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不同溶解氧水平对鲻生长、能量代谢和氧化应激的影响

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Effect of different dissolved oxygen levels on growth, energy metabolism and oxidative stress of *Mugil cephalus*

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摘要

为研究溶解氧（DO）对鲻（*Mugil cephalus*）生长、能量代谢和氧化应激的影响，选择体质量为（29.24 ± 0.08）g 的鲻，在ρ(DO)分别为（1.56 ± 0.39）mg•L^{-1}、（4.13 ± 0.45）mg•L^{-1}和（7.22 ± 0.46）mg•L^{-1}的流量控制循环水系统中养殖40 d，测定其特定生长率（SGR）、血浆、肌肉、肝脏和鳃组织的乳酸（LD）含量、过氧化物歧化酶（SOD）活力、总抗氧化能力（T-AOC）、抗超氧阴离子活力（ASOR）和丙二醛（MDA）含量，然后在循环水控温装置中[（25.0 ± 1.0）°C]测定每DO处理鲻的耗氧率、排氨率和氧氮比。结果表明，实验结束时鲻体质量随ρ(DO)的提高而增大，SGR与ρ(DO)呈正相关关系，DO对鲻的生长影响显著。鲻在DO$_{7.22}$处理下的耗氧率和排氨率最高，而氧氮比却明显低于其他2种DO水平。肝脏中T-SOD活力、T-AOC活力和ASOR活力均与SGR负相关，表明在此实验条件下，肝脏氧化应激指标的提高与快速生长冲突，即消耗较多的能量和物质参与氧化应激可能导致用于生长的能量物质减少，致使鲻生长速度下降。

关键词 ： 溶解氧, 鲻, 能量代谢, 氧化应激

Abstract :

To study the effects of dissolved oxygen levels on the growth, energy metabolism and oxidative stress of mullets (*Mugil cephalus*), we cultivated the healthy mullets at average body weight of (29.24±0.08) g for 40 d in a circulating water flow control system [(25±1)℃] at dissolved oxygen levels of (1.56±0.39) mg•L^{-1}, (4.13±0.45) mg•L^{-1} and (7.22±0.46) mg•L^{-1}, respectively. The specific growth rate (SGR), LD, SOD, T-AOC, ASOR and MDA in the plasma, muscle, lung and gill were measured; the oxygen consumption rate, ammonia excretion rate and O : N ratio were also determined. The results show that the weight gain increased with increasing dissolved oxygen content; the SGR was positively correlated with dissolved oxygen content which had significant effect on the growth of mullets. The oxygen consumption rate and ammonia excretion rate were the highest at dissolved oxygen level of 7.22 mg•L^{-1}, while O : N value was the lowest. The contents of T-SOD, T-AOC and ASOR in liver were negatively correlated with SGR. It is revealed that since the increase of oxidative stress was conflict with rapid growth, the mullets will consume more energy under oxidative stress, which leads to slow growth.

Key words : dissolved oxygen *Mugil cephalus* energy metabolism oxidative stress

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