











efficiency ratio and low food conversion ratio than fish fed with Bluecrown feed (Nigerian made) which is strongly attributed to the high CP level than the Nigerian made feed. In his research, there was a consistent survival rate in the culture of *C. gariepinus* in both treatments from week two till the end of the study. This is because of its resistance to water quality stress as well as diseases (Limbu, 2015). Comparing the weekly weight gained, the second week had the lowest, perhaps, and this was due to the condition of the fish to adjust to the initial feed after acclimatization. More so, nutrients were rather utilized for their survival instead of effective increase in fish length and weight. However, there was a stable growth rate in later weeks which is indicative of effective adaptation to the fish feed. The physical and chemical properties of the fish cannot be ignored; as they play important roles in the growth and survival of fish even in their natural environment. The physicochemical parameters obtained from this study are shown in Table 3. It revealed that the water temperature and pH were within the appropriate range required for efficient growth of catfish under cultured system (Musiba et al., 2014). The values of DO in both treatments fell within the allowable limits suitable for fish proper growth, development, maturation and gamete production (Okey-Wokeh et al., 2020). The increased in FCR for Bluecrown is totally a function of the total weight gained. Also, the 5% body weight for determination of feed allocation increased significantly in Coppens compared to Bluecrown.

## CONCLUSION

Considering the current economical state of the country, imported fish are very expensive therefore this study suggests affordable Nigerian made fish feed (Vitafeed) for Catfish sustainability in the industry. Additionally, Aqua culturists and concerned stakeholders should equip and develop fish farmers in Nigeria with the technical know-how to formulate quality fish feed with available affordable local ingredients for more profit. Based on this study, Vitafeed is commendable to keep fish famers in the business. Regular studies on new feed are necessary to inform the farmers adequately in order to sustain the industry. In view of the limited knowledge among

some farmers on the choice of feed, this work recommends the information gathered from this research for use by local farmer. In addition, further researches should be considered on other common feeds known to and used by farmers to determine their effectiveness on *C.gariepinus* fish farming in Nigeria. Also, conventional plant extracts should be studied to replace fish feed protein, thereby reducing the cost of fish feeds so sustain fish farming business in the industry.

## Compliance with Ethical Standards

### Authors' Contributions

EAE: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing

AOO: Conceptualization, Data curation, ng acquisition, Investigation, Methodology, Resources, Supervision, Validation, Writing – original draft, Writing – review & editing

EPU: Methodology, Supervision, Validation, Writing – original draft

KPA: Validation, Writing – review & editing

VFA: Supervision

All authors read and approved the final manuscript.

### Conflict of Interest

The authors declare that there is no conflict of interest.

### Ethical Approval

The authors declare that the study was conducted in accordance with all applicable international, national, and/or institutional guidelines for the care and use of animals. The research did not involve blood extraction or sacrifice of fish samples. Additionally, the number of fish used (80 samples) did not exceed the threshold requiring ethical approval (200 samples and above) as per the local regulations. The study was performed on a private fish farm licensed by the State Government, which lies outside the jurisdiction of the Ethical Approval Research Committee in Nigeria. For these

reasons, no formal ethical approval number was issued for this study.

### Funding

Not applicable.

### Data Availability

The data that support the findings of this study are available from the corresponding author on request.

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