MICROBIOLOGICAL EVALUATION OF FIVE COMMERCIAL BROILER SUPER STARTER FEEDS IN JOS NORTH LGA OF PLATEAU STATE

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ABSTRACT:
Animal feeds are potential reservoirs for cross contamination of microorganisms. This can lead to health concerns in animals as well as humans that consume the products. This study was conducted to analyze the microbial load in five selected broiler super starter feeds within Jos North LGA of Plateau State. Results obtained showed microbial contamination of all feed samples. Total plate count ranged from 0.88 to 1.28×10^5 CFU/g, coliform count ranged from 1.40 to 3.20×10^4 CFU/g, and fungal count 0.08 to 2.90×10^5 CFU/g. Bacteria species isolated from the feed samples were *Streptococcus feacalis, Proteus spp., Staphylococcus aureus, Pseudomonas aeruginosa* and *Salmonella paratyphi.* The presence of these pathogenic microorganisms in poultry feeds is indicative of the level of contamination. The study concluded that periodic examination of poultry feeds for biosafety can reduce or prevent cross contamination of poultry products.

Keywords: Microorganisms; poultry; feed; contamination; broiler

INTRODUCTION

Feed represents a major aspect of poultry production required for maintenance and productivity (Isiaku, 2015). Poultry feeds are contaminated during processing, handling, mixing and exposure to microorganisms. Onyeze *et al.* (2013) asserted that most poultry diseases occur as a result of consumption of contaminated feeds. Diseases such as dysentery, fowl cholera, *samonellosis*, *staphylococcosis*, *aflatoxicosis* amongst others are associated with ingestion of contaminated feeds (Aliyu *et al.*, 2016).

Irrespective of the adequacy of nutrients in formulated rations, microbial contamination can result in competition for ingested nutrients in the GIT, leading to poor performance (Idachaba, 2017). According to Aliyu *et al.* (2016), microorganisms also degrade nutritional value of feeds resulting in the production of toxins. The nature and presence of microorganisms in animal feeds should be a major concern to animal nutritionists and poultry farmers because they cause economic losses and affect animal health. Hence, this study focus on microbiological evaluation of selected commercial broiler super starter feeds in Jos North LGA of Plateau state.

MATERIALS AND METHODS

Area of Study

The study was carried out in Jos North LGA of Plateau State. It is located in Northern Guinea Savannah between longitude 8° 20'N and latitude 9° 30'E. The average temperature ranges between 21-25°C. The climate of Jos is cool due to its high altitude with average annual rainfall of 1,250 mm (Federal College of Forestry, 2017)

Sample collection

Five brands of broiler super starter feeds were purchased from retailers in Jos North LGA of Plateau State. Each feed sample was aseptically collected in triplicate in sterile plastic bags and labelled A, B, C, D and E.

Sample analysis
The feed samples were taken for analysis at the Microbiology Laboratory, Department of Microbiology, Faculty of Natural Science, University of Jos. They were cultured and isolated for bacteria species and fungal counts according to procedures described by Ochei and kolhatkar (2007).

Data analysis
Data obtained from microbial colony count was subjected to statistical analysis using the General Linear Model (GLM) procedure of SAS (2001) software for analysis of variance. Duncan multiple range test (Duncan, 1955) was used to determine differences between means.

RESULTS AND DISCUSSIONS

Microbial colony count in five (5) commercial broiler super starter feeds
Table 1 shows the microbial colony count in five (5) commercial broiler super starter feeds. All feed samples were contaminated by bacteria and fungi. Feed A showed significantly (P<0.05) lower total plate count compared to others while the highest was observed in feed sample B. Feed C showed significantly (P<0.05) lower coliform count compared to others while feed B showed the highest. Okgun *et al*. (2016) reported that broiler starter and chick mash feeds are easily contaminated by microorganisms. This according to the authors is due to their high protein contents which serve as growth factors for contaminating organisms. Uwaezuoke and Ogbulie reported that bacteria and fungi contamination of poultry feeds can result from exposure to microorganisms on field, in feed mills, during storage or poor sanitary practices in pens.

Table 1: Microbial colony count in five commercial broiler super starter feeds

Microbial count (CFU/g)	FEEDS					
	A	B	C	D	E	SEM
Total plate count (10^5)	0.88^a	1.28^d	1.11^c	1.05^b	1.12^c	0.01
Coliform count (10^4)	2.60^d	3.20^e	1.40^a	1.60^b	1.90^c	0.06
Fungal count (10^5)	0.08^a	1.21^c	2.90^d	1.00^b	1.16^c	0.03

abc = means with different superscript on the same row differs significantly, SEM- standard error of means, and CFU- coliform forming unit.

Culture media and biochemical tests for isolated bacteria species in five broiler super starter feeds
Table 2 shows the culture media and biochemical tests for isolated bacteria species in five broiler super starter feeds. Bacteria isolates of *Proteus sp.* was found in all feed samples and *Pseudomonas sp.* in feed samples A, B and D. This agree with reports of Anon (2001) and Veldman *et al*. (1995) who stated that enterobacteriaceae are common contaminants of poultry feeds. All feed samples were contaminated by *Staphylococcus aureus* while feed samples A, B and E were contaminated by *Salmonella sp.* Idachaba (2017) reported that *Staphylococcus aureus* and *Salmonella sp.* can cause acute or chronic infections in poultry and other animals. The author further stressed that microorganisms from poultry feeds can attach to intestinal epithelium, thus competing with host animals for ingested nutrients.

Table 2: Culture media and biochemical tests for isolated bacteria species in poultry feed samples.

							Triple sugar ion agar slant				
Feeds	Catalase	Coagulase	Urease	Indole	Oxidase	Motility	Slope	Butt	H_2S	Gas	Bacteria species
A	+	+	+	-	+	+	Red	Yellow	+	+	*Staphylococcus aureus, Proteus spp., Pseudomonas aeruginosa, Salmonela typhi.*
B	+	-	+	-	-	+	Red	Yellow	+	+	*Streptococcus feacalis, Proteus spp., Staphylococcus aureus, Pseudomonas aeruginosa, Salmonela paratyphi A.*
C	+	+	+	-	-	+	Red	Yellow	-	+	*Staphylococcus aureus, Proteus spp.*
D	+	+	+	-	+	+	Red	Yellow	-	-	*Staphylococcus aureus, Proteus spp., Pseudomonas aeruginosa.*
E	+	+	+	-	-	+	Red	Yellow	+	+	*Staphylococcus aureus, Proteus spp., Salmonela typhi.*

CONCLUSION

The study showed that all feed samples were contaminated by microorganisms (bacteria and fungi). This may be due to poor handling and storage practices of the feeds from field to the retail shops. Ingestion of such contaminated feeds can affect productive performance in chickens with residual effects affecting humans where meat is improperly cooked. The study concludes that there is a need to establish better quality control strategies for proper handling of feeds at retail shops and on-farm. Periodic examination of feeds for biosafety can reduce or prevent cross contamination of poultry products.

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