STUDIES ON DECOMPOSITION OF ORGANIC MANURES

& THEIR NUTRITIONAL VALUE

FOR COCONUT PALM

BY

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ABSTRACT

Organic manures can be used to increase the coconut yields and it has very wide role or influence in bringing about improvement to soil physical, chemical and biological properties. There are many kinds of locally available organic manures such as poultry manure, cattle manure, goat dung, and green manures that can be used as manure for coconut cultivation.

Addition of organic manure improves the soil in many ways. Sandy soils can be improved by increasing its moisture retention while clayey soils are made loose and poros thereby improving aeration, drainage and water intake. Organic manure also enhance the soil microbial activity and recycling of minerals. Organic matter plays a considerable role as a soil ameliorant and provides nutrients to the soil.

The releasing of nutrients from the different types of organic manures in two types of soils and the assessment of plant nutrient status of two field experiments were established in two coconut plantations. One was at Mangala eliya Estate situated in the dry zone and other one was at Horombawa Estate situated in the intermediate wet zone. The experiments involved Randomized Complete Block Design with three replicates.

The treatments combinations were considered as T_1 - control, T_2 - cowdung (35 kg/palm/year), T_3 - goat dung (15kg/palm/year), T_4 - poultry litter (layer) (30 kg/palm/year), T_5 - poultry litter (broiler) (30 kg/palm/year) and T_6 - gliricidia (30 kg/palm/year).

Physical, chemical and microbiological changes of soil were assessed by number of parameters such as number of total bacterial colonies, number of total fungal colonies, carbondioxide evolution, moisture content%, pH, available nitrogen (NH_4N-NO_3N) total nitrogen, total carbon, C/N ratio, identification of bacteria and fungi, leaf nutrient levels were also analyzed for this study.

Poultry (broiler) manure treated soil showed highest bacterial population

in 3 months and one year after manuring in both experimental sites. There was a suitable pH range for coconut plantation in both sites during the experimental period. Ammonical nitrogen concentration is high in Mangala eliya experimental site but nitrogen retention ability is high in Horombawa experimental site. Available N (NH_4N) showed highly significant difference ($p \leq 0.001$) among the treatments 3 months, 6 months, and 12 months after manure application in both sites. Available NO_3N in gliricidia treated soil showed rapid decrease upto six months after manuring in both site, because the gliricidia leaves were decomposed quickly. In Horombawa site significantly ($P \leq 0.05$) high available $N(NO_3)N$ concentration showed in goatdung treated soil in 3 months. Goatdung treated soil showed slow nutrient releasing pattern to the soil during the experimental period, compared to other sources of organic manures.

Available P retention ability in Mangala eliya experimental site is high. The loss of the organic carbon from the organic matter increased gradually with the time. Organic carbon content is high in Horombawa site. In both sites exchangeable K retention ability is high in goatdung treated soil.

Most isolated bacteria and fungi are common in the soil. However bacteria and fungi species variation is high in Horombawa site than Mangala eliya site. *Bacillus* species, *Micrococcus* species, *Aspergillus* species, *Penicillium* species, *Sachcharomyces* species and *Mucor* are isolated common species which decompose the added organic manures.

The foliar nutrient concentration of coconut from organic manure treated soil showed significantly high nitrogen, phosphorus,potassium and magnesium over the control.