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Awareness of Farmers on Effect of Aflatoxins on Poultry Birds

Phebe Okusanya.,[1*] Olamilekan Akinlade, O. O[2]., Olusola Leramo[3] & Raimot Lawal[4]

[1]Department of Animal Health and Production Technology, The Federal Polytechnic Ilaro, Ilaro Ogun State Nigeria
[2]Department of Animal Production Technology, The Federal Polytechnic, Ilaro, Ogun State, Nigeria
[3]Department of Agricultural Technology, The Federal Polytechnic, Ilaro, Ogun State, Nigeria
[4] Department of Agricultural Extension and Management, The Federal Polytechnic Ilaro, Ogun State, Nigeria
([*]Corresponding author: [1]phebe.okusanya@federalpolyilaro.edu.ng, [2]olamilekan.akinlade@federalpolyilaro.edu.ng)

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Abstract

The effects of mycotoxin especially aflatoxin in poultry production is enormous. Aflatoxin increase the risk of hepatocellular carcinoma, reduces immunity and growth rate with highest carcinogenic potential. When chickens are fed feed contaminated with this toxic fungi, it results into reduced egg production, weight loss and low return for farmers. This study investigates the awareness of poultry farmers about aflatoxin contamination in poultry birds in Ogun State. One hundred and twenty-five poultry farmers were interviewed using a well-structured questionnaire which contains questions ranging from the farmer's socioeconomic characteristics to their awareness of aflatoxins contamination in poultry feed. The data obtained were subjected to descriptive analysis. Results indicate that 31.20% of respondents have poultry flocks ranging from 100 to 500 birds. Dominant species include layers (52%), and broilers (24%). Feed sourcing is diverse, with 43.2% obtaining feed from retail shops and 39.2% from commercial mills. 56.8 % of the respondents claimed that they know about aflatoxin contamination, while 43.2% lack awareness. This study concluded that there is a need for targeted education on aflatoxin risks, emphasizing the role of training programs and extension services in improving awareness and addressing knowledge gaps in poultry farming practices.

Key Words: Aflatoxins, Awareness, Farmers, Ogun State, Poultry

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Introduction

Chicken meat and eggs are important sources of high-quality animal proteins. Mycotoxin contamination is a major problem to agricultural products in Nigeria and over 40% of agricultural products have been reported to be prone to mycotoxins (Pittet, 2005). Livestock feed quality may be affected by various mycotoxin contaminants. Contaminated cereals that are not healthy for human consumption usually find their way into the animal feed manufacturing companies for use in feed production (Park *et al.*, 2005).

Mycotoxin contamination of animal feeds is more common in countries with hot and humid environments (Paterson & Lima, 2011). Certain *Aspergillus* species create aflatoxins, which are mycotoxins that are frequently found in agricultural products such as cereals, legumes, nuts, and different animal feed stuffs. Aflatoxins, a group1 carcinogens, increase the risk of hepatocellular carcinoma worldwide (IARC, 2012). Furthermore, in people and animals, aflatoxins reduce immunity and growth rate (Reddy et al., 2010; Yunus et al., 2011; Atherstone et al., 2016). Aflatoxin B1 is the type of aflatoxin with the highest carcinogenic potential. Aflatoxin B1 is excreted as aflatoxin M1 (AFM1) in

milk after being consumed by nursing animals, which may be harmful to people who consume milk and milk products (Yunus et al., 2011; IARC, 2012). Research carried out in several low- and middle-income nations has consistently revealed milk to be often contaminated with AFM1 to varying degrees, especially in Asia (Iqbal et al., 2022; Salari et al., 2022) and sub-Saharan Africa (Kagera et al., 2019; Kemboi et al., 2020).

When chickens are fed feed contaminated with toxic fungi such as *Aspergillus flavus*, *Aspergillus parasiticus*, and *Aspergillus nominus*, which grow on agricultural commodities and pollute them, aflatoxicosis occurs (Rahmani et al., 2009).

All animal species are impacted by aflatoxicosis, including humans. Because they frequently come into contact with contaminated feed, animals are the most vulnerable or affected. Affected animals' tolerance levels vary depending on their species, age, immunity to the toxins, the kind and quantity of mycotoxins they ingested, and the length of time they were exposed.

