



In vitro antibacterial properties of magnesium metal against *Escherichia coli*, *Pseudomonas aeruginosa* and *Staphylococcus aureus* ☆

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ABSTRACT

Bacterial infections are a costly sequela in any wound. The corrosion properties of 0.15, 0.30, 0.45 and 0.60 g of Mg metal were determined in Mueller–Hinton broth by serially measuring the Mg²⁺ concentrations and pH over 72 h. In addition, the effect of Mg metal, increased Mg²⁺ concentration and alkaline pH on the *in vitro* growth of *Escherichia coli*, *Pseudomonas aeruginosa* and *Staphylococcus aureus* were evaluated in three separate experiments. The primary outcome measure for culture studies was colony-forming units/ml compared to appropriate positive and/or negative controls. Regardless of the mass of Mg added, there was a predictable increase in pH and Mg²⁺ concentration. The addition of Mg and an increase of pH resulted in antibacterial effects similar to the fluoroquinolone antibiotic; however, a simple increase in Mg²⁺ concentration alone had no effect. The results demonstrate an antibacterial effect of Mg on three common aerobic bacterial organisms, the mechanism of which appears to be an alkaline pH.

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