Enriched Organic based Manures

Enriched organic manures are low grade materials and have to be applied in large bulk to obtain significant effects on crop growth and yield. It has been found that the rate and extent of liberation of nitrogen from applied organic manures is adequate for normal plant growth when their C:N ratio is less than 10:1 or the nitrogen content is more than 2.5 % . In practice, the C/N ratio of organic materials can be reduced by adding the requisite amount of nitrogen in the form of any nitrogen fertilizers to it.This would immediately reduces the c/n ratio and the enriched manure can than utilized effectively.

Enriched organic manures of the above types are processed and get ready in a short time and possess many advantages. Losses resulting from their composting are avoided and the total quantities of organic matter and nitrogen taken initially are conserved and utilized.

Variations in the preparations of these enriched manures include incorporation of more nitrogen to obtain concentrated manures containing 5 to 7 % nitrogen and supplementing this with superphosphate and potassium sulphate to get mixed organic mineral fertilizers of any desired grade to suit specific requirement of soil and crops.

Preparation of enriched manures:

Enriched organic based manures are prepared by taking requisite quantities of nitrogenous and other fertilizers and dissolving them in sufficient water. The solution is then treated with 100 ml of concentrated hydrochloric acid per quintal of the final manure for controlling decomposition of the added nitrogen and its retention in the manure. This is then absorved in the calculated quantity of the organic material, mixed thoroughly and dried in the sun. The dry enriched manure can then be aged and stored for use.

Microbial method for hastening compost preparation:

Compost is bulky in nature. There is a need to reduce its bulkiness and period of composting to make it more acceptale to the farmers. Moreover the quality of manure should e improved to supply more N, P and humus content per unit of weight. It is feasiile to hasten the period of composting by proper inoculation with cellulytic micro organisms as well as improve nitrogen and phosphorus content of organic fertilizers with low cost technology. Mesophilic cellulolytic fungi when used as inoculants in composting of the plant residues (Straw and leaf fall) can hasten the composting process and improve the quality of compost. Due to inoculation of compost heaps y cellulolytic culture materials can e reduced by 4 to 6 weeks.

Low cost technology for enrichment of compost:

Organic manures inoculation with Azotoacter chrococcum and phosphate soluilizing microorganism (Aspergillus awameri or bacillus polymyxa) improved the maurial vallu of

compost. Inoculation of compost with nitrogen fixer and p solubiliser was done when the temperature had stailised around 30 to 35 0c after one month of composting . Low grade rock phosphate (10 kg / ton material) was applied at the initial steps of filling up of compost pits. Thus C/N ratio was reduced during 1st and 2nd months after inoculation. There was appreciale gain in N content also preservation.

Mechanism of Decomposition:

The biodegration process is carried out by different groups of heterotrophic micro organisms, bacteria, fungi, actinomycetes and protozoa. Micro organism involved in the process derive their energy and carbon requirements from the decomposition of carboaceous materials and for every 10 parts of carbon 1 part of nitrogen is required for building up of their cell protoplasm. Fungi are more efficient in carbon assimilation than bacterias and actinomycetes. Thus CO_2 evolution is comparatively less when fungi are more active in biodegradation then bacterial.

When organic materials are broken down in presence of O_2, the process is called as aerobic decomposition under aerobic condition, living organisms which utilize O_2, decompose organic matter and assimilate same of the carbon, nitrogen, phosphorus, sulphur and other nutrients for sysnthesis of their cell protoplasm, heterotrophs derive energy from the decomposition of organic matter resulting on production of CO_2 , humic substances and release of available plant nutrients. Carbon serves both as energy source and is also required for the cell protoplasm. Greater amount of carbon is assimilated than nitrogen. Generally about 2/3 of the carbon is respired / evolved as CO_2 and the remaining 1/3 is combined with nitrogen in the living cells.

Aerobic decomposition of organic materials is most common in nature and generally occurs in arable soils and in forest soil surfaces where animal droppings and organic residues are stabilized into humus, with involvement of different groups of microflora. In the aerobic process, there are no problems such as foul odour associated with it as produced under anaerobic conditions.