WASTE DECOMPOSER

(A WAY OF FARMERS DOUBLING INCOME)

WASTE DECOMPOSER
(For Farmers use only)
Recommended for All Crops

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WASTE DECOMPOSER
(A Way of Farmers Doubling Income)

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Hon'ble Prime Minister's Swachh Bharat Abhiyan is a milestone vision to convert the waste into a usable form. This will not only reduce the dependency on fertilizers but also various other benefits are related to the Abhiyan. National Centre of Organic Farming, Ministry of Agriculture has taken one step towards this magnanimous vision and developed a 'Waste Decomposer' which is a consortium of beneficial microorganisms and is able to convert all types of waste from the kitchen, agriculture, and animal, etc. in forty days in a usable form.

It was noted that so far whatever technology is available in the market, which is a composition of a number of microorganisms. It requires around 1-2 kg of culture to convert per tonne of waste which is costly and also ineffective as it cannot convert all types of wastes. The technology being uneconomical is not accepted by farmers/users.

The new technology of waste decomposer ensures all types of waste conversion into manure within 30-50 days depending upon raw material/wastes used. This single product is able to convert more than 1 lakh metric tonne of waste into manure in just 40 days. Besides this, it can be used in the soil improvement, seed dressing, biofertilizers, plant protection, etc. This single mother culture can be used by farmers for several years.

The technology of 'waste decomposer' is devoted to the farmers who are facing the problem of waste/crop management in agriculture. I hope this scintillating product will bring a bio-revolution among the users. My resolution to work for the betterment of farmers and this society drove me for eleven years and instigated me to create this product.

(Dr. Krishan Chandra)
INTRODUCTION

1.0 SALIENT FEATURES OF WASTE DECOMPOSER

2.0 MASS MULTIPLICATION OF WASTE DECOMPOSER
   2.1 Process of Mass multiplication
   2.2 No Structure, Pit or equipment require
   2.3 Quick Composting by Waste Decomposer
   2.4 Healthy Compost

3.0 ADDITIONAL USES OF WASTE DECOMPOSER
   3.1 As Biopesticide and Biofertilizers
   3.2 In-situ composting of crop residue
   3.3 Drip irrigation
   3.4 Seed Treatment
   3.5 Foliar Spray

4.0 MULTI-POTENT EFFICIENCY OF WASTE DECOMPOSER
   4.1 Disease Management
   4.2 Crop quality and yield
   4.3 No need of Chemical Fertilizer
   4.4 No need of Pesticide/Fungicide/Insecticide for crop protection
   4.5 Effect of Waste Decomposer on Soil
      a Soil Physicochemical and Biological Properties
      b Soil salinity
   4.6 Effect on Seed Germination
   4.7 Nilgai (Blue bull) don’t eat plants drenched with Waste Decomposer solution
   4.8 Promising tool for Swachh Bharat Abhyian
   4.9 Cleanses toilets and reduces the foul odour

5.0 SUCCESS STORIES

6.0 FARMERS VIEW
   6.1 No need to use any input while using Waste Decomposer and its usage
doubled my income – Lalit Kumar Sahoo
   6.2 Control of root borne diseases - Om Veer Singh, Organic Farmer

7.0 FINDINGS OF WASTE DECOMPOSER EFFICIENCY BY ICAR-IIFSR, MODIPURAM
INTRODUCTION

India generates about 62 million tons of bio-waste every year. Not only the waste has increased in quantity, but the characteristics of waste have also changed tremendously over a period. The per capita waste generation in Indian cities range from 200 grams to 600 grams per day. However, an estimated 2 Tons per day agri-waste is produced in each village having an average 300-400 households through largely cow dung, cow shed waste and post-harvest residues (husk, trash, biomass, stems, sticks etc). Besides this, it is also noted that an average of 10 MT of cow dung is generated from the "gaushalas" per year. Also, around 11 MT of press mud which is a high value in nutrition is generated per year from the sugar industry. The main cause of concern among the rural population in developing countries is the management of agricultural and municipal solid waste. The present practice is usually to burn these residues or to leave them to decompose. To overcome this problem National Centre of Organic Farming, Ghaziabad developed a product called Waste Decomposer. It is a consortium of few beneficial microorganisms which is isolated by Krishan Chandra 2004 from desi cow dung and took 11 years to standardise the mass multiplication technique at the farm level. Waste decomposer works as Biofertilizer, Biocontrol, and as well as soil health reviver. It can also be used in various ways such as quick composting of bio wastes, drip irrigation, foliar spray as biopesticide against most of the plant diseases for all types of agriculture and horticulture crops, in-situ composting of crop residue and seed treatment. Waste decomposer microorganism produces primary metabolites that are a precursor of anti microbial compounds, it also produces a variety of antimicrobial secondary metabolites including polyketides and alkanes. These antimicrobial metabolites facilitating in the field crop which controls the number of diseases. Besides this, it also produces glucanase and β-1,3 glucanase enzymes which trigger defence mechanism of the plant.

