EFFECTS OF DIETARY ALLSPICE, *PIMENTA DIOICA* POWDER ON HEMATOLOGICAL AND IMMUNOLOGICAL RESPONSES OF *OREOCHROMIS MOSSAMBICUS* UNDER LOW pH STRESS

ÜMIT ACAR[1], OSMAN SABRI KESBIÇ[2], NEJDET GÜLTEPE[1], FERHAT YALGIN[4], SEVDAN YILMAZ[5], ALI TÜRKER[1]

[1]*Muğla Sıtkı Koçman University, Department of Aquaculture, Faculty of Fisheries, 48000, Muğla / Turkey.*

[2]*Kastamonu University, Inebolu Vocational School, 37500, İnebolu / Turkey*

[3]*Kastamonu University, Faculty of Engineering and Architecture, Department of Genetics and Bioengineering, 37000, Turkey*

[4]*Kastamonu University, Faculty of Fisheries, Department of Aquaculture, 37000, Turkey*

[5]Department of Aquaculture, Faculty of Marine Sciences and Technology, Çanakkale Onsekiz Mart University, Çanakkale, 17000 Turkey

EFEKTI PIMENTA *(PIMENTA DIOICA)* U PRAHU U HRANI NA HEMATOLOŠKE I IMUNOLOŠKE REAKCIJE KOD MOZANBIČKE TILAPIJE *(OREOCHROMIS MOSSAMBICUS)* IZLOŽENE STRESU NISKOG pH

Apstrakt

U spoljnjim sistemima gajenja u akvakulturi, ribe su često izložene fizičkim i hemijskim izvorima stresa kao što je kolebanje nivoa kiseonika u vodi, temperature i pH vrednosti. Brzo kolebanje pH vrednosti često može da bude veći problem kod riba nego pojedinačne pH vrednosti (Roberts and Palmerio, 2008). Tilapija je manje tolerantna na promenu pH vrednosti i može da razvije fiziološke promene prilikom prebacivanje iz vode neutralnog pH u kiselu sredinu (El-Sayed, 2006). Visoka ili niska pH vrednost vode može da dovede do promena u ponašanju, ošteti epitelne ćelije škrga, smanji efikasnost ekskrecije azota i poveća smrtnost Nilske i Mozanbičke tilapije (Yada and Ito, 1997).

U ovom eksperimentu korišćena je zdrava gajena Mozanbička tilapija *O. mossambicus* (prosečne težine ± SD = 16.05±0.08 g). Obrok od semena pimenta (*P. dioica*) dobijen je od Kotanyi, GmbH, (Istanbul, Turska). Ovaj obrok dodavan je hrani za ribe u količini 0. 5, 10, 15 i 20 g/kg. Eksperiment je rađen u triplikatu za svaki od ovih hrana. Petnaest akvarijuma (80 L) nasađeno je sa 270 riba (18 jedinki po akvarijumu). Riba iz eksperimenta hranjena je do vidljivog zasićenja dva puta dnevno u toku 60 dana. Riba nije hranjena 24 sata pre izla-

ganja stresu. Sve grupe riba bile su izložene stresu. Stres niskog pH postignut je izlaganjem riba vodi pH 5.5 u periodu od 3 dana.

Stresni uslovi značajno su smanjili hematološke i imunološke parametre kod riba koje su hranjenje kontrolnom hranom, osim one koje je bila obogaćena sa 5 –20 g/kg pimenta.

Rezultati ovog istraživanja pokazuju da dodatak pimenta u ishrani od 10 g/kg u trajanju od 60 dana ima pozitivne efekte na poboljšanje nekih hemato-imunoloških parametara kod Mozanbičke tilapije posle izlaganja stresnim uslovima kiselosti. Slične rezultate su objavili i Nayak i Abhilash (2008).

INTRODUCTION

In an outdoor aquaculture system, fish are usually exposed to physical and chemical stressors, such as fluctuations in water oxygen, temperature and pH. Rapid fluctuations in pH are generally more problematic for fish than specific individual pH values (Roberts and Palmerio, 2008). Tilapia are less tolerant to water pH and may develop physiological changes following transfer from neutral water to acidic water (El-Sayed, 2006). Low or high water pH may lead to behavioural changes, damage of gill epithelial cells, reduction in the efficiency of nitrogenous excretion and increased mortality of *Oreochromis niloticus* and *O. mossambicus* (Yada and Ito, 1997).

MATERIAL AND METHODS

Healthy cultured *O. mossambicus* (mean weight ± SD = 16.05±0.08 g) were used in experiment. Allspice (*P. dioica*) seed meal was obtained from Kotanyi, GmbH, (Istanbul, Turkey). It was added to the feed at a rate of 0, 5, 10, 15 and 20 g/kg. The experiment was designed in triplicate for each diet. Fifteen 80–L aquarium were stocked with 270 fish (18 fish/aquarium). The experimental fish were fed to apparent satiation twice a day for 60 days. Fish were not fed for 24 h before exposing them to stress. All group of fish were subjected to stress. An acidic stress was achieved by exposing the sampled fish to acidic water (pH 5.5) for 3 days.

RESULTS

The stressful condition significantly decreased hematological and immunological paramaters in fish that were fed the control diet, except diets that had been supplemented with 5–20 g/kg allspice.

DISCUSSION

The results of the present study demonstrated that supplementation of allspice at 10 g/kg for 60 days, has adequate beneficial effects on improvement of some hemato-immunological parameters of *O. mossambicus* after acidic stress. Similar results were given by Nayak and Abhilash (2008).

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