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The Multiple Proteolytic Enzymes  
of  
Two *Microsporium* Species

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## ABSTRACT

Dermatophyte infections can be contracted from animals, humans or from the soil. In the genus *Microsporum* some species commonly are associated with cats & dogs but also often cause infections in humans. Others are regarded as non-pathogenic & are commonly isolated from the soil. The present studies investigated the production of proteolytic enzymes by the zoophilic species *M.canis* & the geophilic species *M.cookei*, in various cultural conditions which might affect expression of such enzymes, in an attempt to detect differences between the two that could be associated with the ability of *M.canis* to invade skin *in vivo*.

Biochemical assays showed *M.canis* produced higher azocollytic & elastase activity in a keratin containing medium(BSW) than in Sabourauds Broth(SDB). In contrast, azocollytic & elastase activity of *M.cookei* in the two media was relatively similar. Azocollytic & elastase activity of both species peaked in the pH range 7-10 & azocollytic activity demonstrated highest activity around 45°C in both media. Both species produced some keratinolytic activity in BSW but not in SDB. Inhibition studies of azocollytic & elastase activity revealed the presence of an aspartic elastase with little or no azocollytic activity, which also was not detected using a substrate(gelatin) SDS-PAGE technique. Other proteinase types found were serine, cysteine & metalloproteinases.

Using the gelatin-SDS-PAGE technique, the mode of culture(shake & stationary) & the effect of substrate, time & temperature were analysed to compare the effects these factors may have on proteolytic enzyme expression between the two species. Substrate proved to be the most important factor in the expression of gelatinases. Mode of culture in SDB demonstrated that some proteinases were expressed in shake culture sooner than in stationary cultures. *M.canis* in both SDB & BSW produced 6 bands between 85,000 Da & 13,000 Da. *M.cookei* in SDB produced 7 bands between 64,000 Da to 19,000 Da but in BSW only 5 bands between 61,500 Da to 19,000 Da. Inhibition studies revealed that both species expressed several metalloproteinases & serine proteinases in BSW which were not expressed in SDB cultures. It is suggested that these proteinases may be important factors in the ability

of dermatophytes to colonise keratin & possibly, in the case of *M.canis*, to invade skin *in vivo*.

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