations, 53 Municipalities and 999 Panchayaths) is approximately 6000 tonnes/day and around eighty percentage of this is biodegradable. The disposal of such large quantities of solid biodegradable waste has become a serious problem in corporations and municipalities. The observations made by the Kendra found that the people are not aware of scientific and easy methods of waste disposal at the source itself, resulting in accumulation of such large quantities. In this context the Kendra popularized a novel technology developed by KAU for solid organic waste management (kitchen and house hold) using a microbial consortia 'composting inoculam' in the households of Kollam Corporation of Kerala and nearby places through frontline demonstrations during the year 2014-2015. The primary objective of this technology was the disposal of kitchen and food waste at the source itself. This eco-friendly, environmentally sound and economically viable technology attracted the attention of other urban dwellers and local administration. In the demonstrations, a pot with a dimension of 60 cm height and 60 cm diagonal converted 34.78kg kitchen waste to 6.93kg compost in 71 days. They could also utilize the compost for growing crops in backyard and terraces.

**Key Words :** Kitchen waste management, Using microbial consortia, Urban, Semi urban households

**View Point Article :** Yadav, P.I. Poornima, Manu, C.R. and Meenakumari, K.S. (2018). Decentralized biodegradable kitchen waste management using microbial consortia 'KAU's composting inoculums' in urban and semi urban households of Kollam district through frontline demonstrations. *Internat. J. agric. Sci.*, **14** (1) : 240-243, DOI:10.15740/HAS/IJAS/14.1/240-243.

**Article History :** Received : 02.08.2017; Revised : 10.12.2017; Accepted : 22.12.2017

## INTRODUCTION

### Problem statement:

The total solid waste produced in 5 Corporations, 53 Municipalities and 999 Panchayaths of Kerala is approximately 6000 tonnes/day. In Kollam Corporation

the estimated total solid waste generation is 170 t / day (estimated based on direct sampling). Out of which 55.88 per cent is household wastes. The per capita waste generation in Kollam Corporation is 434 g/day/head. More than 80 per cent of these wastes are biodegradable

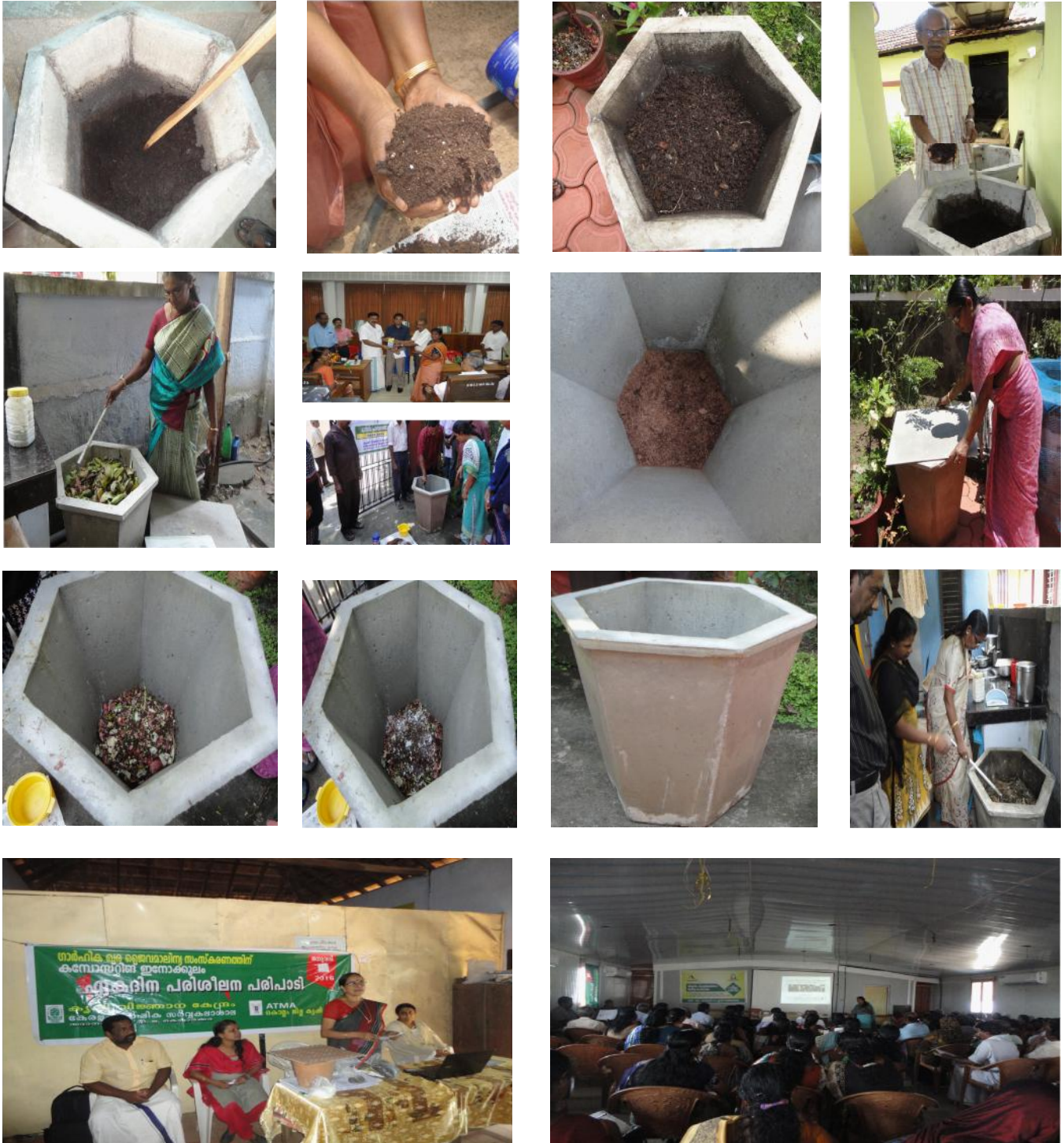
\* Author for correspondence:

