Summary
Dermatophytoses cause morbidity which poses a major public health problem especially in tropical countries like India due to the hot and humid climate. To make an in-depth study of this problem the out-patient clinic of Mycology Section, Department of Dermatology, Madras Medical College & Hospitals, Chennai was chosen. Among the 90 suspected patients with clinical symptoms of dermatophytoses, 71 (78.9%) were positive for dermatophytoses. Among the confirmed dermatophytoses cases, 59.1% were males and 40.9% were females. In the identified 71 culture positive cases, *Trichophyton rubrum* was the predominant species to be isolated (73.3%), followed by *Trichophyton mentagrophytes* (19.7%). The other etiological agents encountered were *Epidermophyton floccosum* (4.2%) and *Microsporum gypseum* (2.8%).

In terms of site of infection, tinea corporis was predominant among the majority of the cases (64.8%), which was followed by tinea cruris (26.8%), tinea pedis (5.6%) and onychomycoses (2.8%). Among the dermatophytoses infected persons, 15.5% (11 patients) were with chronic infection of more than one year and *T. rubrum* accounted for 81.8% of chronic cases of infection.

The results of protease activity profile of the strains revealed that *M. canis* showed a maximum protease activity with a peak activity of 540.90 CU in human hair, closely followed by *M. gypseum* (504.83 CU). On the other hand *E. floccosum* and *T. rubrum* showed a peak protease activity of 345.57 CU (in human nail) and 285.30 CU (in human hair) respectively. Keratinase activity was maximum in
M. gypseum (80.75 KU) followed by M. canis (78.72 KU) in human hair. E. floccosum recorded relatively lower activity of keratinase (64.55 KU) in human nail while T. rubrum recorded the lowest activity of keratinase (45.43 KU) in human hair. On the basis of protease and keratinase enzyme activity, it was observed that among the native keratinaceous substrates chosen for the study, human hair was the preferred substrate for T. rubrum, M. gypseum and M. canis. Human nail was the most ideal substrate for E. floccosum. All the organisms showed an increased keratinase activity at pH 7 to 9, with a peak activity at pH 8. The keratinase activity was high at temperature ranging from 30°C to 40°C with a peak activity at 35°C.

Molecular weight of the keratinase isolated from different species showed marked variations. Molecular weight of the protein fragments were 36.21 kDa for T. rubrum, 33.19 kDa for M. gypseum, 33.26 kDa for M. canis and 31.41 kDa for E. floccosum. The culture supernatant showed fragments ranging from MW of 14.17 kDa to 121.28 kDa in PAGE. The banding pattern of M. gypseum and M. canis were similar and the banding pattern of T. rubrum and E. floccosum showed similarity.

The electron micrographs of human hair infected with T. rubrum, M. gypseum, M. canis and E. floccosum showed evidence of how the dermatophyte fungal hyphae invade human hair in-vitro. M. gypseum and M. canis have distinct
perforating organ with wedge shaped hyphal tips which enables faster destruction of hair cuticles.

Geophilic (*M. gypseum*) and zoophilic (*M. canis*) dermatophytes recorded a significantly higher activity when compared to the anthropophilic (*T. rubrum* and *E. floccosum*) counterparts. This supports the fact that human infection by geophilic and zoophilic dermatophytes are more severe and extensive in nature than infections caused by anthropophilic group.