

**DEVELOPMENT OF PROTEIN-SOURCE FEED  
INGREDIENTS FROM RUMINAL CONTENT AND BLOOD**

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## ABSTRACT

This study was designed to develop a protocol for the processing of blood and rumen content into protein-source feed ingredient for livestock, assess the microbial safety of the products, and determine the level of utilization of the products by broilers in order to provide readily available protein-rich feed.

A preliminary survey of slaughter slab operations in Oyo, Ogbomoso and Ile-Ife was carried out before the commencement of the laboratory and feeding experiments to assess the mode of operation, type and volume of animals slaughtered, and how by-products, especially blood and rumen content, are disposed. Rumen content was collected from freshly slaughtered cattle in a plastic bowl. The rumen content was emptied into a woven sac and the water removed with the aid of a hydraulic press. The resulting rumen content was thereafter sifted through a 2 mm sand sieve. The blood was prevented from clotting by adding 18 g common salt /kg of blood. Rumen content carried blood meal 1 (RCCBMI) was produced by mixing sifted rumen content and blood in the ratio 4:3 w/w and sun-dried to a moisture content of 10.55%. Rumen content carried blood meal 2 (RCCBM2) was obtained by mixing RCCBMI and blood at a ratio of 2:3 w/w and sun-dried to a moisture content of 10.9%. Proximate and amino acid composition, energy content, and microbiological status of RCCBM1 and RCCBM2 were determined. Nutrient bioavailability trials with RCCBM1 and RCCBM2 yielded apparent and true nitrogen retained (ANR and TNR) of 0.7 g, 1.26 g and 0.84 g, 1.40 g, respectively, apparent and true metabolizable energy values (AME and TME) 1.9231 kcal/g, 2.3883 kcal/g for RCCBMI and 2.184 kcal/g, 2.737 kcal/g for RCCBM2 and apparent and true metabolizable energy values corrected for nitrogen (AME<sub>n</sub> and TME<sub>n</sub>) values of 1.8045 kcal/g, 2.1625 kcal/g and 2.082 kcal/g, 2.464 kcal/g for RCCBM1 and RCCBM2 respectively. Fourteen-day-old broilers were used in growth trials for 35 days with

RCCBM2 at 0%, 5%, 10%, and 15% levels of inclusion in starter and finisher diets in a completely randomized experimental design. Data were analyzed using the 2-way analysis of variance procedure to compare the treatment groups in nutrient bioavailability trials and growth performance trials with broiler chickens.

The results showed that the ANR, TNR, AME, AMEn, TME and TMEn were significantly ( $f=2.66, 3.32, 2.30, 2.76$ , respectively,  $P<0.05$ ) higher for birds fed RCCBM2 than for birds fed RCCBM1. The average final body weight and average daily weight gain were significantly ( $f =4.67, 4.05$ , respectively,  $P<0.05$ ) higher for birds on treatment with 10% level of inclusion RCCBM2 than for those on 0, 5, and 15%. Total viable microbial counts of  $6.9 \times 10^5$  cfu/g and  $5.8 \times 10^4$  cfu/g for RCCBM1 and RCCBM2 respectively, did not reach the critical safe level of  $1 \times 10^5$  cfu/g after 60 days of storage.

The study concluded that a simple protocol was successfully developed for the processing of blood and rumen content into protein-source feed ingredients (RCCBM1 and RCCBM2). These were microbiologically safe and RCCBM2 can be fed at 10% level of inclusion in broiler chicken starter and finisher diets.