# DISINFECTION AND ENVIRONMENTAL STUDIES ON PATHOGENIC FREE-LIVING AMOEBAE

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ABSTRACT

Over the last fifteen years, there has been an increasing awareness of sporadic cases of Primary Amoebic Meningoencephalitis (PAM), affecting primarily younger age groups and appearing in an acute fulminant form. The earliest positive case known, may have been in England in 1909.

The pathogenic free-living amoebae (PFLA), which comprises the genera Naegleria and Acanthamoeba, are the causative organisms of PAM and Granulomatous Amoebic Encephalitis (GAE) respectively. PAM is a rapidly fatal disease affecting the central nervous system (CNS), and GAE although essentially confined to the CNS, may also take the form of granulomata in the liver, spleen, uterus and kidneys.

A study on the disinfecting potential of Baquacil in axenic conditions, for comparison with the disinfecting potential of the chlorine, chlorine dioxide, ozone and Deciquam 222, showed that the order of effectiveness as amoebicides was Baquacil, chlorine, chlorine dioxide, ozone and Deciquam 222 in hard water. In soft water the order is Deciquam 222, Baquacil, chlorine, chlorine dioxide and ozone.

Further study on the effect of Baquacil, chlorine and chlorine dioxide on amoebae, in conditions involving the use of a known Biochemical Oxygen Demand (BOD), a known bacteria concentration, and a combination of BOD and bacteria, confirmed Baquacil as a more effective amoebicide than chlorine, which in turn was more effective than chlorine dioxide. The concentrations of each disinfectant required were increased by the presence of a BOD, and of bacteria. The bacteria were preferentially destroyed over the amoebae with all three disinfectants.

Baquacil resistant clones of Naegleria fowleri were isolated, although it is not known whether this resistance is due to genetic or physiological variation.

Axenically and Monoxenically cultured amoebae were used, the

latter to increase the resemblance of the amoebae to those found in the environment. Differences in survival rates were observed, the monoxenically cultured amoebae invariably having higher survival rates.

Competition studies were done with Naegleria spp. and T.pyriformis on three bacteria species, after preliminary studies on the ability of the two protozoa to grow on eight species of bacteria. Of the three bacteria used in the competiton studies, Escherichia coli and Enterobacter cloacae were shown to support both Naegleria spp. and T.pyriformis, with the ciliate increasing in numbers by up to 3 fold over the controls, but the amoebae were affected only slightly, with a small decrease in numbers compared to the controls. A synergistic relationship was evident on the third bacteria species, Pseudomonas fluorescens, between Naegleria spp. and T.pyriformis, where as in the controls, this bacterium was not a good growth support bacteria for either protozoan.

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