The comparison of Aluminium Effects and its Uptake by *Escherichia Coli* in Different Media

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SUMMARY

The investigation of the toxic effects and the uptake of aluminium by Escherichia coli in growth medium (GM) and in physiological solution (PS) have been studied. The toxicity was quantitatively determined according to the decrease of the colony forming units (CFU) in the physiological solution, that is its growth inhibition in the growth medium, vs. the aluminium concentration and incubation time, at pH 5.2, 6.2 and 7.2. The uptake of aluminium was investigated by determining the intracellular aluminium in dry weights (DW), by graphite furnace atomic absorption spectrophotometry, considering that aluminium adsorbed to the cell surface was removed by washing with EDTA solution. The results show that toxicity and accumulation increase with the increase of the aluminium concentration and incubation time. However, the linearity of these functions was lost at higher values, which indicate dependence on time and concentration saturation. The effect of pH was specific, and correlated with the form of aluminium in solution. The increase in toxicity as the pH decreases, suggests that the Al(H2O)63+ ion is the major toxic form, among the remaining present ones aluminium in aqueous media. The results also show that the aluminium in a concentration range from 0.10 to 10.0 mg/l toxic to E. coli in PS, was significantly less toxic for bacteria in the GM, mainly because of living conditions and the accessibility of free Al.

Key words: Escherichia coli, growth medium, physiological solution, aluminium, toxicity, uptake, growth inhibition, colony forming units (CFU)

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