# GROWTH PERFORMANCE AND WATER QUALITY AS AFFECTED BY DIETARY NITROGEN LEVELS IN NILE TILAPIA

**By**


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**B. Sc. Agric. Sci. (Poultry Production), Fac. Agric., Cairo Univ., 2010**


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APPROVAL SHEET

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**Title of Thesis**: Growth Performance and Water Quality as Affected by Dietary Nitrogen Levels in Nile Tilapia

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## ABSTRACT

Nile tilapia juveniles with a range initial weights 95.1 - 106.8 were distributed into 18 concrete tanks with a constant water depth of 75 cm. Two feeding rates (inputs) were employed in the first rearing experiment at 7 and 10 grams diet/$m^2$/day. The commercial feed contained three levels of dietary protein (25, 30 and 35%). The rearing experiment included six treatments. Increasing dietary protein contents within the 7 gram and 10 gram treatments did not affect oxygen concentration at sunset. When feed load increased from 7 grams to 10 gram algal blooms took place in higher feed load. Early morning oxygen deficits ranged -0.72 to -0.81 g $O_2/m^2$ in the 7 grams treatments, with no significant effect due to protein content among tested diets. However, higher early morning oxygen deficits (-1.59 to -1.99 g $O_2/m^2$) were observed in the 10 grams treatments. Feeding Nile tilapia at 7 grams/$m^2$/day had comparable growth performance and better feed conversion ratio to those fed at 10 grams/$m^2$/day. Consequently, higher feed inputs neither improved economic efficiency, nor enhanced oxygen budget. Increasing crude protein within the 7 gram treatments above 30% did not improve PER value. Nile tilapia juveniles with a range initial weights of 129.6-140.3 grams/fish were distributed into 18 concrete tanks with a constant water depth of 75 cm. Two feeding rates (inputs) were employed in the experiment at 8 and 9 grams diet/$m^2$/day, six days a week. The commercial feed contained three levels of dietary protein (25, 30 and 35%). Increasing dietary protein content did not have any effect on oxygen concentrations at sunset among treatments. Dissolved oxygen (DO) concentrations at sunset decreased sharply from 8.9 - 10.8 g $O_2/m^2$ during the second month to 3.4 - 6.9 g $O_2/m^2$ during the third month, with significant differences between the two periods ($p<0.05$). There was a sharp decline in secchi disk readings caused by the excessive increase in algal abundance during the third month. Dissolved oxygen concentration at sunrise and sunset were drastically reduced during the third month due to the excessive algal bloom observed in the latter period. Better environment during the second month improved treatment performance in terms of nighttime oxygen availability, however, adverse environments were observed during the third month with fish suffering oxygen deficiency. The 25% crude protein diet in both the 8 gram and 9 gram feeding rates had better oxygen budget and better environmental conditions for fish production. The better environment of the 25% crude protein treatments were caused by the lower algal blooms (secchi disc readings 10.0 - 13.3 cm) observed in those treatments during the third month compared to most of the other treatments. The 25% crude protein treatments also produced better feed conversion ratios (2.42-3.44:1) and protein efficiency ratios (1.16 - 1.66) compared to those of the 30 and 35% crude protein treatments.

**Key words:** Nile tilapia, protein levels, oxygen dynamics, growth performance.

# *DEDICATION*

*I dedicate this work to whom my heartfelt thanks; to my father* ***Hassan,*** *my mother and my wife* ***Asmaa,*** *my daughter* ***Sherouk,*** *for their patience and help, as well as to my brothers for all the support they lovely offered along the period of my post-graduation studies.*

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# CONTENTS


| | Page |
|---|---|
| **INTRODUCTION** | **1** |
| **REVIEW OF LITERATURE** | **3** |
| **1. Dietary protein and ammonia excretions** | **3** |
| **2. Dietary protein and water quality deterioration** | **7** |
| **3. Ammonia and phosphorus cycles** | **13** |
| **4. Algal blooms and supplementary feeding** | **16** |
| **5. Decomposition of organic sediments** | **20** |
| **6. Ammonia and oxygen cycles** | **30** |
| **7. Algal bloom and natural food** | **36** |
| **8. Growth and feed performance of cultured fish** | **41** |
| **9. Feed and protein loads** | **50** |
| **MATERIALS AND METHODS** | **53** |
| **RESULTS AND DISCUSSION** | **63** |
| **1. The first rearing experiment** | **63** |
| **a. Oxygen dynamics** | **63** |
| 1. Water temperature | **63** |
| 2. Oxygen concentrations at sunset | **63** |
| 3. Oxygen concentrations at early morning | **67** |
| 4. Secchi disk | **67** |
| 5. Daytime oxygen gain | **69** |
| 6. Nighttime oxygen loss | **73** |
| 7. Oxygen budget | **75** |
| **b. Water quality parameter** | **77** |
| **c. Growth and feed performance** | **83** |
| 1. **Growth performance** | **83** |
| 2. **Specific growth rate** | **86** |
| 3. **Feed performance** | **86** |
| **2. The second rearing experiment** | **90** |
| **a. Oxygen dynamics** | **90** |
| 1. Water temperature | **90** |
| 2. Oxygen concentrations at sunset | **90** |
| 3. Oxygen concentrations at early morning | **96** |
| 4. Oxygen concentrations at midnight | **100** |
| 5. Oxygen gain, loss and budget | **103** |
| 6. Secchi disk readings | **114** |

7. Algal sedimentation and sediment respiration…… **117**
b. **Water quality parameters**…..……..……..……..……..... **118**
**c. Growth and feed performance**……...……..……..……... **124**
1. **Growth performance**…..……..…..……..……..…..……... **124**
2. **Feed performance**…..…..……..…..……..…..……..……..... **125**
**SUMMARY**…..……..…..……..…..……..……..…..……..…..…….. **131**
**REFERENCES**…..……..…..……..…..……..……..…..……..……. **137**
**ARABIC SUMMARY**