SUMMARY
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Composting is a biological decomposition process where there is the changing pattern of organic constituents of organic resources into inorganic nutrients.

During composting the organic matter is converted into a stable, dark brown crumbly material called humus, under controlled conditions.

The humus once mixed into the soil undergoes the process of mineralization releasing minerals into the soils and these are available to the plants.

In order to increase the nutritional status of the organic matter in the compost, proper combinations of nitrogen rich green matter and carbon rich crop residues along with cow dung and other animal waste material were included.

Suitable microbial cultures and phosphate solubilizing microorganisms are added to make N & K available to the soil from the composts.

The raw materials were shredded into smaller pieces that increased the surface area and made them more susceptible to bacterial attack. Size was 5 cm.

Moisture level maintained in pits by blending the two dry and too moist materials together.

Anaerobic, aerobic and aerobic - rich manures were made.

Moisture content was 80 - 90% in the anaerobic pit while it was 50-60% in aerobic pit. In the anaerobic manure, greater amounts of organic acids, methane \( \text{H}_2\text{S} \), mercaptans and \( \text{CO}_2 \) gases were produced resulting in foul smell and accumulation of toxins.
No nonsense problems such as foul odour and toxin accumulation in aerobic composting.

In the aerobic process of decomposition, the energy produced by the organisms is much greater than that of the anaerobic decomposition.

High temperature was maintained in the aerobic compost pit which effectively killed pathogens and parasites.

Anaerobic composting occurs at mesophilic temperature which does not effect satisfactorily the destruction of pathogens.

Hence the safe aerobically prepared organic manure was enriched using the compost of obnoxious weeds like *Parthenium hysterocephorus*, *Chromolaena odorata*, Neem, *Pongamia pinnata*, colored leaves of *Crotons* and *Acalypha indica*.

The organic rich manure had besides the nutrients, the insectidial and pesticidal property. The final compost had 120 kg/ acre of P<sub>2</sub>O<sub>5</sub> and 282 µg/g of potassium.

C/N ratio started from more than 38.29:1.32 culminated in 16.4:1 ratio as was desired.

Bioassays were carried out with Methi and Ragi in petri dishes, plastic cups and pots to study the efficacy of the organic rich manure as liquid manure (petri and plastic cups) and directly as manure in the pots. In the pot trials the efficacy of anaerobic, aerobic and aerobic - rich manures were carried out. Palak, Tomato and Cluster bean were grown.

These crops exhibited a preference to different formulations. Palak preferred organic - rich, Tomato preferred aerobic and organic - rich while Cluster beans preferred anaerobic and organic - rich manures.
In the science behind the organic-rich manure formation, the load of microbes peaked by 30 days and MPN of *Nitrosomonas* peaked by 45 days declining with increase in time. By 90 days the bacterial population came down to an insignificant level marking the completion of decomposition.

The activity of *Nitrosomonas* and *Nitrobacter* in the compost completed by 75 days time. Finally all the nitrogen in the organic matter was converted to nitrate.

Acidic pH → Alkaline → Slightly alkaline (pH 7.2) by 105 days of decomposition.

After 60 days of compost maturity – the electrical conductivity indicating the total soluble salts increased to 1.65 dscm⁻¹.

The micro and macro nutrients in the composting media increased with time and phenolics level decreased with increase in time.

With increase in duration of the decomposition the extracts prepared from it recorded increased growth parameters in the test crops (Methi and wheat).

The manure took 105 days for completion of the process, (to mature).

Inorganic nutrients present in MS media could be replaced by the aqueous extract of the organic-rich manure and this was demonstrated in – vitro with growth studies of wheat and methi.

The manure (organic-rich) incorporated into the soil conditioned it in such a way as to improve the physico-chemical properties like – pH, EC, soil moisture content, gravitational water, water holding capacity and the cation exchange capacity.
The organic - rich formulation prepared added values to the vegetables grown in a positive manner. The antioxidant phytochemical ascorbic acid increased in Palak by 63.4%, in Brinjal by 77.8% and Capsicum by 20%.

The antioxidant carotenoids increased by 2% in Tomato, 28.9% in Carrot, and by 86.8% in Palak when grown organically.

The total chlorophyll in Palak increased by 59.8% and the leaves were really dark green and larger in size.

The capsaicin an important alkaloid in chillies showed 0.4% in bell pepper capsicum and this is responsible for the pungency and has several therapeutical values.

The proteins in the pods of Cluster bean increased by 54.7%. The SDS-PAGE of the seed proteins resolved 3 new poly peptide bands in the organically grown seeds. Among this, one was a high mol.wt. polypeptide (63.1 KDa) and 2 were low mol.wt. polypeptides (20.9 and 12.6 KDa).

Rooting in Coleus forskohlii could be improved by treating the cuttings with auxins and caffeic acids at 10 and 50 μg/mL concentrations. Both root and shoot biomass could be increased by this treatment.

On integrating 3 treatments like caffeic acid at 50 μg/mL concentration for rooting, and growing the crop in red, blue, yellow and white light using organic - rich formulation prepared by us, we could increase the yield of tuber, forskolin content and the antioxidant phytochemical (phenolics and ascorbic acid) in Coleus forskohlii.

Red light put up more shoot system and blue light produced more roots. The forskolin content was 39.3% more than white. Carbohydrate content increased by 91%, protein, 23.8%, amino acid 345% and ascorbic acid 54%.