<sup>1</sup>Department of Microbiology, College of Agriculture, VELLAYANI (KERALA) INDIA

in nature (KSUDP, 2006).

The disposal of these organic wastes has become a serious problem in Kerala. The hygienic disposal of organic wastes by composting is an environmentally sound and economically viable technology resulting in the production of manures which is a valuable input in

organic farming. Composting, is a biological process in which micro organisms decompose organic waste material like crop residues, house hold wastes etc and lower the carbon nitrogen ratio of the substrate so that it can be added to the soil without detrimental effects on crop growth. Currently the city administrations are



**Table 1: Mean value of quantity of waste/pot (kg), quantity compost/pot (kg), days taken to fill the full capacity of pot and days taken for composting (days) from the frontline demonstrations**

Quantity of waste/pot(kg)	Quantity compost/pot(kg)	Days taken to fill the full capacity of pot	Days taken for composting(days)
34.7	6.93	72	71

popularizing various methods of composting for the decentralized organic waste management namely pipe composting, vermi composting, biogas process etc. All these practices have some disadvantages like foul smell (pipe composting), type of waste (food waste not preferred in vermi composting and high cost of installation and constant care in bio gas units). Hence, easy and cheap technologies for the disposal of organic waste are the need of the hour. Degradation of solid organic waste especially house hold waste like kitchen and food waste can be done more efficiently by the use of KAU's 'composting inoculum' (a talc based formulation of microbial consortia capable of degrading organic waste) without producing any foul smell. Other advantage of this technology is that the consortium is that extra care from pests, rodents is not required as the microbes are not affected by these organisms. In this background Krishi Vigyan Kendra, Kollam has conducted a frontline demonstration on disposal of biodegradable waste in urban and semi urban areas by composting inoculum with an objective to popularize an alternative mechanism for effective solid organic waste disposal in urban and semi urban households of Kollam district.

#### **Intervention- Planning and implementation:**

ICAR KVK, Kollam under Kerala Agricultural University at Sadanandapuram did systematic studies to evaluate the feasibility of this technology ie kitchen and food waste disposal using KAU's(Kerala Agricultural University) composting inoculums in Kollam district from 2012-2014 and found that the technology was very much suitable for disposing house hold kitchen waste at source. The Kendra had conducted 12 on campus training programmes at KVK level. In order to popularize this technology KVK has submitted proposal on this technology Agricultural Technology, Application Research Institute, Indian Council of Agricultural Research, Bangalore as frontline demonstrations and approved the same for the year 2014-15. Total 25 frontline demonstrations were conducted in the households of Kollam Corporation (Mundakkal east, Uliyankovil and Pattathanam councils) and Sadanandapuram and Kottiyam town under close supervision of KVK scientists. The trial was started on

July 2014 and it took one year to complete. Before the actual implementation, trainings and method demonstrations were conducted to excel the people's understanding and skill about the technology to be demonstrated. Seven training programmes and 15 field visits and method demonstrations were conducted within the project period.

### **MATERIAL AND METHODS**

– The Kendra has designed a cement pot with 60 cm height and 60 cm diagonal with a lid and distributed such pots to the selected 25 households.

– Talc based formulation of microbial consortia 'composting inoculum' and charcoal powder to absorb excess moisture in the system.

