Growth dynamic of Naegleria fowleri in a microbial freshwater biofilm
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INTRODUCTION AND OBJECTIVES

The free-living amoebae are ubiquitous organisms that are encountered in natural and artificial environments. The temporary occurrence in industrial cooling circuits of the pathogenic Naegleria fowleri is a health topic of interest. The ecology of these amoebae is well known to be involved in the occurrence of Naegleria fowleri. Moreover, our works showed that the amoebic growth appears to be a key parameter for its installation, development and survival.

MATERIALS AND METHODS

Two flat-plate open channel reactors made of polyvinylchloride, 41 cm wide, 12 cm deep and 136 cm long with a working volume of 2.7 L were fed by freshwater from the Loire River (Loiret, France). A biofilm colonized spontaneously the 70 immerged glass plates served as substrata. After 24 h, a suspension of the amoeba Naegleria fowleri was introduced by a single injection. Analytical monitoring includes:

- live amoeba (FLA) counting (MPN procedure),
- Naegleria fowleri counting at 43°C (MPN procedure),
- total bacterial flora (cell counting using SYBR Green dye)
- biofilm surface coverage by transmitted light microscopy and image processing.

Several independent runs were successively conducted within 45 days each, respectively at 22°C, 32°C and 42°C.

RESULTS

CONCLUSIONS

This study highlighted the crucial role of temperature on the growth rate of the FLA and Naegleria fowleri. Moreover, the focus on Naegleria fowleri shows that a temperature of 22°C leads to its disappearance, 32°C allows its survival while 42°C allows its proliferation.

Moreover, our works showed that the dynamic of the amoebic growth is a function of the amount of substrate (ratio bacteria/amoebae).