1.0 Salient Features of waste decomposer

- Simple & Reliable
- Ready to use (within 5 days)
- Longer shelf-life (3 years)
- Recommended for all crops
- Better crop response
- Works as a great component for clean India Movement (Swachh Bharat Mission) by converting bio-waste into organic Manure
- Low cost (only Rs. 20 per bottle)
- More than 1 lakh metric tonne organic manure could produce from 1 bottle per year by farmers.

2.0 Mass multiplication of Waste Decomposer

Waste decomposer is given to the farmers in small bottles and they themselves mass multiply this product without using any sophisticated technique.
Process of Mass Multiplication
Take 2 kg jaggery and mix it in a plastic drum containing 200 litres water. Now take 1 bottle of waste decomposer and pour all its contents in a plastic drum containing jaggery solution. Mix it properly with a wooden stick for uniform distribution of waste decomposer in the drum. Cover the drum with a paper or cardboard and stir it every day once or twice. After 5 days the solution of drum turns creamy.

Note: Farmers could prepare the waste decomposer solution again and again from the above formed solution. For this, 20 litres of waste decomposer solution is added to a drum with 2 kg of jaggery and 200 litre water added. Again it will be ready in 7 days.

Fig. Mass multiplication of Waste Decomposer

Structure, Pit or equipment require
Composting with Waste Decomposer is very much cost effective, as this technique demands neither standard structure nor essential parameters which are compulsory in other composting methods. Therefore, the farmer could save the entire costing supposed to be spent on the structures and process. In case of composting other than with waste decomposer, require standard structure like brick lining, bottom line concrete, pit, trench, bins etc and many other parameters like heap size (height, length, and width), covering with plastic/jute material, ventilating stacks etc. Better composting and good quality compost is not expected without maintaining standard structure and essential parameters with the so far existing methods of composting. But composting with the waste decomposer technology could produce high quality compost despite any standard structure and essential parameters.
2.3 Quick Composting

The mass multiplied solution of waste decomposer is used to decompose bio-waste into organic manure.

- 18-20cm thick layers of 1 ton bio-wastes such as agricultural wastes, kitchen wastes, cow dung etc. are piled on the ground.
- Wet the waste with solution of waste decomposer.
- Again another 18-20cm thick layer of bio-waste is spread & again wet with waste decomposer solution.
- The above processes are repeated till the piling goes 30-45cm higher.
- Turn the pile at every 7 days interval for uniform composting and add more solution at every turning.
- Maintain 60% moisture during the entire period of composting. If required again add solution.
- The compost gets ready to use after 30-40 days.

2.4 Healthy Compost

Compost which gets ready by using waste decomposer is dark brown in colour, no foul smell, not warm, dry, and very good in quality having high organic carbon content and other nutrient content. It doesn’t attract flies and insects and no foul smell, which is, in fact, a good sign for healthy composting. Generally, in case of so far, existing composting lot of complication are noticed by farmers and surrounding people which are offensive to the community living in the area of composting, some of the notable complaints with existing composting methods are, 1. Foul smell, 2. Matted leaves or grass clippings aren’t decomposing, 3. Stinks like rancid butter, vinegar or rotten eggs, 4. Odor like ammonia, 5. Attracts rodents, flies, or other animals, 6. Attracts insects, millipedes, slugs, etc, 7. Fire ant problems and etc. But if the Waste Decomposer Technology is adopted, there will be zero percent offensive and recurring management problems. Due to this healthy composting features, it is very much adaptive in for kitchen and terrace gardening.

Waste decomposer microorganism was demonstrated to be an excellent candidate for lignocellulose degradation in this work, showed more robust growth, stronger spore production, faster secretion of lignocellulose-decomposing enzymes and better pH tolerance. These features make this product unique to convert all types of waste into good compost.

| Table 1: Effect of Waste Decomposer on cowdung composted at 35 days |
|-----------------|------|-----|----------------|-------|--------|--------|------------------|
| PA   | EC  | C:N | Organic carbon (%) | N (%) | P (%) | K (%) | Total Micro Organism |
| 7.5  | 3.8 | 18:1| 18.0              | 1.2   | 0.60  | 0.8   | $10^{12}$        |
**Additional uses of Waste Decomposer**

Waste decomposer not only decomposes the bio-wastes, but it can be used in multiple ways.