It is important to note that the severity of these health risks and consequences can depend on factors such as the level of aflatoxin contamination, duration of exposure, age, breed, and overall health status of the poultry birds. Implementing preventive measures, such as ensuring aflatoxin-safe feed, proper storage practices, and regular monitoring, is essential to minimize these risks and maintain the health and productivity of poultry flocks. (Kral & Suchy, 2000). This study therefore investigates the awareness of poultry farmers about aflatoxin contamination in poultry birds in Ogun State.

Methodology

Description of the Study Area

Ogun State is located in the Southwestern part of Nigeria. The capital city is Abeokuta, which holds historical significance as the home of the Egbas and the traditional residence of the Alake of Egba Land. The State is blessed with fertile land, making it a major hub for farming especially cultivation of crops such as cassava, maize, cocoa, oil palm, rubber and livestock production. Farming activities contribute significantly to the state's economy. The inhabitants are mainly Yorubas, speaking various dialects like Egba, Ijebu, Yewa, ketus etc. Other notable cities and towns in the state include Ijebu Ode, Ilaro, Sango, Itori, Sagamu, Ifo, Ayetoro among others.

Population of the study

The population of the study comprised of selected poultry farmers in Sango, Abeokuta, Ilaro, Itori, Sagamu and Ifo.

Sampling Procedure and Sample Size

Ogun state was purposively selected for the study due to easy accessibility and language advantage. A random sampling technique was used to sample poultry farmers. One hundred and twenty-five (125) poultry farmers were randomly selected for the study.

Sources of Data

The data used for research was obtained from primary sources. The primary data was gathered through a well-structured questionnaire. The questionnaire consists of three (3) sections; A, B and C. In order to gain insights into the socioeconomic status and awareness of aflatoxins among poultry bird farmers, a questionnaire was developed.

Data collection method

Data was gathered through field survey where the personal interviews were used.

Data analysis

In other to achieve the objectives of this study, the data collected was subjected to descriptive analysis (frequency and percentage) using Statistical Package for Social Sciences (SPSS).

Results

Socio-economic characteristics of poultry famers in the study area

From table 1, it can be deduced that Abeokuta had the highest respondent 45.6% while Sagamu had the least percentage of 12.8%. 82.4% of the respondents were male, while 16.8% were female, but 0.8% of the respondents did not reveal their gender. Majority of the respondents falls within the age bracket (40-49) years with 35.2% .71.2% are married while only 4%, which was the least had lost their spouse. The years of experience indicated that farmers with 1-5 years of experience and 6 - 11 years of experience had the same respondents with 35 farmers each. Also, farmers who have the least experience in poultry farming are with 20 years and above experience are only 13. The level of education shows that tertiary level had the highest with 86 respondents and only 3 stopped their level of education at primary school level.

Table 4.1; Socio **economic characteristics of poultry farmers in the study area**

Characteristics	Frequency	Percent
Location		
Ilaro	29	23.2
Sagamu	16	12.8
Abeokuta	57	45.6
Itori	23	18.4
Sex		
Male	103	82.4
Female	21	16.8
Undisclosed	1	0.8
Age of the Respondents		
0-19 years	1	0.8
20-29 years	18	14.4
30-39 years	34	27.2
40-49 years	44	35.2
50-59 years	15	12
60 years and above	13	10.4
Marital status		
Single	23	18.4
Married	89	71.2
Divorced	8	6.4
Widow	5	4

Year of Experience in Poultry farming		
1-5 years	35	28
6-10 years	35	28
11-15 years	27	21.6
16-20 years	15	12
21 and above	13	10.4
Level of Education		
Primary	3	2.4
Secondary	24	19.2
Tertiary	86	68.8
Illiterate	12	9.6

Source: Field survey, 2023

Size of flock

Figure 1 describes the size of flock, 100-500 birds had the highest (31.20%). 501-1000 and 1001-5000 poultry bird size had the same of 16%, also the farmland with size of 0-100 birds are 23.20%. finally, 5000 and above poultry farmland are the least with 13.60%. This can be said that farmland with 100-500 had the highest frequency.

