

Dedication

I dedicate this study to the memory of my late supervisor Prof. Abdu El-Dawi, Department of Microbiology, Faculty of Veterinary Medicine, University of Khartoum, Sudan

To the memory of my late father

To my mother

To my brothers and sisters

Acknowledgment

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Abstract

The present study was conducted to determine the aerobic bacterial load in different seasons of the year in *Oreochromis niloticus* and *Clarias lazera* and effects of most common bacteria on health status and meat quality of *Oreochromis niloticus*.

Samples were collected randomly from Jabal Aulia Dam, Shajara Research Centre Pond and El -Mourada market. A total of 600 fish samples consisting of 120 gills, 120 intestines, 120 livers, 120 kidneys, and 18 water samples were examined and cultured aerobically.

74% of the isolated bacteria were identified as Gram-negative bacteria and 26% were Gram- positive. All together comprising 19 genera from different fish samples and water.

The study revealed that the load of bacterial species differed seasonally and in different locality.

The most common bacteria were *Aeromonas hydrophila* and *Vibrio furnissii* had different effects on *O. niloticus* in blood parameters, meat chemical composition, symptoms and mortality rate. In case of blood parameters, *O. niloticus* infected by *V. furnissii* had a high erythrocytic count after 10 days, but after 40 days the control group had highest erythrocytic count compared to the other two infected groups ($P>0.05$). Also *O. niloticus* inoculated with *A. hydrophila* and *V. furnissii* showed hairy appearance of the red blood cells membrane while control group showed normal appearance of the red blood cells and there is a cluster of neutrophils after 10 days of

inoculation. The results obtained showed that a decrease of packed cell volume and an increase in mean cell volume of erythrocytes at the end of the experiment were due to infection of both bacteria and there are vacuoles in the cytoplasm and nucleus of the red blood cells developed hypochromic anaemia.

After 10 days of experiment *O. niloticus* infected with *V. furnissii* had lower value of white blood cells, but after 40 days a higher value of white blood cells was observed compared to the other two groups. Low lymphocytes count were found after 10 days of infection of *O. niloticus* with *V. furnissii*, but after 40 days there was a remarkable increase of lymphocytes which became quite similar to *O. niloticus* infected with *A. hydrophila* while the control group had a lesser number of lymphocyte count compared to the other groups.

Monocytes count in fish infected with *V. furnissii* had the highest count after 10 days, and a clear decrease occurred after 40 days, but fish inoculated by *A. hydrophila* showed the opposite. Also the control group had a lowest monocyte count compared to the other two groups. There was a significant difference in neutrophils count between the control and the two inoculated groups.

Concerning the proximate chemical analysis, the control group had lower dry matter, higher moisture content, higher protein percent and higher potassium level compared to the inoculated groups while there was a significant difference between control group and inoculated *O. niloticus* in ether extract, non free energy, ash, phosphorus, calcium and sodium.

The fish infected with *V. furnissii* showed symptoms of vibriosis as haemorrhage at the base of the fin and distention of the abdomen and had mortality rate of 30% while fish infected with *A. hydrophila* showed no symptoms nor mortality rate.

الخلاصة

أجريت هذه الدراسة على عينات أسماك البلطى النيلى و القرموط والماء تم جمعها من خزان جبل أولياء و مركز بحوث الاسماك و سوق الموردة وذلك لمعرفة البكتريا الهوائية الموجودة بها و تركيز البكتريا في مختلف فصول السنة و الاماكن التى جمعت منها العينات و أيضا اختبار تأثير أكثر البكتريا شيوعاً فى العينات على البلطى النيلى من حيث الحالة الصحية وجودة اللحم.

تم جمع 600 عينة اشتملت على 120 عينة خياشيم ، 120 عينة كبد ، 120 عينة أمعاء ، 120 عينة كلى و 18 عينة ماء. جميع العينات تمت زراعتها في أوساط ذراعية مختلفة لعزل البكتريا الهوائية .

اشتملت العينات المعزولة على أنواع موجبة الجرام و أخرى سالبة الجرام و قد بلغت نسبة الانواع السالبة الجرام 74% ونسبة الموجبة الجرام 26%. و قد أوضحت الدراسة أن تركيز البكتريا و نوع البكتريا يختلف باختلاف فصول السنة و المكان.

أيضا أوضحت الدراسة أن البكتريا الشائعة الأيرومونات و الفيبريو لها تأثير مختلف على البلطى النيلى. فى حالة خصائص الدم وجد ان عدد كريات الدم الحمراء ازداد بعد 10 أيام بالنسبة للأسماك التى حقنت بالفيبريو و لكن بعد 40 يوما نقص عدد كريات الدم الحمراء فى هذه الاسماك و ازداد فى الاسماك التى حقنت بالايرومونات و الكنترول. ايضا حدث تغير فى كريات الدم الحمراء بالنسبة للأسماك التى حقنت الايرومونات و الفيبريو بعد 10 ايام حيث ظهرت شعيرات حول غشاء خلية كريات الدم الحمراء أما الكنترول فكانت طبيعية عدا مجموعة من الخلايا المتعادلة فى الدم الطرفى لهذة الاسماك . بعد 40 يوم اظهرت الاسماك المحقونة بالبكتريا وجود فجوات فى انوية كريات الدم الحمراء مما يدل على وجود الانيميا و ايضا تمثل تأثير هذه الانواع من البكتريا تمثل فى نقص

حجم الهيموقلوبين المرصوص و ازدياد متوسط حجم كريات الدم الحمراء مما أدى إلى الأنيميا في نهاية التجربة . اما كريات الدم البيضاء فقد ازداد عددها بعد 40 يوما من التجربة بالنسبة للأسماك المحقونة مقارنة مع الكنترول.

أما التحليل الكيميائي للحم البلطى النيلى المحقون و الغير محقون فقد اظهرت الدراسة ان البكتريا المحقونة ليس لها تأثير على الرماد و الطاقة غير الحرة و الدهون . أيضاً أظهرت الدراسة أن الكنترول لها نسبة مادة جافة منخفضة ورطوبة عالية ونسبة بروتين أعلى ومعدل بوتاسيوم أعلى مقارنة مع الاسماك المحقونة البكتريا. أيضا وجد أن البكتريا ليس لها تأثير على الفسفور و الكالسيوم و الصوديوم. أيضا الأسماك التى حقنت بهذه البكتريا تدنت فيها نسبة البروتين و البوتاسيوم مقارنة مع التى لم تحقن.

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