

Aflatoxicosis Associated with Swine Stillbirth in the Piggery Farm University of Agriculture Makurdi



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Abstract

Stillbirth in pigs can be define as piglets born dead or dies shortly before or during parturition. The occurrence is worldwide and the effect is significant if greater than 7% piglets born dead. This study investigated two cases of multiparous large white sows, the first was a case of four (4) stillbirth and the second thirteen (13) dead fully developed piglets within the interval of one week. The cultured feed sample on Sabouraud Dextrose Agar (SDA) indicated *Aspergillus flavus* growth while the mycotoxin analysis and quantification of the feed samples were positive to aflatoxin at the level of 80ppb, 90ppb and 110ppb concentration. In conclusion, it is established that the feed material are contaminated with aflatoxin of harmful concentration and should have been responsible for the still born piglets.

Keywords: Stillbirth; Piglets; Aflatoxin; Sows

Introduction

Stillbirth in swine can be defined as birth in which a piglet is born dead or dies shortly before or during parturition. The occurrence is worldwide and the effect is significant if greater than 7% piglets born dead [1]. Several risk factor are associated with stillbirth, about 70% are related to factors including: genotype, nutritional deficiency, environmental stress, dystocia, hypoxia, poison and age [2]. The remaining 30% are associated with infectious agents and these may be responsible for notable diseases including *Mycoplasma suis*, PRRS arcovirus, leptospirosis and mycotoxicosis [3,4].

The factors mentioned above may result in reproductive failure in a pregnant sow leading to a broad spectrum of sequelae characterized by abortion, stillbirth infertility, mummification and embryonic death [1]. For example, mycotoxins, the biochemical metabolite of fungi and the possibility of feed contamination may result in both man and animal mycotoxicosis. Scientists have identified a few out of large numbers of fungi (*Aspergillus flavus*, *A. parasitus*, *A. nominus*), that are capable of germinating and producing mycotoxins in grain at 15%-17%-moisture of content when contaminated [5]. Above 400 mycotoxins are known to date, but only a few have been shown to cause significant, detrimental health and performance problems in swine fed with contaminated plant based feedstuffs. These include aflatoxin, deoxynivalenol, zearalenone, fumonisin, ochratoxin, ergot, and T-2 toxin [5]. Aflatoxin toxicosis has been

severely reported in suckling piglet, growing and finished and breeding pigs. However, the risks of aflatoxin contaminated feeds depend largely on the age and physiologic status of animal as well as the level of toxin in the feed [6]. This study report two cases of multiparous large white sows, the first was a case of four (4) stillbirth and the second thirteen (13) fully developed piglets in the same university farm within the interval of one week.

Case History

The attention of the ambulatory unit Veterinary Teaching Hospital University of Agriculture Makurdi (UAM), was draw to the piggery section of the Animal Farm UAM, with chief complain that one of the sow has decrease appetite with eventual farrowing dead piglets, however, records of the sow farrowing history reveals: first farrow 18-piglets, second farrow 9-piglets were successful but the third farrow resulted in 13-dead fully matured piglets. Further history also reveals that the sow was raise under intensive management system. The farm records indicated that, they were routinely treated for endo and ecto parasite and was fed with breeder ration locally compounded basically with (soyabeans, rice bran, brewer dry gin, premix zinc oxide and bone meal). The feed store investigation reveals moldy contaminated feed materials in large quantities, which are used as the main source of feeding the sow. Therefore, it became apparent to incriminate microbial contamination (Table 1).

Table 1: showing the quantification of the aflatoxins in the sample of feeds. ELISA Reading at 450nm optical Density (OD), (Helica Biosystem Inc.Santa Ana CA).

Feed Sample (15kg)	Total Aflatoxin (bbp)	Optical Density (OD)	Maximum permissible level (bbp)	Commendation
A	80	450nm	20	Higher than the standard
B	90	450nm	20	
C	110	450nm	20	

Physical, clinical and necropsy examination

The 31/2 year old large white sow was apparently health with no sign of disease, weighting 150kg, rectal temperature was 38.4 °C, stable in appearance but scaly skin characterized with papillomatous like growth at the base of the ear.