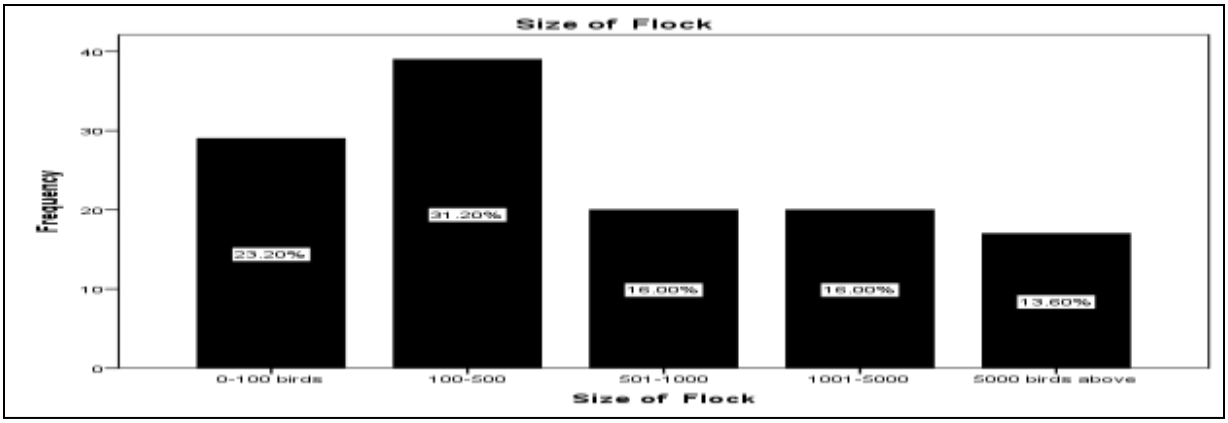

Figure 1: Size of Flock

Type of bird reared on the farm

Figure 2 delineates the distribution of various types of poultry birds within the study area. Layers constitute the largest portion, accounting for 52% of the poultry population, typically known for egg production. Broilers, primarily raised for meat, represent 24% of the birds, highlighting their significance in the poultry industry. Noilers, a hybrid breed for both meat and eggs, account for 10.4%, while cockerels, young male chickens, make up 5.6% of the population. Additionally, 8% of farmers rear a diverse mix of species, possibly comprising a combination of layers, broilers, noilers, and other poultry types.

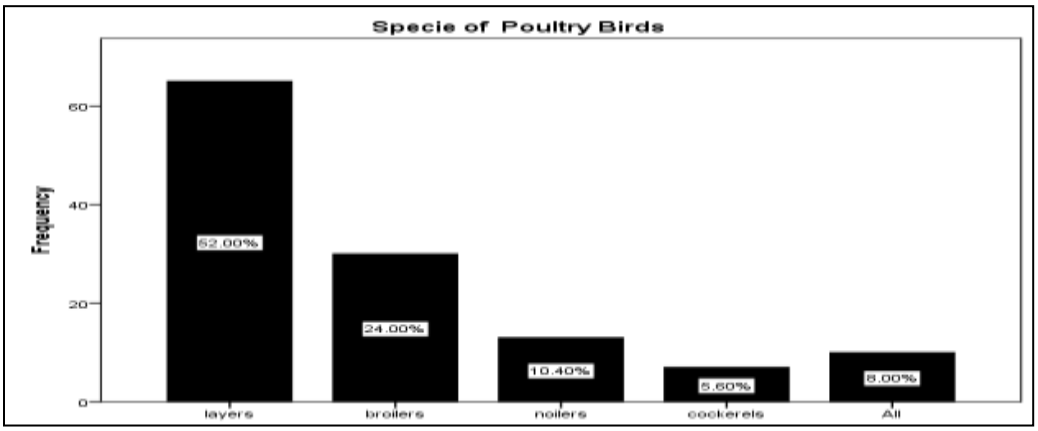

Figure 2: Type of Poultry Bird Reared

Source of Feed

Figure 3 illustrates the distribution of feed sources for poultry birds. The data reveals that a significant portion, 43.2%, of poultry farmers source their feed from retail shops, indicating a reliance on pre-packaged feed. Additionally, 39.2% procure their feed from commercial feed millers, emphasizing the reliance on industrial-scale feed production. A smaller percentage, 12%, rely on personally compounded feed, suggesting a more hands-on or custom approach to feed formulation. Furthermore, 5.6% of farmers obtain their feed from retail feed millers, likely indicating a mix of convenience and trust in smaller, local feed suppliers.