The methodology used for composting organic form of waste especially kitchen and food waste is given below.

– Segregated the domestic waste into plastic, metal (non degradable form) and solid organic form (degradable form).

– Only solid organic biodegradable waste (vegetables, kitchen and food waste) was used for composting.

– A cement garden pot with dimension as mentioned above was taken and the drainage holes of the pot were closed with cement.

– A layer of coir or coir pith of 2.5 -3 cm thickness was added at the bottom of this pot.

– Vegetable wastes and food waste of each day was spread above this daily and then 5-10 g of composting inoculums was added above the waste. (5-10 g inoculum is sufficient for 1kg of vegetable and food waste.)

– Then it was stirred thoroughly and the black powder (given along composting inoculums) was spread over the waste for management of moisture.

– Top of the pot was covered with a plane tile or wooden piece. The process was continued till the pot attained its full capacity.

– Occasional mixing of the whole contents was done using a rod

– Once the pot was filled, the process was continued using the second pot.

– The filled pot was kept for completion of composting process.

The observations on quantity of waste/pot (kg), quantity compost/pot (kg), days taken to fill the full capacity of pot and time taken for composting (days) were recorded.

## RESULTS AND DISCUSSION

The frontline demonstrations conducted in the urban and semi urban areas of Kollam district revealed that the technology demonstrated (Disposal of biodegradable waste in urban and semi urban areas by composting inoculums) was useful for the disposal of organic solid waste especially food waste and kitchen waste. In the demonstrations, it took an average of 73 days to get the pot (60 cm height and 60 cm diagonal) filled and the weight of waste was 34.78kg. This waste was successfully converted to 6.93kg compost. The time taken for composting was 71 days (Table 1) after filling the pot. Similar results were also reported by Kannahi and Babynisha (2014); Jadhav *et al.* (2013) and Payal *et al.* (2011).

According to the feedback of participating people, the main constraint in the technology was the non-availability of composing inoculums and the presence of larvae of soldier fly in the pot. Households which successfully completed the demonstrations opined that the technology was easy, cheap and highly suitable to urban and semi urban household without any foul smell. They utilized the compost obtained through this technology for growing crops in backyards and terraces.

After the successful completion of the programme a gala field day was organized at the Kollam Corporation Hall on 7-8-2015 which was presided over by the Hon. District Collector Dr. A. Kowsighan IAS in which he enquired the possibility of including this technology under Suchitwa Mission; programme was inaugurated by Hon. Mayer Smt. Honey, leaflet on this subject was released, corporation councilors, officials from Dept of Agriculture including the Principal Agrl Officer Sri. Pradeep Naik and Project Director ATMA, Sri. KP Jaicob, and interested farmers were participated and the efforts of Kendra on decentralized waste management were widely

acclaimed. Wide publicity was given through newspapers, DoorDarshan, FM radio etc. DoorDarshan broadcasted the whole field day on 30.11.2015 through Krishidarshan. KVK celebrated New Year 2016, by inaugurating a series of training programmes on kitchen and household waste management using composting inoculum in Corporation and Municipalities of Kollam district. So far 22 training programmes has been conducted from 1<sup>st</sup> January to 31<sup>st</sup> December 2016 and >1070 people participated. Approximately 1450 leaflets on composting inoculum were distributed among the farmers and residents of corporation and municipalities.

### Wide spread adoption of technology through ATMA, Kollam district:

The Department of Agriculture included this technology under district specific activity of ATMA and through which 145 demonstration units were distributed to households of Kollam Corporation and follow up programme of ATMA exposure visit of ADA Sasthamcotta.

### Conclusion:

The disposal of solid organic waste especially kitchen and food waste by the use of microbial consortia KAU's 'composting inoculum' was found promising in urban and semi urban areas. The technology demonstrated was also cheap, easy and eco-friendly.

## REFERENCES

- Jadhav, A.R., Chitanand, M.P and Shete, H.G. (2013).** Flower waste degradation using microbial consortium. *IOSR J. Agric. & Veterinary Sci.*, **3** : 1-4.
- Kannahi, M. and Babynisha, S. (2014).** Microbial consortium: A new approach in effective degradation of Flower waste. *Internat. J. Univ. Pharm. & Biosci.*, **3** (2) : 281-290.
- Payal, S., Meghvanshi, M. and Rajni, S. (2011).** Microbial consortium: A new approach in effective degradation of organic kitchen waste, *Internat. J. Univ. Environ. Sci. & Develop.*, **2** : 441-443.

### WEBLOGGRAPHY

KSUDP (2006). <http://www.sanitation.kerala.gov.in>.

14<sup>th</sup>  
Year  
★★★★★ of Excellence ★★★★★