Necropsy of the dead piglets

At necropsy, observation of the dead piglets lungs were not expanded indicating that they died breathing; the gastrointestinal tract contained no ingesta and appeared apparently healthy.

Laboratory test

Serum sample from the sow was collected for Brucella Rose Bengal immune-diagnosis. And the sow vaginal swab together with the dead piglets thoracic fluid were collected for culture and sensitivity test, which was carried out at the Veterinary Teaching Hospital (VTH) University of Agriculture Makurdi. While the moldy feed sample was collected and cultured in the Veterinary Microbiology Laboratory, UAM and part of the same sample was send for bio-assay at the Disease Diagnostic and Control Laboratory, Animal Care Service Konsult Lagos Nigeria.

Result

The Rose Bengal immunologic test yielded negative as well as the cultured results of the sow vaginal swab and thoracic fluid from the death piglets. However, the cultured feed sample on Sabouraud Dextrose Agar (SDA) indicated *Aspergillus flavus* growth within two weeks. While the mycotoxin analysis and quantification was carried out using Enzyme Link Immunosorbent Assay (ELISA) technique and read at 450nm (Helica Biosystem Inc.Santa Ana. CA). The reading at 450nm optical Density (OD), of the three (3) samples of 15g each from three separates bags were positive to aflatoxin at the level of 80 ppb, 90ppb and 110ppb. The values are above the normal permissible level of 20ppb aflatoxin in feed. The conditioned was therefore diagnosed as aflatoxicosis and this was consistent with the history of recent feeding from a new bag of food and sign of altered food palatability.

Discussion and Conclusion

In the case of this study the dead piglets lungs were not expanded at necropsy indicating that they died not breathing (intrapartum); This finding agreed with Vaillancourt et al. [7], which reported that majority of stillborn piglets die intrapartum i.e sometimes during the farrowing process which is usually characterized by non-expansion of the lungs following a postmortem finding. But early postpartum deaths are those

that occur within 24 hours after birth. Unless a necropsy is performed, it is often difficult to differentiate intra and post-partum death.

Aflatoxicosis have been severally and frequently reported in suckling pig, grower and breeding stock but this is the first report from the UAM Animal Farm. Swine appear resistance to the concentration of 300ppb from weaning to market [8] and high concentration of about 1000-5000ppb was reported to precipitate acute condition and death. However, Marin et al. [9] stated that a low level of 20-200ppb is capable of eliciting immune suppression; increase susceptibility of microbial infection especially pregnant sows being the most susceptible to the toxic effect of aflatoxin. And this is in agreement with the aflatoxin concentration of 80ppb, 90ppb and 110ppb respectively in this study. Nevertheless, there is variability in clinical signs of acute aflatoxicosis, for example, in a reported outbreak involving at least 100 dogs fed on commercially manufactured food, following the dogs examinations, only eight (8) were confirmed with aflatoxicosis [10].

Aflatoxins are not only potent toxins but also are carcinogenic, mutagenic and immunosuppressive. Therefore, this might explain the reason for the pregnant sow leading to still birth. The attendant impact or effect of aflatoxicosis includes reduce productivity, increase disease incidence and reproductive abnormalities in pigs for example stillbirth [11]. Therefore, this constitute a major source of economic loss for the producer, for example, the financial consequence of increase stillbirth level in a farm can be reasonably high; exceeding the 5-7% intervention level, a three hundred (300) sows breeding herd experiencing a 10% stillbirth, this will signify a loss of 235 piglets per year. And if each of these stillbirth piglets were to be fully prized within a breeder feeder enterprise this represent a financial loss of over \$350,000 per year [12].

Conclusion and Recommendation

Based on the clinical/postmortem signs, the growth of *Aspergillus flavus* on growth culture medium and the bio assay detection of aflatoxin; It is established that the feed material are contaminated with aflatoxin of harmful concentration and should have been responsible for the still born piglets, therefore preventive measures to reduce stillbirth piglets are necessary, such as farrowing supervision and timely intervention. Also, emphasis on analysis of stored feeds to avoid moldy growths should always be a routine in the farm.

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