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Abstract

Episodes of low concentrations of dissolved oxygen (DO) and high concentrations of ammonia are major causes of fish stress, which in return, they reduce growth and increase mortality rates in aquaculture ponds. This study measured the effects of water de-stratification on dissolved oxygen and ammonia concentrations for tilapia at culture system. Estimation of water quality parameters ammonia and dissolved oxygen levels in tilapia fish fingerlings. It was conducted between August and September 2015 at Sudan University of Science and Technology, in fish hatchery, Complete randomized block design was used with four treatments. The average body weight of the fry and fingerlings of (*Oreochromis niloticus*) were 14.7-22 g for big and 10.431-14 for small once at fed and another starved. Data was analysed using analysis of variance (ANOVA), The mean of DO concentrations of integrated were lower than 1 mg/L from 02:00pm to 11:00am between 0.53 ± 0.153 to 0.20 ± 0.00 at big starved and in big fed, 0.63 ± 0.115 to 0.13 ± 0.058 were significantly different between big starve and fed ($p < 0.05$). The Oxygen consumption ranged from 2594.59 to 1000.00 mlO₂/m for fingerlings starved for 72 Hrs. The fingerlings were 3490.91ml O₂/m to 342.86 ml O₂/m when fed commercial dietary to fingerlings. Oxygen consumption rate were significantly different ($p < 0.05$) in both sizes and between feeding and starved status during the measurement period compared. The effects of ammonia on carbohydrate metabolism in Nile tilapia (*O. niloticus*) during the experimental period measured of ammonia in the water were calculated to determining the mean and standard deviation. Analysis of variance revealed that ammonia concentration obtained in big starved fingerlings varied from 1.07 ± 0.06 to 0.73 ± 0.06 and in the big group feeding in range 1.13 ± 0.15 to 0.67 ± 0.07 were no significantly different ($p > 0.05$) between big starve and fed. In small fingerlings starved the ammonia obtained from 1.47 ± 0.55 to 1.00 ± 0.10 , while at the fed group from 1.27 ± 0.25 to 0.83 ± 0.15 . At the end of the study The results showed that there were no significantly at level ($p > 0.05$).

ملخص الدراسة

معدل التركيزات المنخفضة من الأوكسجين الذائب في الماء والتركيزات العالية من الأمونيا هي من الأسباب الرئيسية لإجهاد الأسماك، والتي تؤثر علي النمو وتزيد من معدلات النفوق في تربية الأحياء المائية. هدفت الدراسة لتقييم تأثير الأوكسجين والأمونيا في المياه المستخدمة في نظام استزراع البلطي، تقدير قياسات المياه مثل الأمونيا ومستويات الأوكسجين المذاب لإصبعيات اسماك البلطي اجريت الدراسة في الفترة بين شهري اغسطس وسبتمبر 2015 بمفرخ جامعة السودان للعلوم والتكنولوجيا، واستخدم التصميم العشوائي الكامل وكان متوسط وزن الجسم من الاصبعيات من (البلطي) 7.14-22 جم للأحجام الكبيرة و 14-10.431 جم للأحجام الصغيرة في حالة التغذية وحالة التجويع وحللت البيانات بتحليل التباين . وكان متوسط التركيز للأوكسجين المذاب اقل من 1 مل/لتر في الفترة من 2:00 ظهرا الي 11:00 صباحا ظهرت فروق معنوية) ($P < 0.05$) بين الكبيرة المجموعة و الكبيرة المغذية من 0.153 ± 0.53 الي 0.00 ± 0.20 في الكبيرة المجموعة و 0.115 ± 0.63 الي 0.13 ± 0.058 بالنسبة للمغذية. و في حالة الاحجام الصغيرة المجموعة 0.115 ± 0.83 الي 0.33 ± 0.057 مدي استهلاك الاوكسجين تراوح من 2594.59 الي/ $1000.00 \text{ mlO}_2/\text{M}$ للإصبعيات وهي جائعة لمدة 72 ساعة و في تغذية الاصبعيات التي تم تغذيتها مدي استهلاك الاكسجين تراوح بين $3490.91 \text{ M}/\text{mlO}_2$ الي $342.86 \text{ M}/\text{mlO}_2$ ظهرت اختلاف كبير ($p < 0.05$) في كل الأحجام وبين التغذية والحالة جوعا خلال فترة قياس المقارنة

حسبت آثار الأمونيا على التمثيل الغذائي للكربوهيدرات في البلطي النيلي خلال الفترة التجريبية لقياس الأمونيا في الماء لتحديد المتوسط والانحراف المعياري. وكشف تحليل التباين أن تركيز الأمونيا في الإصبعيات الكبيرة الجائعة تتراوح بين $0.73 - 0.06 \pm 1.07$ و 0.06 وفي حالة التغذية للكبيرة في مدي $0.07 \pm 0.67 - 0.15 \pm 1.13$ وكان لا يختلف بشكل كبير ($P > 0.05$) بين تجويع كبير المغذي . في الإصبعيات الصغيرة المجموعة كانت الأمونيا التي تم الحصول عليها من $1.47 \pm 1.00 - 0.55 \pm 0.10$ ، بينما في المجموعة التي غذيت من $1.27 \pm 0.83 - 0.15 \pm 0.25$. في نهاية التجربة أظهرت النتائج عدم وجود فروقات في مستوى ($P > 0.05$).

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LIST OF ABBREVIATIONS

EPA: Environmental Protections Agency

TAN: Total ammonia nitrogen

DO: Dissolved oxygen

RAS: Recirculating aquaculture systems

FCR: Feed conversion ratio

PCV: Packed cell volume

SGR: Specific growth rate

PVC: Pipe very crowded

ASR: Aquatic surfaces respiration

MO₂ : Oxygen consumption

ANOVA: Analysis of variance

µg/l: micro gram per liter

LC50 = Lethal concentration to 50% of the test population

FBW= Final body weights

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