**As Biopesticide**

The mass multiplied liquid waste decomposer culture is diluted in the ratio of 1:3 with water and applied as a foliar spray to control pest and diseases. It can control all types of soil borne, foliar diseases, insects, and pests.

**In-situ composting of crop residue**

Spray the solution on the post-harvest stalks of crop plants soaked with water and leave it for few days.

In water stress areas just sprinkle the solution on crop residue and when the farmer does the irrigation in field the process of decomposition starts.

The above 200 litre preparation can be used for 1 acre crop residue as in-situ composting.

**Sprinkler irrigation**

For the revival of soil health and as biofertilizer for the crop, waste decomposer is used during irrigation in the field by mixing the mass multiplied solution with water. 200 litres of waste decomposer solution is enough for 1 acre land.

**Seed Treatment**

Simply spray/sprinkle the waste decomposer solution uniformly over any type of seeds. Leave the treated seeds under shade for 30 minutes. After 30 min. the seeds are ready for sowing. Various seed borne diseases are controlled by waste decomposer.

**Foliar Spray**

The mass multiplied liquid waste decomposer culture is diluted in the ratio of 1:3 with water and applied as a foliar spray to control pest and diseases.

**Multi-potent efficiency of Waste Decomposer**

Waste Decomposer has a great potential to control a variety of fungal bacterial and viral diseases effectively on different crops. Damping off disease in Chilli, Tomato, Brinjal peanut, potato soybean, maize cabbage etc., Rhizome rot disease in Ginger turmeric, onion etc, Root rot disease in citrus, methi, berseem, pineapple, potato, cotton, tomato, Brinjal, Chilli, peanut, potato, coffee, balck pepper, lychee etc.
4.2 **Crop quality and yield**
Good quality of crop and high yields are the desired feature of any crop by any farmer/producer across the globe. Waste Decomposer is a promising tool for good quality of crop and high yields. It was reported by the farmers that usage of waste decomposer in their fields has resulted in the luxuriant growth of the crop. Potato producers have reported that they have harvested the potatoes with bare hands only as the soil has become soft and tender due to the usage of waste decomposer. Pomegranate producers have reported that they have harvested good quality and very shiny pomegranates than that of yester years.

4.3 **No Chemical Fertilizer**
No chemical fertilizers (like urea, DAP, MOP etc) are required for growing crops when the Waste Decomposer is applied in organic fields. Waste Decomposer technology is an alternate for all the chemical fertilizers, in fact, Waste Decomposer impounds them. Waste Decomposer helps the raise in soil micro-organism and leaves congenial environment for nutrients release by decomposing the plant/crop residue in the field by releasing enzymes and organic acids.

In case of chemical farming, a farmer can save 60 % of input (chemical fertilizer) cost by the usage of Waste Decomposer. The usage chemical fertilizers can be dropped down to 60% by the application of waste decomposer. That means when waste decomposer is applied in the conventional fields, only 40 % of urea, 40 % of DAP and 40 % MOP of the earlier dose is required as waste decomposer decomposes the crop residue, which results in the increase of organic carbon and it is well known that presence of 0.1% of organic carbon would increase the 10% uptake of inputs. Hence, fertilizer use efficiency (FUE) enhanced by 60 to 80%.

4.4 **No Pesticide/Fungicide/Insecticide**
Farmers can save their entire investment related to pesticide/fungicide/insecticide purchase when they start using/adopting the Waste Decomposer technology. Waste Decomposer application eliminates the usage of all pesticides/fungicide/insecticide since it controls both root diseases and shoots diseases. Moreover, regular spray of the Waste Decomposer over standing crop and application with irrigation avoids the attack of all kinds of plant diseases. Thus, no pesticide/fungicide/insecticide is required.

4.5 **Effect of Waste Decomposer on Soil**

4.5a **Soil Physicochemical and Biological Properties**
Waste Decomposer application changes the biological and physico-chemical properties of soil, thereby soil becomes favorable for plant growth. The biological properties of the soil seemed to changed tremendously in terms of increase in beneficial macro and micro soil biota, as already mentioned, innumerable quantity of earthworms in the field is the identifiable aspect of the Waste Decomposer soils. The texture and structure of the soil are changed in tune with supporting plant growth. Further, farmers reported that weed pattern/system slowly declined.

It is also noted that the Waste Decomposer microorganisms have the potential for producing extracellular lytic enzymes which help in inhibiting the growth of soil borne pathogens. Biological control by Waste Decomposer is known as a combination of different mechanisms among which the most important are 1. Competition for nutrients 2. Production of volatile & non volatile antibiotic compounds adhering the plant roots and root hairs.

