# EFFECT OF SEX AND LEVELS OF BAKER'S YEAST SUPPLEMENTATION ON BLOOD BIOCHEMICAL PROFILE OF DROMEDARY CAMELS

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## ABSTRACT
*Three experiments was conducted to determine the effect of sex and baker's yeast (Saccharomyces cerevisiae) supplement on serum biochemical profile of dromedary camels fed diets containing 14% crude protein (CP). Eighteen (18) male and female camels with an average body weight of 256 ±0.5kg. The camels were balanced for weight randomly allocated in to sex groups (males and females) fed diets containing 14% crude protein (CP) supplemented with 0, 5 and 10g/d BY in 3 x 2 factorial arrangements, replicated 3 times in a Completely Randomized Design (CRD). However, baker's yeast supplement has no effect on sex of the animals. Similarly, no significant (P>0.05) difference was observed in most of the serum biochemical parameters measured. There was an increase in total protein, (TP), albumin (ALB) and globulin (GLO) contents of the blood with increased BY supplements. In conclusion, effect of baker's yeast supplementation on the serum biochemical profile of dromedary camels sheds light on its potential as a nutritional intervention. The study reveals notable shift in key biochemical parameters, suggesting a modulatory role of yeast supplementation in camel metabolism. Further research should be conducted to delve deeper into the specific mechanism underlying these observed changes, ultimately contributing to the development of effective nutritional practices for the optimal health and productivity of dromedary camels*
**Keywords:** Baker's yeast, camels

## INTRODUCTION
There has been a trend of growing numbers of camels in the world between 2001 and 2011 (FAO, 2013). This increase might be attributed to changing the environment from the savannah to arid and semi-arid conditions, development in camel farming, and an improved ecological image of camel farming and products. The general estimate of the camel world population may probably be around 35, 525, 270 head (FAOSTAT 2020). About 88% of the camels are found in Africa, while Asia has 12%. The main concentration of dromedary camels (*Camelinae spp*) in Africa is in the East African countries with 80% of the total camel population raised under various production systems (FAO, 2013).

The most important countries with a camel population of more than 1 million are Somalia, Sudan, Ethiopia, Niger, Mauritania, Chad, and Kenya. A significant proportion (71%) of the world camel population is found in countries defined by FAO as Net Food Importing Developing Countries, Low Income Food Deficit Countries hold 68% of the total and Least Developed Countries had 59% of the total (Kadim *et. al.*, 2014). Nigeria has about 28,000 camels (NASS, 2011) which are concentrated in the Sahelian region of the Northwestern part of Nigeria (FDCPLS, 1992).

The dromedary camel is one of the most important domestic animals in the arid and semi-arid regions as it is equipped to produce high-quality food at comparatively low costs under extremely harsh environments (Kadim *et al*., 2008). Bissa, (1996) noted that the camel is likely to produce animal protein at a comparatively low cost in the arid zones based on feeds and fodder that is generally not utilized by other domestic species due to either their size or food habits. The dromedary camel is also a good source of meat especially in areas where the climate adversely affects the performance of other meat animals. This is because of its unique physiological characteristics, including a great tolerance to high temperatures, solar radiation, water scarcity, rough topography, and poor vegetation (Kadim *et al*., 2008).

However, the ban on antibiotic growth promoters in feed to produce animal foods in Nigeria (NAFDAC, 2018) has increased interest in evaluating the effect of yeast on the serum biochemical profile of dromedary camels aims to unravel the intricate interplay between biological sex, nutrition

interventions and physiological response of the camels. Therefore, this research aimed to ascertain the use of baker's yeast supplements on the blood profile of camel providing valuable insight into optimizing the health and wellbeing of the camel in various contexts.

## MATERIALS AND METHODS

The research was conducted at the Experimental pens of Beef Research Programme, National Animal Production Research Institute (NAPRI), Ahmadu Bello University, Shika, Kaduna State. Eighteen (18) male and female dromedary camels were balanced for their weight (average 256 ±0.5kg) and allocated to the experimental diets containing 14% crude protein (Table 2) supplemented with 0, 5 and 10g/d of baker's yeast (BY) in 3 x 2 factorial arrangement, replicated three (3) times in a Completely Randomized Design. The concentrate and basal diet (*Digitaria smutsii*) were offered at 2% of their body weight each.

### Sources of the feed ingredients

The ground nut haulms and cowpea husks were sourced from Shika environs. Baker's yeast was purchased from Samaru market, Sabon Gari Local Government, Kaduna State. While other ingredients were obtained from the Feed and Feeding Unit, National Animal Production Research Institute, Shika – Zaria. However, the gross composition of the experimental diets is presented in Table 1

**Table 1 Gross composition of the experimental diets**

| | Levels of Crude Protein (%) | | |
|---|---|---|---|
| **Feed ingredients (%)** | **14** | **14** | **14** |
| Groundnut haulms | 22 | 22 | 22 |
| Cowpea husk | 15 | 15 | 15 |
| Maize offal | 30 | 30 | 30 |
| Rice offal | 17 | 17 | 17 |
| Cotton Seed Cake | 10 | 10 | 10 |
| Bone meal | 3.5 | 3.5 | 3.5 |
| Common salt | 1.5 | 1.5 | 1.5 |
| Premix | 1 | 1 | 1 |
| **Total** | **100** | **100** | **100** |
| **Calculated analysis** | | | |
| Crude Protein (%) | 14 | 14 | 14 |
| Crude fibre | 21.04 | 21.04 | 21.04 |
| Energy (kcal/kgME | 1690.74 | 1690.74 | 1690.74 |

