

Organic manures and their importance in Coconut Cultivation

V.S. Lekha, C.C. Bidappa & P.G. Kamalakshi Amma
(Research Station) CPCRI, Kayangulam

Soil is a living system with a series of physical, chemical and biological reactions that determine the potential fertility status. Healthy nutrient absorbing roots are spread through the maze and interstices formed between the randomly distributed primary and secondary particles of the soil. The primary particles of the soil *viz.* sand, silt and clay mostly aggregate into semipermanent clusters or groups by the binding action of materials of organic, bacterial and plant origin. The shape, size, arrangement and stability of these aggregates in the packed soil collectively determine the structure of the soil. A good soil structure with adequate channel for water and air movement is a must for intensive cultivation and the productivity. Application of organic manures to the soil are beneficial in improving the soil structure and increasing the crop yield.

Organic manure is very essential in coconut nutrition. Organic manures are important as they contain several nutrients though in lower concentrations than inorganic fertilizers. Organic matter promotes microbial process in the soil, improves the soil structure, aeration and water holding capacity. It has a regulating effect on soil temperatures, delays the fixation of mineral phosphoric acid and supplies decomposed products which aid growth of plants. More over it is slow source of uniformly active nitrogen and consequently has a beneficial influence on the protein content of plants.

Organic manures include both bulky and concentrated manures. FYM, compost and green manures are

bulky organic manures where as oil cakes, fish manure, guano etc. are concentrated organic manures. About 25-50 kg of any bulky organic manure supplemented with required quantity of inorganic fertilizers is the best manurial combination for an adult bearing palm.

Green Manuring

Green manuring is one of the means to maintain organic matter status in the soil. It includes both green crop manures and green leaf manures. The leguminous green manure crops have been found to improve the nitrogen status of the soil. Further, the green manuring improves soil structure, releases plant nutrients present in the soil in an available form, conserves nutrients from leaching losses, regulates soil temperature and minimises the loss of soil due to erosion. Growing and incorporating green manure crops in soil helps to improve soil fertility.

Sunhemp (*Crotalaria juncea*), wild sunhemp (*Crotalaria striata*), daincha (*Sesbania aculata*) and sesbania species are the most suitable green manure crops for growing *in situ* in the coconut gardens. Plants like *Gliricidia maculata* and *Tephrosia candida* can be grown along the boundaries of the coconut garden and the green matter can be cut and applied to coconut palms. Leguminous crops like *Calapagonia*, *Stylosanthes gracillis*, *Mimosa invisa* also fix nitrogen biologically with the help of bacterium rhizobium present in root nodules. The nitrogen fixed by legume - rhizobium association become available to coconut palm by the

decomposition of nodules and plant materials after incorporation. Among the green manure crops *Crotalaria striata* is the most suitable green manure crop for growing *in situ* and incorporating in gardens. This is because of its quick growth, giving good tonnage of organic matter, leaf material rich in nitrogen, tolerance to shade and stand up to heavy rains, producing seeds in abundance and is not eaten by cattles.

Green manure crops are sown with the onset of monsoon and are incorporated in the soil at the flowering stage. Under normal condition, the green manure crops give a total output of about 5000 to 10,000 kg of green stuff per ha.

Oil Cakes

Application of neem cake and ground nut cake have beneficial effect for coconut cultivation. Though N content of groundnut cake is more (nitrogen 7.3%, P_2O_5 1.5% and K_2O 1.3%) neem cake is widely used because of its nematode and insect repellent properties. Neem cake contains essential nutrients such as N (5.2%), P_2O_5 (1.0%) and K_2O (1.5%) and is applied at the rate of 5 kg. neem cake per palm per year. Urea coated neem cake at 1:5 ratio enhances the availability of nitrogen to coconut palm for a long period. Neem cake application also increases productivity of coconut. It also reduces severity of stem bleeding disease.

Other oil cakes like rubber, castor, mahuva, marotti and coconut cake can also be used as organic manures for coconuts.

Poultry Manure :

It approximately contains 1.5% nitrogen, 0.43% P_2O_5 and 0.41% K_2O and hence richer in NPK than cattle manure. It is obtained from poultry farm generally bound together with litter. Bird dropping along with litter which forms the waste of poultry farm can be used as a good organic manure for coconut. It can be applied either in fresh or in the dried form or after composting with other farm manure. However, the decomposed matter is a better product for application than fresh one. For every young palm, 10-15 kg. of manure can be applied and in the case of adult palm 25-50 kg should be applied.

Fish Meal

Fish meal can be used as an

organic manure for coconut. The nutrient content of fish meal is 2.5% N, 3.4% P_2O_5 and 0.5 kg K_2O . It can be applied at the rate of 5-10 kg per palm per year.

Bone Meal

It is a good source of nitrogen, phosphorous and calcium. Bonemeal supplies 2.5% N, 22% P_2O_5 , 0.3% K_2O and 18% calcium. Two kg. bone meal per palm per year is beneficial for the better growth of the coconut palm.

Sheep Manure

It is a good source of nitrogen, supplying 2.4% N, 0.9% P and 2.0% potash.

The soil also gets organic matter from the rocks, stubbles of crops that

are left behind after each harvest, leaves and other parts that are shed by the plants, and also the dead remains of small soil animals like rodents, soil insects and soil micro-organisms. The nutrient contents of some of the commonly used and locally available organic manures are given in the *Tables 1-3*.

The maintenance of organic matter in the soil is then vitally important and calls for careful husbandry, especially in the coconut growing soils where it is oxidised rapidly and exhausted. Increasing the organic matter content of the soil is therefore desired and its attainment is the hall mark of distinction in the management of soil by farmers.

Table 1: Nutrient contents of different green manures

Green manures	N	P	K
	(in%)		
1. <i>Crotalaria juncea</i>	2.6	0.6	2.0
2. <i>Glyricidia</i>	2.9	0.5	2.8
3. <i>Daincha</i>	3.3	0.7	3.6
4. <i>Sesbania specioso</i>	2.7	0.7	2.2
5. <i>Crotalaria striata</i>	2.1	0.6	2.6

Table 2: The nutrient composition of common oil cakes

Oil Cakes	N%	P_2O_5 %	K_2O %
Ground nut cake	7.3	1.5	1.3
Castor cake	4.3	1.8	1.3
Neem cake	5.2	1.0	1.5
Mahuva cake	2.5	0.8	1.8
Coconut cake	4	1.9	1.8

Table 3: The quantity of green matter/ha from different green manures

1. <i>Crotalaria juncea</i>	10 ton/ha
2. <i>Crotalaria striata</i>	13 ton/ha
3. <i>Glyricidia maculata</i>	3-6 ton/ha
4. <i>Sesbania aculata</i>	13-17 ton/ha
5. <i>Sesbania specioso</i>	2-5 ton/ha
6. <i>Pueraria</i>	24 ton/ha