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Perspective

Antibiotic properties of Chlorine and Alcohol Disinfectants, as well as the Resistance Profile of Escherichia Coli when Isolated from Domestic Livestock that Appeared to be in Good Health

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Abstract

Escherichia coli isolates from domestic animals in Osun State, Nigeria, including cows, goats, and chickens, that appeared to be in good health were used in this investigation to assess the profile of antibiotic resistance. Eosin methylene Blue Agar (EMB) was used to isolate E. coli, which was then identified using standard microbiological methods. Using the disc diffusion technique, the isolate was screened against 14 antibiotics. Each isolate shown resistance to at least four out of the eight tested antibiotics, making a total of 42 distinct antibiotic resistance profiles visible. Generally speaking, the E. coli isolates showed resistance to Ampicilin at a rate of 93.8 percent; Chloramphenicol at 15.3 percent; Cloxacillin at 52.7 percent; Erythromycin at 74.3 percent; Gentamicin at 20.9 percent; Penicillin at 53.8 percent; Streptomycin at 17.7 percent; Tetracyclin at 67.3 percent; and Ceftazidine at 21.1 percent. 70.7 % to cefuroxine, 20.5 % to cefixine, 28.8 % to ofloxacine, and 58.6 % to Ciprofloxacin. According to statistical research, cows had a substantially greater average number of resistance phenotypes per isolate than did poultry (Behr H et al., 1994). The fact that multi-drug resistant commensal E. coli strains may operate as a possible gene reservoir for resistance that might spread to dangerous bacteria raises serious concerns for public health, according to this study.

INTRODUCTION

In hospitals and other health care facilities, antiseptics and disinfectants are widely utilized for a range of topical and hard-surface applications. They help prevent nosocomial infections in particular and are a crucial component of infection control procedures. Public usage of antiseptics and disinfectants has risen as a result of growing worries about the possibility of microbial contamination and illness hazards in the food and general consumer sectors. These products include a wide range of active chemical substances, often known as "biocides," many of which have been used for antisepsis, disinfection, and preservation for many years. Despite this, less is known about these active drugs' modes of action than is the case with antibiotics. Antibiotics typically target particular intracellular targets, but biocides may target several intracellular targets. In general, biocides have a wider spectrum of action than antibiotics. Some have speculated that the increasing use of antiseptic and disinfection goods may be contributing to the rise of microbial resistance, particularly antibiotic cross-resistance (Barrette WC et al., 1989).

Due to their broad spectrum of antibacterial action, low toxicity, cheap cost, and effectiveness in biofilms, chlorinated compounds are often employed in dentistry clinics and laboratory settings. However, in high quantities, they are inactivated by organic matter and corrode metals. Sodium dichloroisocyanurate, a chlorine compound with a delayed release, is employed in healthcare facilities but is very corrosive. Corrosion inhibitors have been added to slow-release chlorine dioxide disinfectants, which are widely used in industrial environments (Ayres H et al., 1993). Products containing chlorine dioxide have been investigated

for use in dentistry. Studies have shown that it works well in mouthrinses to treat conditions including chronic atrophic candidiasis, denture stomatitis, plaque buildup, periodontal infections, and bad breath. It has also been proven that sodium dichloroisocyanurate is effective at cleaning radiography films and irreversible hydrocolloid impression material (Cozens RM et al., 1983). The effectiveness of these disinfectants against Mycobacteria and the Hepatitis B virus has not been examined in any of the aforementioned trials. Additionally, chlorine dioxide's anti-hepatitis B viral action has not been shown.

DESCRIPTION

In order to destroy germs, active chlorine compounds are used in a number of disinfection procedures as well as in the myeloperoxidase-hypochlorite system, which is present in the phagolysosomes of human leucocytes. Studies on N-chlorotaurine (NCT), the primary long-lived oxidant generated by granulocytes and monocytes, provided fresh information on the effects of chlorinating pathogens. In the mouse peritonitis model, it was shown that incubation for a sublethal duration of 1 minute in a solution containing 1 percent NCT resulted in a delay in bacterial regrowth (postantibiotic effect) and a loss of virulence of highly encapsulated staphylococci and streptococci (Gilbert P et al., 1990). Furthermore, bacteria chlorinated by the myeloperoxidase system lost their capacity to stimulate macrophages to produce nitric oxide and tumour necrosis factor-a. These results compelled us to develop techniques for measuring the chlorination of bacterial surfaces and to conduct the first comprehensive analysis of chlorine covers on Candida albicans, Gram-positive and -negative bacteria, and other microorganisms.

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