CHARACTERIZING MULTIPLE ANTIBIOTIC RESISTANT (MAR) AND DETERMINATION OF MAR INDEX IN CULTURED BACTERIA FROM HOSPITAL EFFLUENT, SRI LANKA

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Abstract

Concurrent resistance to antibiotics of different structural classes has arisen in a multitude of bacterial species and cause complicating the therapeutic management for both human and animal. The objective of the study was determined the Multiple Antibiotic Resistance (MAR) and MAR index of isolated antibiotic-resistant bacteria from hospital effluent. Among the total resistance bacteria isolates (378), 157 (41.53%) were gram-positive whereas 221 (58.46%) were gram-negative. Each resistance bacteria were tested against Oxytetrcyline (OTC), Tetracycline (TET), Ampicillin (AMP), Amoxicillin (AM.X), Sulfamethaxasol (SMX), Trimethoprim (TMP), Erythromycin (ERM), Gentamycin (GEN), Cloxacillin (CLOX) and Ciprofloxacin (CIP). The MAR was determined by using Triphenyl Tetrazolium Chloride assay and then the MAR index was calculated. MAR index range varied from 0.08 to 0.51 for the isolated bacteria. It was found that MAR was highest within gram-positive (0.08 -0.51) bacteria than the gram-negative (0.08 -0.45) bacteria. The highest MAR index was found for *Streptomyces* sp. (0.51), and the lowest was for *Bacillus* sp. (0.08) and *Enterobacter* sp. (0.08). Among 378 resistant bacteria isolates, 40 strains belong to; *Staphylococcus* sp. (3), *Streptococcus* sp. (2), *Micrococcus* sp. (3), *Bacillus* sp. (8), *Lactobacillus* sp. (1), *Acinetobacte*r sp. (7), *Enterobacter* sp. (9), *E.coli* (7) and they showed resistant against all the tested antibiotics. *Streptomyces* sp., *Moraxella* sp., *Pseudomonas* sp., *H. influenza* and *A. hydrophila* have not shown resistance against CLOX and CIP. The overall resistance to AMX was 92%, followed by AMP (90%), SDI (68 %), SUF/TRI (65 %), TET (62%), ERM (58%), GEN (47 %), AZY (40 %), CLOX (16 %) and least resistance was recorded for CIP (11%). The results of the study indicate that overuse and misuse of antibiotics led to emergence of MAR bacteria and it compromises the effectiveness of antibacterial therapy and leading infectious microorganisms to become resistant against antibiotics.

Keywords: Multiple Antibiotic Resistance (MAR), antibiotic, Multiple Antibiotic Resistance Index (MARI)