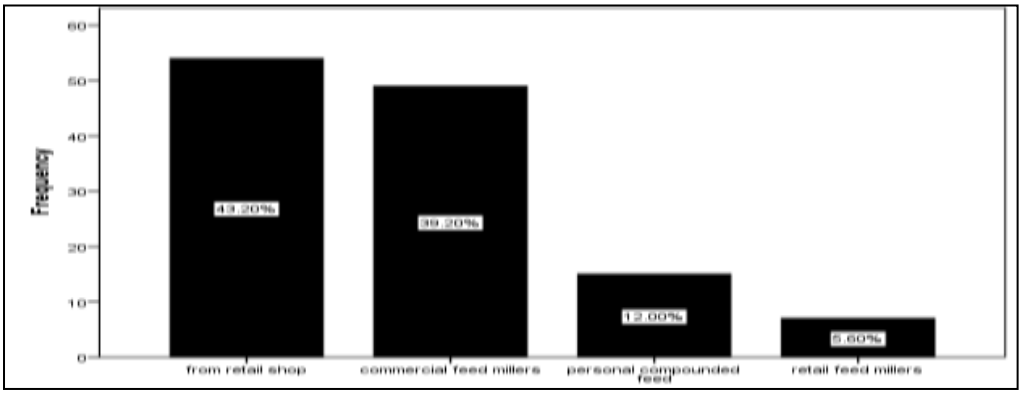

Figure 3. Sources of feed

Use of Storage Facilities for Feed

Figure 4 presents data on the duration of feed storage before use in poultry farming. The analysis reveals that a significant majority, 59.2%, stores feed for a week before utilization, indicating frequent turnover and minimal long-term storage. Furthermore, 25.6% of farmers store feed for up to two weeks, highlighting a substantial portion opting for slightly longer storage periods. A smaller but notable percentage, 13.6%, extends their storage to three weeks, while only 1.6% store feed for a month before usage, suggesting a very limited segment preferring longer-term storage.

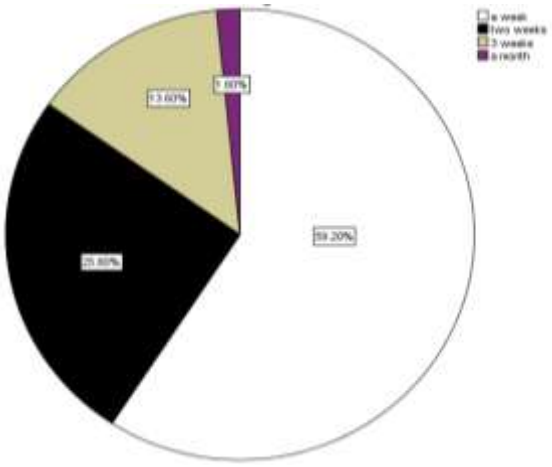

Figure 4: **Use of Storage Facilities for Feed**

Predisposing Factors to Aflatoxin Contamination

Table 2 indicates Predisposes Poultry Factors, with poor storage of feed and poor hygiene each at 12.0%, feeding of contaminated feed at 13.6%, storage of feed for a long duration at 6.4%, and 37.6% reporting all the mentioned factors. Additionally, 18.4% reported none of the mentioned factors, highlighting potential gaps in understanding the predisposing factors.

Table 2 **Predisposing Factors to Aflatoxin Contamination**

Parameters	**Frequency**	**Percent**
Poor storage of feed	15	12.0
Poor hygiene	15	12.0
Feeding of contaminated feed	17	13.6
Storage of feed for a long duration	8	6.4
all of the above	47	37.6
None	23	18.4
Total	**125**	**100.0**

Source: Field survey 2023

Occurrence of aflatoxin contamination on the farm

Table 3 presents the Aflatoxin Experience on Farm, indicating that 24.8% of respondents have had experiences with aflatoxin ('yes'), while 63.2% have not ('no'). Moreover, 12% report no presence of aflatoxin experience on their farms ('none'), suggesting a significant proportion of respondents have encountered aflatoxin issues on their farms.

Table 3 **Occurrence of aflatoxin contamination on the farm**

Parameters	Frequency	Percent
Yes	31	24.8
No	79	63.2
None	15	12.0
Total	125	100.0

Source: Field survey, 2023

Methods used to prevent or reduce effect of aflatoxin contamination on the flock

The table 4 on Aflatoxin Prevention methods reveals diverse approaches among respondents. A significant percentage (46.4%) reported employing no specific preventive methods. Among those implementing measures, probiotics were the most common, utilized by 26.4% of respondents, followed by the use of vitamins (16.8%) and herbs (10.4%) as preventive measures against aflatoxin contamination.

