

PPP Project

Composting of Organic Wastes & Production of Organic Fertilizers

تصنيع السماد العضوي من المخلفات الحيوانية والنباتية

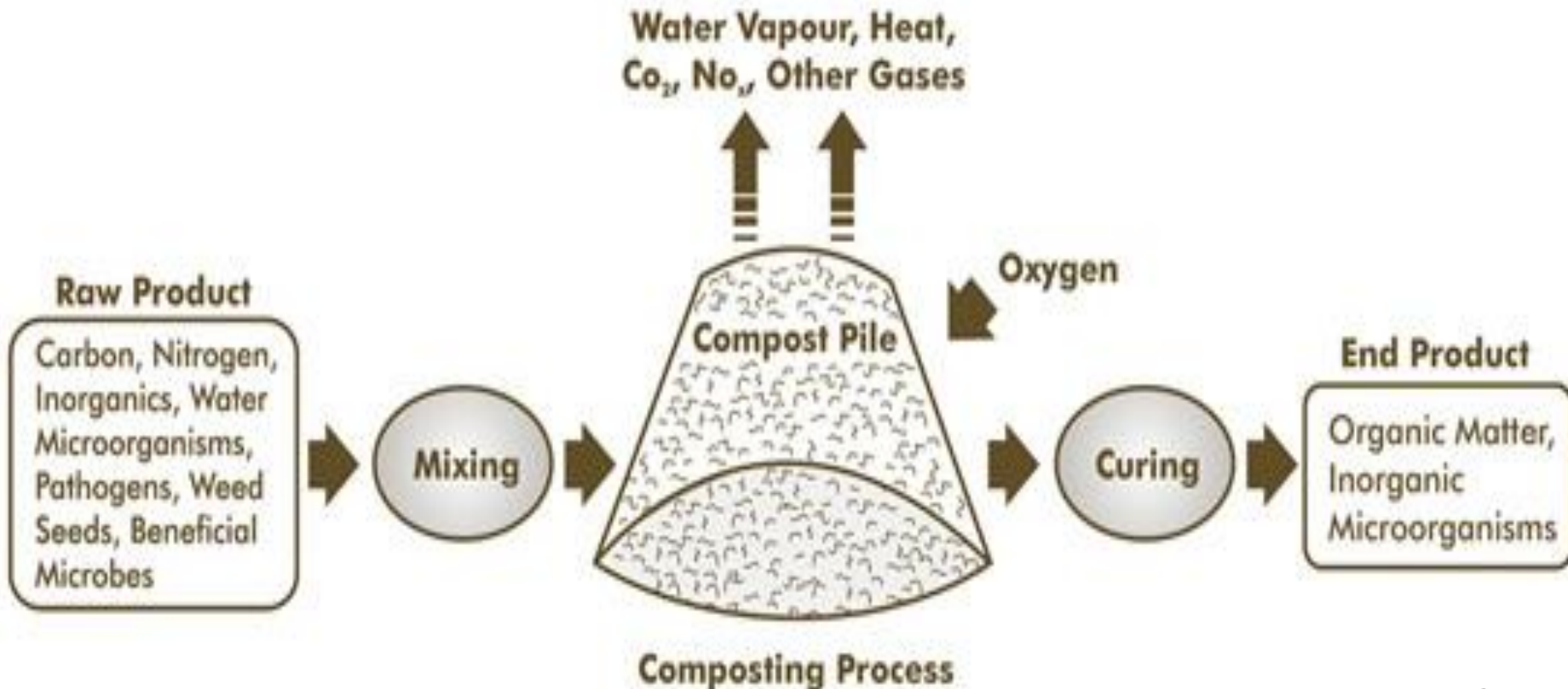
Case Study Jordan and Palestine

Presented by

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Aerobic Composting Process

Composting is a low-cost natural way of recycling organic materials, and defined as a controlled process of organic matter decomposition and stabilization that results in production of CO_2 , H_2O , heat and relatively stable organic end-product.



Optimum Condition for rapid, aerobic Composting

Condition	Acceptable	Ideal
Carbon to Nitrogen Ratio	20:1 - 40:1	25:1 - 30:1
Moisture Content (% by weight)	40 - 65%	50 - 60%
Oxygen Concentration (%Vol)	>5%	5 -15 %
Particle Size (diameter)	3.2 - 12.5 mm	Depends on the material
pH	5.5 – 8.5	6.5 – 7.5
Bulk density (kg/m ³)	500 - 800	600
Temperature (inside piles)	45 – 65 C°	55 – 60 C°

