Antimicrobial Resistance Testing of "Staphylococcus" Isolates with Spiral Gradient Endpoint Technology

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Abstract: Over 200 known diseases are transmitted via food, and the causes include bacteria, viruses, parasites, toxins, metals and prions. It is estimated that foodborne diseases are attributable to 76 million illnesses, resulting in 325,000 hospitalizations and 5,000 deaths annually in the United States. Active surveillance of nine major foodborne pathogens was implemented in the United States in (1996); however, Staphylococcus is not among the actively surveyed pathogens. Multi-drug resistant Staphylococcus aureus is one of the leading causes of foodborne disease outbreaks, and the incidence of hospital and community acquired Staphylococcal infections are also increasing. The aim of this study was to examine the antimicrobial resistance profile of Staphylococcus aureus strains against fourteen antimicrobial agents, using Spiral Gradient Endpoint (SGE) technology. Sixty-six isolated strains of Staphylococcus were obtained from 21-Clinical; 11-milk and 34-meat samples. Sixteen (24%) were coagulase-positive; 50 (76%) were negative and all (100%) isolates were catalase positive. One hundred percent of the isolates were susceptible to enrofloxacin (GMIC = ≤1 µg/ml; EC = ≤0.7 µg/ml; TEC = ≤0.7 µg/ml). Forty-seven (71%) of strains were resistant to Sulfadimidine (GMIC = ≥256 mg/ml; EC = 145 mg/ml); 67% to trimethoprim (GMIC = ≥256 mg/ml; EC = 147 mg/ml). Thirty-six strains (55%) were resistant to 1-3 antibiotics; twenty-one strains (32%) were resistant to 4-6 antibiotics; 5 strains (8%) were resistant to 7-9 antibiotics; 1 strain was resistant to >9 antibiotics and 3 isolates showed no resistance to any antimicrobial agent. This study demonstrated a prevailing increase in the isolation of multiple antimicrobial resistant strains of Staphylococcus aureus from clinical and food samples, and some strains share similar antimicrobial resistance profile. The paper concludes that several strains show resistance to more than one antibiotic, which is in agreement with other studies indicating the increased prevalence of multidrug resistant Staphylococcus from hospital, community and food.

Keywords: Spiral Gradient Endpoint, Staphylococcus Aureus, Antimicrobial Testing

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