

Environmental influence on physico-chemical and biological activities of fungus growing termite (Isoptera: Macrotermitinae)

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Fungus cultivating termites are important, highly specific insect microbe symbionts in Asia and Africa: The aim of this study was to determine physical, chemical and biological parameters of the fungus comb of *Macrotermitinae* collected from the different locations of Western Ghats of Tamil Nadu. The pH of the fungus comb was 4.4 to 4.8 and moisture content about 46.92 to 52.80%. The Carbohydrate: Lignin ratio of old combs varied between 1.55 to 2.08 (w/w) and C: L ratio of New comb varied between 0.6 to 0.86 (w/w). The nitrogen, phosphorus and potassium content of fungus comb varied from 0.75 to 1.8%, 0.175 to 0.193% and 0.075 to 0.08% on dry weight of fungus comb, respectively. The distribution of other fungi and also the symbiotic fungi *Termitomyces* in the nest of *Macrotermitinae* was also investigated in this study.

Key words : *Macrotermitinae*, Fungus comb, Microbial population, Nutrient content, Lignin content.

INTRODUCTION

In tropical ecosystems, the main influence of macro invertebrate such as earthworms and termites on soil characteristics is by the creation of biogenic structure viz., gallery, voids and tunnels (Lavelle, 1997). The symbiotic relationship with fungi were observed in various insects (Kendrick, 1991), including scale insects (Hemiptera), gall midges (Diptera), wood- wasps (Hymenoptera), beetles (Coleoptera), aphids (Homoptera), ants (Hymenoptera) and termites (Isoptera). Among these insects, ants (fungus-growing ants, sub family Myrmicinae) and termites, (fungus-growing termites, subfamily *Macrotermitinae*) are well known to have a major impact on tropical ecosystems (Cherrett *et al.*, 1989; Wood and Thomas, 1989). The group of fungus growing termite is interesting, have symbiotic relationship with basidiomycetes fungi of the genus *Termitomyces*, in this relationship termite cultivate the symbiotic fungi with in their nest. The insect cultivates its symbionts *Termitomyces* on a special medium, the fungus comb, which is maintained within the nest. The symbiotic fungi grow on a sponge like structures (called a fungus comb) constructed by the termites from a litter. They are found as mycelia and white round structures (called fungus nodules) on the fungus comb surface. The termites water their fungal gardens with termite excretions and thus maintain the necessary humidity for fungal growth. The termites building ventilation ducts into their

mound so that the fungi are properly aerated.

The fungus comb are constructed from termite faecal pellets with partially digested plant debris; old combs are consumed by the termites (Darlington, 1994). To construct fungus comb, different *Macrotermitinae* species feed on different plant materials; usually one of wood, leaf litter or grass. For example, *Macrotermes carbonarius* feeds on leaf litter (Abe and Matsumoto, 1979; Jones and Brendell, 1998; Sands, 1998) are likely to be predominantly wood feeders. The chemically analyzed fungus comb of different ages to assess lignin degradation with in them.

MATERIALS AND METHODS

Samples of fungus comb of *Macrotermitinae* collected from the termite mound at five different locations of Western Ghats of Tamil Nadu viz., Location, Mettupalayam; Location, Ooty; Location, Kodaikanal; Location, Anaikatti; Location, Thadiyankudisai and Location, Sotthuparai. The samples were taken to the laboratory for experiment under controlled condition. The collected samples were analyzed for their physico, chemical and biological properties.

Isolation of microorganism from fungus comb:

The bacteria, fungi and actinomycetes were isolated from the fungus comb by dilution plates method in respective media. All the plates were incubated at 28^o - 30^oC for 3-5 days and counts were made. The results