

### Findings from Co-Composting Operations at a Fecal Sludge Treatment Plant (FSTP), Devanahalli, India

# BACKGROUND



## METHODOLOGY / PROCESS

- Thermal Heating
- Co-composting
- · Solar drying or
- lime addition

# Assessment of Options

### Feasibility

- Co-composting Less capex and readily available bulking agent
- Market Value for end product

- Aerobic Windrow method
- Proportioned (MSW:FS ratio)
- Periodical turning

Co-composting methodology

## **OBJECTIVE OF THE STUDY**



## **CO-COMPOSTING PROCESS**

#### FEED STOCKS USED

- 1. Municipal Solid waste (Segregated)
- 2. Coconut Coir
- 3. Paddy Straw
- 4. Faecal Sludge
- 5. Leaf Litters

#### PARAMETER CONTROLLED:

- 1. Temperature
- 2. Moisture content
- 3. FS:MSW ratio
- 4. Turning frequency



Fecal sludge layer



Organic waste layer



Windrow of 6 feet



## **TURNING PROCESS**

### **Key Observations**

- Due increase in temperature, heat was released as fumes while turning
- 2. Frequent turning 7-10 days interval
- 3. Ensured faster degradation of waste
- 4. Faster Reduction of volume





## ANALYSIS VALUES OF WINDROW

Parameters	Organic compost (FCO, 2009)	Results of 88 days		Parameters	Organi compost (FCO, 2009)	Results of 88 days
рН	6.5 – 7.5	7.07				
Conductivity (as dsm-	4	1.24		Total P205 % by weight,	0.4	0.2
1), not more than				min		
Moisture %by weight,	15 – 25	30.2		Total K20 % by weight, min	0.4	0.98
max						
Bulk density (g/cm3 )	Less than 1.0	0.77			00	10.4
Total Organic Carbon,	12	18.2		C:N ratio	<20	12.1
% by weight, minimum				Lead(mg/kg)	100	84.9
Total N % by weight,	0.8	0.23		Chromium (mg/kg))	50	31.1
minimum				Cadmium	5	0.37
Total P205 % by	0.4	0.2			-	
weight, minimum			1	Nickel(mg/kg)	50	23

### **Key observations**

All the parameters are meeting the FCO standards DURATION OF THE PROCESS = 80-90 days

### ANALYSIS VALUES OF MICROBES

Microbial parameters							
Parameters	Treated faecal sludge	15 days of compost sample	60 days of compost sample				
Fecal coil in CFU/ml	60*10^5	12000	70*10^5				
E.coil in CFU/mI	29*10^5	Absent	10*10^5				
Helminth Eggs in EPG	100	Absent	Absent				

### **Key observations**

Due to increase in the moisture content E.coil and Fecal coil forms count has increased

## TOTAL FAECAL COLI FORMS AND E.COLI COLONIES







### MASS REDUCTION



#### **Key observations**

Percentage of feedstock recovery lies between 30-33%



### CONCLUSION

- Maintaining optimum moisture content and turning frequencies of 7 days achieved maximum deactivation of pathogens.
- FS : MSW Ratio of 1:1.5 and 1:2 was found to be the optimal process.
- On application of EM and cow dung slurry, windrow with EM has high composting rate than cow dung.
- Seeding of EM in windrows has met the pathogen reduction within the permissible limits.
- Pathogen reduction on seeding of cow dung slurry has not met standards.
- Might be due to presence of microbes in cow dung slurry caused/impacted to increase the E.coil and Faecal coliforms count

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### **KEY LEARNIGNS**

- The provisions for various parameters to guide the quality of the manure are too stringent
- Need for policy recommendations with an aim to correct short comings to benefit the farming community for co-compost utilization
- Need a 'Policy Brief' to consider Faecal sludge byproducts as organic manure by providing evidences through study findings