### Data Collection

### Blood Collection and analysis

At the end of the experiment, the animals were restrained in their individual pen by holding the upper and lower lips and five (5) mL of blood samples were collected from eighteen (18) camels through the jugular vein using an 18mm gauge needless fitted to a 10 mL plastic disposable syringes and placed into the plain bottles. The blood samples were collected during morning hours and was allowed to clot by leaving it undisturbed at room temperature for 30 minutes. Clotted blood was centrifuged at 1,000–2,000 rpm for 10 minutes in a refrigerated centrifuge as described by Thavasu (1992). The serum was analyzed spectrophotometrically for total protein and albumin as described by Mohammed (2007). Globulin was calculated by subtracting the concentration of albumin from the concentration of total protein as described by Coles (1974) and reported by Mohammed (2007). Blood glucose level was determined by Coles (1974) method, using appropriate test kits. The data generated on the serum biochemistry were subjected to analysis of variance (ANOVA) (SAS, 2002) while significant differences among means were compared using Dunnett's Test (1955).

**Effect of sex and levels of baker's yeast supplementation on blood biochemical profile of dromedary camels**

The result of the effect of sex and levels of baker's yeast supplement on blood biochemical profile of dromedary camels is presented in table 3. There was a significant difference in most of the parameters measured. However, the total protein (TP), albumin (ABL) and globulin concentration ranged from 5.30 – 6.25 g/dl, 4.27 – 5.02 g/dl and 1.03 – 1.23 g/dl, respectively. The glucose level was higher (2.04 mg/dL) but not significant in camels supplemented with 5 g/d BY. There was an increase in total protein (TP), albumin (ALB) and globulin (GLO) concentrations in the blood with an increase in yeast supplements. This is in line with the report of Ramadan *et al*. (2021) who stated that adding SC significantly increases the TP, ALB and GLO. Similarly, the inclusion of SC in the diets of lactating buffalo induced an insignificant increase in levels of total TP, ALB and GLO from 6.64 - 7.09, 3.30 - 3.50 and 3.34 - 3.37g dL, respectively. Contrarily, Piva *et al*. (1993) stated that TP is not affected by yeast supplementation. However, the increase in TP and GLO levels in this study might be associated with yeast supplementation, which enhances microbial protein synthesis in the rumen which in turn increases the population and cellulolytic bacteria activity. This process also enhances fiber digestion and lactate use in the rumen and increasing the flow of bacteria.

**Table 2: Chemical composition of the experimental diets**

| | Levels of baker's yeast (g/day) | | |
|---|---|---|---|
| **Parameters (%)** | **0** | **5** | **10** |
| Dry matter | 94.79 | 94.79 | 94.79 |
| Organic Matter | 87.93 | 87.93 | 87.93 |
| Crude protein | 14.10 | 14.10 | 14.10 |
| Crude fiber | 22.14 | 22.14 | 22.14 |
| Ether extract | 5.98 | 5.98 | 5.98 |
| Ash | 6.86 | 6.86 | 6.86 |
| Neutral Detergent Fiber | 50.92 | 50.92 | 50.92 |
| Acid Detergent Fiber | 48.66 | 48.66 | 48.66 |
| Nitrogen Free Extract | 56.27 | 56.27 | 56.27 |
| Energy (kcal/kgME) | 1690.74 | 1690.74 | 1690.74 |

Key: Kcal = Kilocalories, Kg = Kilogram, ME = Metabolizable Energy

**Table 3: Effect of Sex, Barkers Yeast supplements on Blood Biochemical profile of Dromedary Camels**

| **Parameters (%)** | **Sex** | | | **Varying levels of Barker's Yeast (g/day)** | | | |
|---|---|---|---|---|---|---|---|
| | **M** | **F** | **SEM** | **0** | **5** | **10** | **SEM** |
| TP (g/dL) | 5.82 | 5.61 | 0.32 | $5.30^{b}$ | $5.60^{ab}$ | $6.25^{a}$ | 0.40 |
| ALB(g/dL) | 4.49 | 4.69 | 0.30 | $4.27^{b}$ | $4.48^{ab}$ | $5.02^{a}$ | 0.32 |
| GLO (g/dL) | 4.04 | 3.90 | 0.48 | $1.03^{b}$ | $1.12^{b}$ | $1.23^{a}$ | 0.20 |
| GLU (g/dL) | 1.78 | 1.71 | 0.25 | 1.28 | 2.05 | 1.90 | 0.50 |

$^{ab}$ = Means with different superscripts along the row differed significantly ($P<0.05$). M = Male, F = Female, SEM: Standard Error of mean, TP = Total protein, ALB = Albumin, GLO = Globulin, GLU = Glucose

**CONCLUSION AND RECOMMENDATION**

In conclusion, the investigation into the effect of baker's yeast supplementation on the serum biochemical profile of dromedary camels sheds light on its potential as a nutritional intervention. The study reveals notable shift in key biochemical parameters, suggesting a modulatory role of yeast supplementation in camel metabolism. Further research should be conducted to delve deeper into the specific mechanism underlying these observed changes, ultimately contributing to the development of effective nutritional practices for the optimal health and productivity of dromedary camels

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