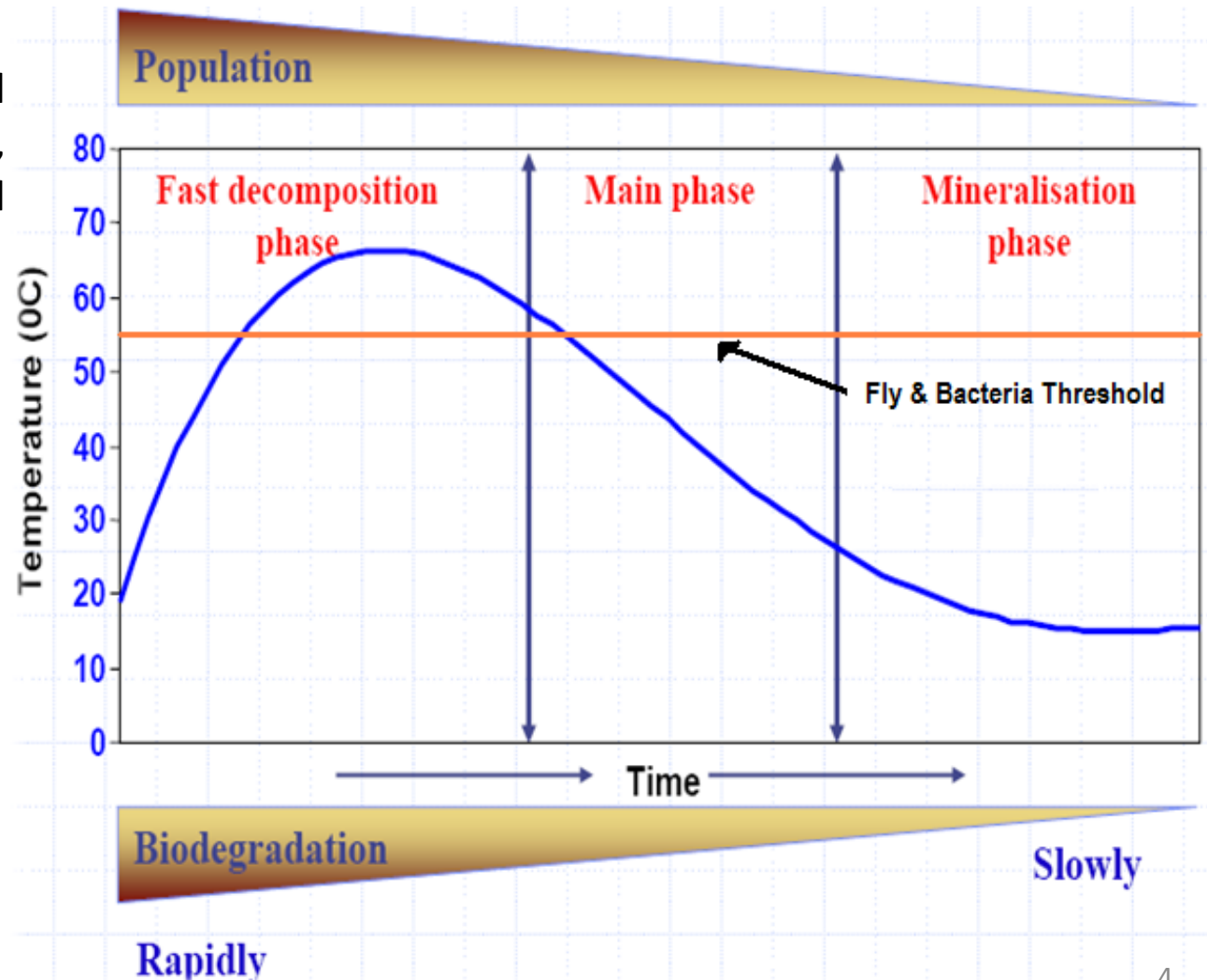


Main Factors Controlling Aerobic Composting Process

3. Temperature inside Composting Piles (Heat sterilization)

Heat naturally generated
Kills fly eggs, viruses,
pathogens and weed
seeds

Windrows:
14 days at 55 °C
07 days at 65 °C



Windrow Composting PPP Plant

Compost Run No. 1
التجربة رقم 1



Average Daily Temperatures in the three Piles of Run 1



Comparison in Physiochemical Properties between our Product and other Market Products in Jordan

Parameter	Samples						Reference *
	1	3	4	5	2	6	
<i>PH</i>	7.98	8.17	8.5	8.14	6.83	8.55	5.5 - 8.0
<i>CEC (meq/L)</i>	50.8	50.2	52.32	52.78	51.24	50.34	> 60
<i>Organic Matter %</i>	60.03	35.93	36.38	29.49	15.81	31.72	30 - 70
<i>Total Nitrogen %</i>	4.33	2.43	2.16	2.17	1.43	1.75	0.2 - 2.0
<i>P - Olsen (ppm)</i>	1429.3	2946.2	2180.7	2021.19	720.51	1319.5	0.2 - 1.0
<i>Available K (ppm)</i>	20180	24580	20680	22280	13580	19980	0.5 - 1.0
C:N	8	9	10	8	6	11	8:1 - 20:1
<i>Moisture %</i>	24.56	41.75	36.44	59.63	57.65	39.01	30 - 50

* Typical values from US EPA 2001 Compost Quality Standards, also from Germany & Austria Quality

Samples	Description
1	Fresh poultry manure (non treated)
2	Commercial compost product from Nursery bitmoss
3	50% poultry + 50% cow (treated)
4	100 % poultry (treated)
5	66.5% poultry + 33.5 % cow (treated)
6	Dir alla factory from compost products

Conclusions

- Composting as an environmental sound method for organic solid processing is considered the most cost efficient process that produces compost according to the international and national standards.
- The investigation tests showed that the biological degradation in the composting process is rapidly proceeded at suitable conditions of C/N ratio, moisture content, and available oxygen.
- Special attention should be given to the turning frequency which greatly depends on the measured parameters (O_2 , CO_2 , H_2O , and Temperature).
- Chicken and cow manure with possible addition of structural material (sawdust) have been proven to be excellent input materials for composting processes.