

Determination of Multiple Antibiotic Resistant (MAR) and MAR Index in bacteria isolated from aquaculture farms

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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 to determine the Multiple Antibiotic Resistance (MAR) and MAR index of isolated tetracycline resistance bacteria from aquaculture sources. 42 tetracycline resistance bacteria, which were previously isolated from aquaculture farms were tested against Oxytetracycline (OTC), Tetracycline (TET), Ampicillin (AMP), Amoxicillin (AMX), Sulfamethaxazol (SMX), Trimethoprim (TMP), Erythromycin (ERM), Cloxacillin (CLOX) and Ciprofloxacin (CJP). The MAR was determined by using Triphenyl Tetrazolium Chloride (TTC) assay and agar dilution method following CLSI guidelines. Then the MAR index was calculated. Among the isolates, 64.3% were resistant to three or more antibiotics and considered as multiple antibiotic resistant according to the WHO and CLSI guidelines. Among the MAR isolates, 93 % were resistant to OTC, 90% to TET, 34% to AMX, 14 % to AMP, 13 % to ERM, 11 % to SMX-TMP and 2% were resistant to CLOX were detected. None of the bacteria were resistance for CIP. The calculated MAR index was ranged from 0.03 to 0.42 for the isolated bacteria and the highest MAR index was recorded by *Staphylococcus* sp. (0.42), while the lowest was shown by *Enterobacter* sp. (0.03). The results of the study indicate that the overuse and misuse of antibiotics led to emergence of MAR bacteria and it compromises effectiveness of antibacterial therapy, leading infectious microorganisms to become resistant against antibiotics.

Keywords: Antibiotic, Multiple antibiotic resistance index, Multiple antibiotic resistance, Tetracycline