

mainly in those based on unusual protein sources. In addition, lysine is one of the amino acids involved in growth processes and is known to act together with arginine to increase the activity of the latter (Furuya et al., 2023). Its normal level in the local feed clearly explains the better growth rates recorded. Similarly, the better growth recorded with the tested feed can also be justified by the optimal level of phenylalanine, which is within the recommended range (NRC, 2011), an amino acid capable of increasing the growth rate of catfish (Furuya et al., 2023). The results indicate that *C. gariepinus* fingerlings efficiently utilized the local feed tested with total replacement of fish meal by the combination of earthworm, maggot and brewer's yeast meal.

Feed is the most expensive input in fish farming, accounting for up to 60% of total production costs (Gangbazo Kpogue et al., 2024). Analysis of the economic parameters showed that the cost of producing one kilogram of fish was 8206 GNF for the local feed, compared with 16708 GNF for the imported control feed. The profit obtained with the local feed was 14373 GNF per kilogram of fish produced, compared with 5875 GNF for the imported commercial feed. This shows the profitability of feeding *C. gariepinus* local feed without fish meal made from local by-products. Nevertheless, for industrial production of local feed T1, electricity, various taxes and transport must be taken into account in determining the production cost per kilogram of feed. The use of these proteins in fish feed helps to recover animal and industrial waste and to clean up the environment by recycling animal and industrial production waste.

The observed difference in survival could be attributed to the digestibility of feed T1, which was formulated using ingredients such as soybean and cottonseed meal. These ingredients contain antinutritional factors, such as gossypol, fibre and tannins (Imorou Toko et al., 2008). These factors lead to poor nutrient absorption or mortality related to digestive disorders.

4 Conclusion

Profitable fish farming requires the use of protein sources other than fish meal. However, large quantities of plant and animal proteins exist that are not used in human food and could partially, or even totally, replace fish meal in fish farming. Here, the results show that the use of local sources of protein (maggots, earthworms and brewer's yeast) as a total replacement for fish meal in the diet of *C. gariepinus* makes it possible to obtain good growth performance and feed utilization with improved profitability. These results are of great interest because they allow us to conclude that feed formulas based on local by-products can be developed without fish meal and fish oil with good performance. Nevertheless, further investigations are required to ascertain the impact of using this local feed on the organoleptic quality of the muscle of the fish produced, as well as the impact of this feed on the reproductive capacity of adult *C. gariepinus*, i.e. on the quality of the gonads of broodstock fed with this local feed.

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