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## Conversion of farm wastes / by-products into enriched compost through use of microbial consortium

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## SUMMARY

An experiment was carried out during 2007 and 2008 at Navsari Agricultural University, Navsari in a pit – cum- heap (3 m length x 2m width x 2m depth) with different farm wastes / by-products in varying proportions (W/W) as raw materials for making organic compost within a specified time of 50-52 days by use of microbial consortium (EM-1) with an objective to prepare enriched compost. The details of treatments were, 1) T<sub>1</sub>: 100 per cent dung (control), 2) T<sub>2</sub>: 50: 25: 5: 10: 5: 3: 2 (cattle dung: wheat straw wastes : Rock phosphate : animal urine: castor cake : FYM : soil), 3) T<sub>3</sub> : 50: 25: 5 : 10: 5: 3: 2 {(cattle dung: wastes of (Pigeonpea + Indian bean) : rock phosphate : animal urine : castor cake : FYM : soil) and  $T_4$  : 50: 25: 5 : 10: 5: 3: 2 {( cattle dung: leaves and twigs of (Subabul + gliricidiya+ sunhemp) : rock phosphate : animal urine : castor cake : FYM : soil) . Chopped raw materials (2-3cm size) were spread in layers right from the bottom of the pit. The bottom layer was thoroughly moistened with water and then EM-1 spraying solution was sprayed on the material thoroughly. Subsequently the second and other layers were imposed and the same procedure was followed for spraying. The material was allowed for composting for 50 - 52 days maintaining moisture level to about 55 per cent. Composts were harvested after 52 /53 days and from each treatments 6 samples were collected and were analysed for pH, EC, organic carbon, total N, total P, K, Ca, and Mg content and also for Na, Fe, Zn, Mn and Cu content following standard procedure and C: N ratio was computed. The results revealed that the effect of different treatments on pH, total N and C: N ratio was significant in both the excremental years. Significantly higher total N content and significantly lower C/N ratio of end product were registered in treatment T<sub>4</sub> (N content 3.19% and C/N ratio 12.5), but it was at par with treatment T<sub>3</sub> in case of N content and C/N ratio with raw material of dung + wastes of (Pigeonpea + Indian bean). Pooled effect was non - significant in case of pH and EC of organic compost. Treatment effect was significant on total P, K, and Mg content in both the experimental years as well as in pooled. Pooled data revealed that treatment effect was more pronounced in  $T_4$  (cattle dung: leaves and twigs of (Subabul + gliricidiya+ sunhemp): rock phosphate: animal urine: castor cake: FYM: soil). *i.e.* the significantly highest P (1.58%), Ca (2.54%) and Mg (4.11%) were noted in treatment  $T_{4}$ . Treatment effect did not reach to the level of significance in case of Fe, Zn, Mn and Cu content in pooled. However, in case of sodium, treatment  $T_4$  gave significantly highest Na (1.43%) over others. Based on the higher content of major, secondary and micronutrients content as well as lower C/N ratio, the treatment T<sub>4</sub> {cattle dung: (Subabul + gliricidiya + sunhemp): Rock phosphate: animal urine: castor cake: FYM: soil produced the highest quality of organic compost and thus considered as the first grade of organic compost followed by treatment  $T_3 T_2$  and  $T_1$  which produced, respectively second, third and fourth grade of organic compost.

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India has vast resource of organic inputs. However, It is very difficult to assess its exact estimate especially when production of residues, dung and other organic wastes fluctuate every year. Marwaha and Jat (2004) reported that the estimated total availability of different trappable organic sources (cattle manure, crop residues, forest litter, rural compost, city refuge, sewage sludge and pressmud) in the country and their total nutrient potential are 875 and 15.85 million tonnes, respectively. Composting of organic wastes can be most effectively accomplished by biological process, employing the activities of microorganisms such as bacteria, algae, fungi or by some microbial consortium. The novel process of composting will not only transform huge waste material

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