Received: 19 December 2022 | Accepted: 18 February 2023

DOI: 10.1111/jpn.13813

ORIGINAL ARTICLE

Fish

Journal of Animal Physiology and Animal Nutrition WILEY

Effects of dietary *Euphorbia heterophylla* extract on the growth performance, physiological, antioxidative and immune responses of *Clarias gariepinus* juveniles

Olarinke V. Adeniyi[1] | Ibrahim Adeshina[2] | Seyramsarah B. Setufe[3] | Theophilus Jarikre[4] | Shehu M. Albarka[1] | Fauziyat Attahiru[5]

[1]Department of Animal Production, Fisheries and Aquaculture, Kwara State University, Malete, Nigeria

[2]Department of Aquaculture and Fisheries, University of Ilorin, Ilorin, Nigeria

[3]Department of Fisheries and Water Resources, University of Energy and Natural resources, Sunyani, Ghana

[4]Department of Veterinary Pathology, University of Ibadan, Ibadan, Nigeria

[5]Department of Biosciences and Biotechnology, Kwara State University, Malete, Nigeria

Correspondence
Ibrahim Adeshina, Department of Aquaculture and Fisheries, University of Ilorin, P.M.B. 1515, Ilorin, Nigeria.
Email: adeshina.i@unilorin.edu.ng

Funding Information
Tertiary Education Trust Fund, Grant/Award Number: TETFUND 2013

Abstract

Effects of dietary *Euphorbia heterophylla* extract (EH) on growth performance, feed utilization and haemato-biochemical parameters in African catfish, *Clarias gariepinus*, juveniles were evaluated in this study. Diets fortified with EH at 0 (control), 0.5, 1.0, 1.5 or 2.0 g/kg were fed to the fish to apparent satiation for 84 days before challenging it with *Aeromonas hydrophila*. The weight gain, specific growth rate and protein efficiency ratio of fish fed EH-supplemented diets were significantly higher but lower feed conversion ratio ($p < 0.05$) than the control group. The villi height and width at the proximal, mid and the distal of the guts rose significantly with the increasing levels of EH from 0.5 to 1.5 g than the fish fed basal diet. Dietary EH enhanced ($p < 0.05$) the packed cell volume and haemoglobin, whereas 1.5 g EH boosted white blood cell, in relation to their counterpart in the control group. There were significant increase in the activities of glutathione-*S*-transferase, glutathione peroxidase and superoxide dismutase ($p < 0.05$) in the fish that were fed diets supplemented with EH than the control. Dietary EH also enhanced phagocytic activities, lysozyme activities and relative survival (RS) of *C. gariepinus* than the control group, with the highest RS obtained in fish that were fed diet containing EH at 1.5 g/kg level. These results revealed that the fish fed 1.5 g/kg dietary EH promoted growth performance, antioxidant and immune profiles, as well as protection against *A. hydrophila* infection.

KEYWORDS
antioxidation, *Clarias gariepinus*, *Euphorbia heterophylla*, growth performance, immune response

1 | INTRODUCTION

opportunistic diseases, the use of immunostimulants as dietary supplements might strengthen the defence of innate animals by