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Changes in temperature and pH of wheat straw during its decomposition *

Temperature and pH are some of the important regulative factors in the break down and synthesis of organic matter in soil and in manures. Temperature and pH affects the rate of chemical, particularly enzymatic reaction and it influences in part electively, the development of micro-organisms. The effect of temperature on the decomposition of organic matter in soil was studied by Aliev (1962) and Elkan (1960).

An experiment was conducted at Central Campus of Mahatma Phule Krishi Vidyapeeth, Rahuri to study the changes in temperature development in compost pits and pH of wheat straw during its biological decomposition. The micropits of size 3' x 3'x 3' were dug and were filled with chopped wheat straw. The C : N ratio of wheat starw was adjusted to 36 : 1 and enriched with phosphorus. The pits were filled layer by layer. Each layer was moistened with urea and superphosphate solutions. A suspension of micro-organisms previously isolated and screened for their ability to decompose wheat straw (10 cells/spores per ml) was sprinkelled on each layer. The moisture content of wheat straw was adjusted to 55-60 per cent of W. H. C. of straw and the pits were covered with polythene sheets and finally by soil. The temperatures developed in compost pits was recorded at 10, 20, 30, 40, 60, 90 and 120 days at 1.5' depth with the help of dial thermometer. Changes in pH were recorded at each turning i. e. at 30, 60 and 120 days of composting.

From the results in regard to temperature development in compost pits and changes in pH of wheat straw it is observed that in general, maximum temperatures were developed during first ten days of composting. The maximum temperatures were observed in treatment 16 (mixture of all cultures) and were found to be significantly higher than control at 10, 20 and 60 days after composting. All the treatments except treatment No. 10 (*Cytophaga rubra*) and No. 1 (*Serratia kiliensis*) were found to be significantly superior in respect of temperature development than that of control at 10 days after composting. At 20 and 60 days after composting lower temperatures than control were observed in some treatments but the differences were found to be statistically non-significant. The temperatures developed at 30, 40, 90 and 120 days were found to be statistically non-singificant. After 60 days there was steady decline in temperatue developed in compost pits in all the treatments excluding control. The reason for such decline in temperature at 90 and 120 days after composting might be due to the completion of decomposition in majority of treatments as evidenced from narrower C : N ratios of these treatments (Wani and Shinde).

The results regarding pH changes of wheat straw during its composting at 30, 60 and 120 days were found to be statistically non-singificant, upto 60 days of decomposition. The pH of wheat straw increased towards an alkaline range by 0.00 to 1.00 unit. From 60 days to 120

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days slight increase or decrease in the pH of wheat straw in compost pits was observed. The reason for increase in pH towards an alkaline range may be due to increase in the amount of NH_4 -N during composting period (Wani and Shinde). Dowson (1949) obtained values in pH ranging from very acid to distinctly alkaline in decomposed wheat straw.

From the above results it is concluded that maximum temperatures develop in compost pits during an early period of decomposition and the temperature development differs from an organism to organism. There is no particular trend in pH development of wheat straw, it varies from organism to organism.

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REFERENCES

Aliev, S. A. (1962). IAN Azerbajd-zanskoj SSR 1, 59-66.

Dawson, R. C. (1949). Soil Sci. 67 (6) : 467-79.

Elkan, G. H. W. E. C. Moore (1960). J. Elisha Mitchell Sci. Soc. 76. 1, 134-40.

Wani, S. P. and Shinde P. A. (1975). (in press)