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Pathological and Immunological Studies on Bacterial Diseases in Oreochromis Fish Species with Emphasis on Vaccination Trials

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Abstract

Our study is divided into two main parts; the first part was a survey for one year and determination the prevalence rate of bacterial microorganisms affecting some fish farms in El fayoum and El sharkia governorates. These farms showed signs of septicemia with a history of 20 -25% recorded mortalities during the period from autumn 2018 to summer 2019. In postmortem examination, the affected fish showed loosed scales, ulceration in the dorsal part of the head, petechial hemorrhages on the body surface, unilateral exophthalmia, and corneal opacity together with congested blood vessels of nearly all fleshy portions of the body fins. Internal examination of the viscera showed congestion of the blood vessels in the kidneys and brain together with dark enlarged spleen while the liver was marbled in appearance. Ninety fish samples (representing 10% of the fishes showing clinical signs) were collected from such fish farms for histopathological and bacteriological examination. *Aerococcus viridans* was isolated from El Fayoum and El Sharkia governorates in rates of 7.7% and 15.9% respectively throughout the year while *Enterococcus faecalis* was isolated with a rate of 34.6 and 39.02 respectively. The prevalence rate of *Aeromonas hydrophila* was

42.3% in El fayoum governorate and 13.4 % in El sharkia governorate while Vibrio vulnificus was recorded 0 % in El fayoum governorate and 7.3 % in El sharkia governorate, *Proteus vulgaris* was 3.8 in El fayoum governorate and 12.2% in El sharkia governorate. *Pseudomonas aeruginosa* was 11.5% in El fayoum governorate and 12.2% in El sharkia governorate. The seasonal prevalence rates were analyzed in both locations throughout the year. In antibiotic sensitivity testing, the *A.viridans and E.faecalis* showed resistance to ampicillin, oxolinic acid, nalidixic acid, amikacin, and gentamicin but they were sensitive to amoxicillin and nitrofurantoin. *E. faecalis* exhibited resistance to erythromycin and oxytetracycline while *A. viridans* was sensitive to them. Experimental infection and re-isolation of both bacterial isolates in *O. niloticus* was performed to confirm the field isolation and for studying the pathogenicity of such microorganisms in this fish species. The Gram negative bacteria were showing resistance against erythromycin except *Vibrio vulnificus* that showed sensitivity. *Aeromonas hydrophila* and Proteus vulgaris showed resistance to colistin sulphate and susceptibility to sulpha-trimethoprime. *Vibrio vulnificus* and *Pseudomonas aeruginosa* showed resistance against sulpha-trimethoprime and sensitive against colistin sulphate. In last decade, because of the bacterial diseases in egypatian farms were recorded ahighly increase in Gram positive bacteria and a new isolates were admitted to aquaculture as result of using agriculture drainage water, so part 2 of our study was directed to experimental design to control newly admitted bacterial diseases by using of formalin killed vaccine against the isolated Gram positive strain in our field study (*A.viridans* and *E.faecalis*). This design were performed by using 84 fish divided in 7 groups (control negative, vaccinated *A.viridans*, vaccinated *E.faecalis*, infected *A.viridans*, infected *E.faecalis*, challenged *A.viridans* and challenged *E.faecalis*); 12 fish / each group. The efficacy of vaccine was evaluated by making WBCs count and lysosome activity which showed marked increase in vaccinated, challenged than in the infected group. The statistical analysis for all parameters used for vaccine evaluation was performed. The parameters included pathological changes, biochemical and hematological aspects as well as immunological aspects to compare between naturally, experimentally infected and vaccinated groups.

Keywords: Bacterial diseases- *O .niloticus* – vaccine – WBCs –lysosome activity

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