4.5b **Soil salinity**
Soil salinity refers to the presence of high concentrations of soluble salts in the soil moisture of the root zone. These concentrations of soluble salts, through their high osmotic pressures, affect plant growth by restricting the uptake of water by the roots. All plants are subject to this influence, but sensitivity to high osmotic pressures varies widely among plants species. Salinity can also affect plant growth because the high
concentration of salts in the soil solution interferes with a balanced absorption of essential nutritional ions by the plants. The main effects of salinity on plant growth and crop production are: The spread of plant pathogenic fungi which cause damping-off, wilt and root-rot diseases, agricultural soil Slow and insufficient germination of seeds, Physiologic drought, wilting, and desiccation of plants; Stunted growth, small leaves, short stems and branches; Blue-green leaf color; Retarded flowering, fewer flowers, sterility, and smaller seeds; Growth of salt-tolerant or halophilic weed plants; As a result of all these unfavorable factors, low yields of seeds and other plant parts. As a result, the need of an hour is selection for some eco-friendly biocontrol agent that is resolving the above mentioned problems. Decomposer is closely related to their ability to produce a wide range of lysing enzymes, to degrade substrates and to possess high resistance to microbial inhibitors antagonizes phytopathogens by competing for nutrients, space, by producing antibiotics as well as by inducing systemic resistance of plants. In addition, stimulates plant growth and development by means of the production of plant growth promoting molecules. Hence the plant growth starts after 5 application of waste decomposer in soil through irrigation @ 400 litres per acre.

Table 2: Effect of Waste Decomposer on different physico-chemical and microbial properties of soil.

<table>
<thead>
<tr>
<th>SNo.</th>
<th>State</th>
<th>Treatment</th>
<th>pH</th>
<th>EC</th>
<th>Organic Carbon (%)</th>
<th>N (%)</th>
<th>P (%)</th>
<th>K (%)</th>
<th>Total Microbial Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Karnataka</td>
<td>Control</td>
<td>6.22</td>
<td>0.06</td>
<td>0.42</td>
<td>73</td>
<td>63</td>
<td>253</td>
<td>$10^3$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Waste Decomposer after 6 months</td>
<td>7.14</td>
<td>0.18</td>
<td>0.65</td>
<td>95</td>
<td>73</td>
<td>290</td>
<td>$10^{14}$</td>
</tr>
<tr>
<td>2</td>
<td>Maharashtra</td>
<td>Control</td>
<td>7.16</td>
<td>0.15</td>
<td>0.45</td>
<td>98</td>
<td>43</td>
<td>300</td>
<td>$10^8$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Waste Decomposer after 6 months</td>
<td>7.89</td>
<td>0.20</td>
<td>0.49</td>
<td>105</td>
<td>60</td>
<td>330</td>
<td>$10^{14}$</td>
</tr>
</tbody>
</table>

4.6 Effect on Seed Germination

Seed treatment with waste decomposer is an advance technique of seed treatment that involves the application of beneficial microorganisms on seed surface followed by seed hydration. Seed treatment is an ecological management strategy to control much seed and soil-borne pathogens which provide an alternative to chemical treatment. Seed treatment enhances the initial step of plant development by increased seed germination and provides protection before seedling emergence. The growth of seed can be observed at least 4 days in advance over chemical.

Some farmers reported 98% seed germination after sowing with waste decomposer treated seeds. It has a remarkable effect on alleviating the adverse effects of salt stress on seedlings and seed germination. Waste Decomposer seed treatments help to control soil borne diseases and also enhances plant growth and yield as it got the ability to alleviate biotic stress (seed and seedling disease caused by soil borne pathogens) and abiotic stresses (osmotic, salinity, chilling, or heat shock). Further waste decomposer proved to have the ability to overcome physiological stress (poor seed quality induced by seed aging).

4.7 Nilgai (Blue bull) don’t eat plants drenched with Waste Decomposer solution

Farmers from Faridabad region has reported that their field crops plants drenched/sprayed with waste decomposer solution are not eaten by the Nilgai of their area. The feature attributed to waste decomposer is a matter of interest and there exists no scientific knowledge in this regard. But the farmers are happy that there crop is not being damaged by animals.
4.8 Promising tool for Swachh Bharat Abhyian
Waste Decomposer has become a prominent tool in Hon'ble Prime Minister Flagship programme Swachh Bharat Abhyian as the single bottle of Waste Decomposer has the efficiency of converting more than 1 lakh metric ton of bio-waste. As result, it was widely used in Swachhta Pakhwada which held from 16 to 31 May 2017, where in 64 Mandis (including 16 model mandis and public places) across India Waste Decomposer technology was demonstrated and this initiative has gathered great momentum for composting.

