

4 Materials and Methods

4.1 Experimental site

The study was conducted at fish nutrition unit of the Department of Fisheries, Faculty of Agriculture, University of Maiduguri, Nigeria. The University is located along Bama Road, Maiduguri, Borno state with the mean monthly temperature is highest (40.2 °C) prior the onset of the rain in June and the lowest (31.3 °C) during the peak of the rainy period of August. The area has an average mean annual rainfall of about 550 mm (Shettima et al., 2018).

4.2 Experimental fish

One hundred and fifty *Clarias gariepinus* fingerlings were procured from Aquarium Planet Agric Business Services, a private fish farm in Maiduguri, Borno State.

4.3 Source of experimental feed ingredients

Feed ingredients was purchased at Custom Market, Maiduguri Borno State which include: soybeans, fishmeal, maize, oil and *Saccharomyces cerevisiae*. Other ingredients including premix, lysine, methionine, calcium, vitamin C, salt and binder were procured at Gidan madara. The soybean was toasted and ground into powdered form separately.

4.4 Feed formulation and compounding

Pearson's square method was employed to formulate the experimental diets at 38.89cp the experimental feed ingredients were grounded separately into a powdered form and measured based on the inclusion level (Table 5), then mixed thoroughly to obtain a homogeneous product and water was added to form dough. *S. cerevisiae* was supplemented at different concentrations (0, 0.5, 1.0, 1.5 and 2.0%). The dough was then pelleted using pelleting machine. The pelleted diets were sun dried and packaged in polythene bag in well-ventilated room under ambient temperature.

Table 5 Gross composition of ingredients with *Saccharomyces cerevisiae*

Ingredient	Inclusion level				
	SC 0.0%	SC 0.5%	SC 1.0%	SC 1.5%,	SC 2.0%
Fish Meal	24.37	24.37	24.37	24.37	24.37
Soybean Meal	48.75	48.75	48.75	48.75	48.75
Maize	16.88	16.88	16.88	16.88	16.88
Lysine	2	2	2	2	2
Methionine	1.7	1.7	1.7	1.7	1.7
Vitamin premix	1	1	1	1	1
Vitamin c	0.3	0.3	0.3	0.3	0.3
Bone meal	1	1	1	1	1
Salt	0.5	0.5	0.5	0.5	0.5
Palm oil	3.5	3.5	3.5	3.5	3.5
Yeast	0	0.5	1.0	1.5	2.0

4.5 Experimental design

Complete Randomized design (CRD) was employed. One hundred and fifty *C. gariepinus* fingerings were used for the treatment. Ten fish were randomly assigned to each 1 m² hapa net. A total of 15 hapa net were used in polythene lined pond of 10 m × 7 m (l × b) and depth of 1.5 m, and the five formulated diets were fed at 5% body weight to the experimental fish for 8 weekss and the pond water was monitored daily.

4.6 Determination of nutrient contents

The proximate composition of the diets and carcass composition of the fish was determined using the methods of the AOAC (2019).