Table 4 Methods used to prevent or reduce effect of aflatoxin contamination on the flock

Parameters	Frequency	Percent
Probiotics	33	26.4
Herbs	13	10.4
Vitamin	21	16.8
None	58	46.4
Total	125	100.0

Field survey 2023

How to reduce aflatoxin contamination

The table outlines farmers' perceived roles in reducing aflatoxin, with a significant 54.4% indicating they don't engage in any specific practices. Notably, 20.0% emphasize the importance of maintaining proper hygiene of poultry equipment, while 11.2% stress avoiding storage of feed for an extended duration. Additionally, 4.8% advocate for measures such as avoiding feed contamination and ensuring laboratory testing of raw materials, underscoring the diversity in farmers' strategies to address aflatoxin concerns.

Table 4: How to reduce aflatoxin contamination

	Frequency	Percent
Avoid stock piling of feeds	1	0.8
Avoid storage of feed for a long duration	14	11.2
Avoid feed contamination	6	4.8
Ensure laboratory test all raw materials before use	2	1.6
Awareness and training from specialist	6	4.8
Proper hygiene of poultry equipment	25	20.0
Good storage facilities	3	2.4
None	68	54.4
Total	125	100.0

Field survey, 2023

Discussion

This study assesses the awareness of poultry farmers in Ogun state on aflatoxins' contamination in poultry farms. The questions covered various aspects such as demographics, farming practices, awareness levels, and experiences with aflatoxins.

The study's participants were distributed across different locations, with Abeokuta having the highest representation at 45.6% and males dominated the respondents (82.4%). This may be attributed to the fact that the poultry enterprise is a highly risky venture, labour intensive and characterized by uncertainties which in most cases can only be handled by men as noted by (Ironkwe and Ajayi, 2007). The majority of the respondents fell within the age range of 40-49 years, representing 35.2 %. Married individuals constituted 71.2% of the respondents, and the majority had 1- 5 and 6- 10 years of poultry farming experience representing 35% of the respondents. This outcome was corroborated by the findings of Bello *et al*., (2017) who reported that farmers who established their poultry farms between 5 and 10 years ago are the majority of poultry farmers in Ogun State.

The highest size of the flock ranged from 100 to 5000 birds being the most prevalent (31.2%) which corresponds to the report of Bello *et a.l* (2017), who reported that poultry farmers in Ogun State rear a minimum of 5000 birds. This reduction could be attributed to the increase in backyard poultry farms in Ogun State as reported by Adene and Ogunade (2006). Layers were the most common poultry species with 52% which agrees with the findings by Bello *et al*. (2017) and Maduka *et a*l. (2016) that layers constituted the highest proportion of chickens in their study area. A significant portion (43.2%) of poultry farmers sources their feed from retail shops in the study area. Poultry feed retailers buy feeds from the manufacturer and store in their shops until the last batch is sold which may take weeks or months. This long storage period affect the quality of the feed as those stored closer to the floor form cake and grow mould. The majority of farmers (59.2%) store their feed on the farm for minimum of a week before use. This research also revealed that poor storage of feed, poor farm hygiene, feeding contaminated feed and long storage of feed are the predisposing factors to aflatoxin contamination on the farm. The findings of Ilesanmi and Ilesanmi (2011) revealed that long storage of poultry feed is a major predisposing factor to aflatoxin

contamination, which was also corroborated by the report of Ayo *et al* (2001).

Conclusion

This study reveals significant knowledge gap in awareness, and training on mitigating aflatoxins contamination among poultry farmers in Ogun State. Introduction of coordinated educational programs, adherence to feed formulation regulations, and better dissemination of information are essential to mitigate the risks associated with aflatoxin contamination in poultry farming. The findings indicate a substantial percentage of poultry farmers obtaining feed from retail shops and commercial mills, emphasizing the need for vigilance in feed quality. Storage practices show a preference for short-term storage, possibly indicating a commitment to maintaining feed freshness.

Despite a notable awareness percentage of 56.8%, there exists a significant gap in knowledge, with 43.2% lacking awareness of aflatoxin effects. The positive influence of training programs and extension agents highlights the potential for targeted educational initiatives in enhancing awareness.

Recommendations

Implement targeted educational programs, workshops, and training sessions to bridge the awareness gap, with a focus on the 43.2% lacking knowledge about aflatoxin effects.

Collaboration with extension agents and educational institutions can enhance the effectiveness of such initiatives.

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