4.9 Cleanses toilets and reduces the foul odour
Having said about the efficiency of Waste Decomposer in composting the bio-waste, it is very much essential to mention that it has another characteristic feature is its effectiveness in cleaning toilets and reduction of the foul odour generated from toilet/septic tanks especially in villages. This characteristic feature very much admirable and drives Swachh Bharat Abhiyan to reap its benefits by making the village environment clean in terms of foul odour.

5.0 Success Stories
Since the launch of Waste Decomposer more than 10 lakh farmers have used it and revived their soils/fields and all of them witnessed no crop damage by pests and have got the good yields. It is often said by the farmers that the input cost has reduced to zero and their income is doubled by the usage of Waste Decomposer, the success stories can be seen on youtube of Dr. Krishan Chandra. Some of the success stories published on youtube are given as links on the adjacent side.

6.0 Farmers view
6.1 No need to use any input while using Waste Decomposer and its usage doubled my income – Lalit Kumar Sahoo
The happiness of yield increase due to the usage of waste decomposer (WD) in his field said Sh. Lalit Kumar Sahoo, a Farmer from Nisgha (Vi) Raipur Dist., Chhattisgarh. He is saving the input cost of Rs. 40,000 per acre as there is no need to use the urea, DAP and chemical pesticides. For more details visit https://www.youtube.com/watch?v=R3YkWViNOyM&t=68s

6.2 Control of root borne diseases -- Om Veer Singh, Organic Farmer
Shri. Om Veer Singh is the native of Kasampur in Saharanpur Dist U.P, who experienced heavy loss due to crop damage by root borne diseases, due to which faced bitter situations in his life, he came in touch with Shri Bharathbhusan Tyagi, a progressive organic farmer who leads him to NCOF, Ghaziabad. Later, he collected the waste decomposer and used in his fields and found that root borne diseases in berseem, methi, and other crops were completely controlled. He said that more than 10 tillers appeared in sugarcane sets by the usage of only Waste Decomposer and has not used any other input in his field. It is also reported by some of the farmers that single sets of sugarcane will produce up to 35 numbers of tillers. For details visit https://www.youtube.com/watch?v=HE23HxzpEb0&t=162s

7.0 Findings of Waste Decomposer Efficiency by ICAR-IIFSR, Modipuram
The ICAR-IIFSR, Modipuram has given its findings regarding the efficiency of Waste Decomposer by carrying research for one month. Dr. N. Ravi Shankar, Principal Scientist and his team comprising of Dr. Debashis Dutta, Senior Scientist, and others studied the efficiency of Waste Decomposer by treating the Straw Wheat, Paddy and Sugarcane leaves with it under laboratory and pot culture techniques and found that the decomposition of the residue is done just in 40 days. Dr. Ravi Shankar said that they are in a process to analyze all the biochemical compositions of the decomposed material shortly. The Waste Decomposer was procured by ICAR-IIFSR of their own interest due to its popularity among the farmers.
For more information on the use of waste decomposer, in regional languages, please click on the below mentioned youtube links.

https://www.youtube.com/watch?v=4kWT7uoiiLE (Hindi)
https://www.youtube.com/watch?v=MWWnyir8gRo (Hindi)
https://www.youtube.com/watch?v=yM4aCHfTRc8 (Hindi)
https://www.youtube.com/watch?v=4_SnTCiT1RE (Hindi)
https://www.youtube.com/watch?v=Qq91JqX0wAo (Punjabi)
https://www.youtube.com/watch?v=Fdikauc3a_o (Assami)
https://www.youtube.com/watch?v=7gcSe9nECH8
https://www.youtube.com/watch?v=04Qds-WrE94 (Oriya)
https://www.youtube.com/watch?v=Huq7r7qFYDI (Oriya)
https://www.youtube.com/watch?v=y43M_66473Q (Nagaland)
https://www.youtube.com/watch?v=UqX6D9eyw_E&spfreload=10 (Marathi)
https://www.youtube.com/watch?v=oxGBveUzjsM (Telugu)
https://www.youtube.com/watch?v=TIjnPcv29k (Telugu)
https://www.youtube.com/watch?v=X8U0Mob8HSc (Telugu)
https://www.youtube.com/watch?v=xzbjfrNDQw
https://www.youtube.com/watch?v=CpDoYhkJT2c (English)
https://www.youtube.com/watch?v=45neaDyR8SE (English)
https://www.youtube.com/watch?v=EVWjarcZ8rQ (English)