AFLATOXICOSIS IN LIVESTOCK AND AQUACULTURE BUSINESS: A FIELD AND LABORATORY PERSPECTIVE

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...Working for Animal Health and Production
• **Introduction:**

• Aflatoxicosis is a type of mycotoxicosis. (‘Mykes’-fungus, ‘Toxicum’-poison)

• Aflatoxins are secondary fungal metabolites produced during metabolism of carbohydrates, fats, proteins, minerals and vitamins.

• These toxins are produced by fungi like *Aspergillus flavus* and *Aspergillus parasiticus*. 
PLATE ON THE RIGHT, SHOWING VERY HIGH GROWTH OF
Aspergillus flavus (yellowish green fungal colonies) FROM
AFLATOXIN CONTAMINATED MAIZE
• Effects of Aflatoxins on animals:
  • Immunosupression- (shown by increased susceptibility to infectious diseases and poor response to vaccinations in birds)
  • Carcinogenic (Induces neoplastic changes/cancer, especially Aflatoxin B1)
  • Induce Anaemia
  • Hepatotoxic
  • Nephrotoxic
Effects of Aflatoxins on animals

- Infertility and abortions
- Delayed onset of egg production in birds and gradual to sudden losses in egg production in actively laying birds.
- Loss of appetite, poor egg shell quality, and paralysis.
- Lingering mortality which can suddenly increase and remain high if source of aflatoxicosis is not addressed. Poor response to antibiotics also observed.
• **Effects of Aflatoxins on animals:**
  • Broilers often show poor weight gain and are more susceptible to aflatoxicosis than layers.
  • In fish, inappetence, generalized cutaneous depigmentation, hepatic and renal palor with ascites and under chronic exposure to sublethal concentration, jaundice may be noticed.
• Between January 2012 and December 2012, a total of 2,403 samples were analysed at the Animal care Laboratory, Ogere Remo, Ogun state.

  The type of samples included, Maize, G.N.C., P.K.C., SBM, SBC, Wheat, Rice and Corn offal, poultry and fish feed, BDG, Indomie waste, e.t.c.
<table>
<thead>
<tr>
<th>YEAR 2012</th>
<th>MONTH</th>
<th>TOTAL NO.</th>
<th>NO. &amp; % (Over 300ppb total aflatoxin)</th>
<th>NO. &amp; % (100 ppb - 299 ppb total aflatoxin)</th>
<th>NO. &amp; % (Less than 100 ppb total aflatoxin)</th>
</tr>
</thead>
<tbody>
<tr>
<td>JANUARY</td>
<td>110</td>
<td>8 (7.27%)</td>
<td>11 (10%)</td>
<td>91 (82.73%)</td>
<td></td>
</tr>
<tr>
<td>AUGUST</td>
<td>125</td>
<td>7 (5.6%)</td>
<td>15 (12%)</td>
<td>103 (82.4%)</td>
<td></td>
</tr>
<tr>
<td>SEPTEMBER</td>
<td>86</td>
<td>36 (41.86%)</td>
<td>14 (16.28%)</td>
<td>36 (41.86%)</td>
<td></td>
</tr>
<tr>
<td>OCTOBER</td>
<td>289</td>
<td>37 (12.8%)</td>
<td>52 (17.99%)</td>
<td>200 (69.21%)</td>
<td></td>
</tr>
<tr>
<td>NOVEMBER</td>
<td>324</td>
<td>59 (18.2%)</td>
<td>62 (19.14%)</td>
<td>203 (62.66%)</td>
<td></td>
</tr>
<tr>
<td>DECEMBER</td>
<td>343</td>
<td>48 (13.99%)</td>
<td>49 (14.29%)</td>
<td>246 (71.72%)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Animal care Laboratory data 2012
• Some of the cases encountered involved colossal losses (millions of Naira) in areas of mortalities, egg production losses, delayed weight gain in birds and fish, e.t.c.

• CASE 1: DA FARMS

• CASES 2 -5( O- FARMS, RTZ FARMS, BNL FARMS, F- Fish farm)
LEFT: FISTULATION OF PROVENTRICULAR SEROSA, LEADING TO LEAKAGE OF INGESTA IN LAYERS

RIGHT: EROSION OF MUCOSAL SURFACE OF THE PROVENTRICULUS
FRIABLE LIVER WITH MULTIPLE STREAKS OF PALOR IN CHRONIC AFLATOXICOSIS IN THE SAME SET OF LAYERS.
JAUNDICED CATFISH FROM A FARM WHERE FISHES CONSUMED CONTAMINATED FEED

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ASCITES (FLUID ACCUMULATION IN ABDOMINAL CAVITY) IN CATFISHES
• PREVENTION
• Testing of feed raw materials (especially those sources of protein, carbohydrate and fibre) for aflatoxin level by direct competitive ELISA. This will help classify samples for rejection or acceptance.
• Testing of finished feed made from accepted raw materials to ensure compliance with set standards.
• Use of mould inhibitors (i.e. feed organic acids), and a blend of toxin-bindners and mycotoxin-neutralizing enzymes (Detoxizyme®) in production of finished feed.
• **CONTROL**

In most outbreaks, the following are key steps that must be taken to avoid colossal losses:

• Take a complete history of the case.
• Perform a post-mortem examination and note the lesions observed.
• Analyze feed consumed by birds to know the aflatoxin level.
• There may be need to totally withdraw such feed or change a major raw material which was responsible for high aflatoxin level in finished feed.
CONTROL

- Since cases encountered are often complicated by mycosis and bacterial infections, these are also brought under control. We have also isolated fungi from blood and tissues of affected chickens.
- We often use liver tonics in combination with systemic anti-fungal preparations to control these outbreaks. It is however better and cheaper to prevent aflatoxicosis.
• Recommendations
• At pre and post harvest levels, minimal contamination with toxigenic strains of fungi should be ensured by:
• Application of competitive exclusion method (use of non-toxigenic strain of *Aspergillus* spp - e.g. Aflasafe® on the field. This could be packaged with distribution of fertilizers and extended to crops like groundnut/peanut and soya.
Recommendations

• Educating farmers on the need to ensure proper drying of produce, for e.g. some often yield to the temptation of selling maize (because of high demand) with high moisture content. Where possible, government may establish centres for machine drying of produce before storage. This may be started in areas of high concentration of active farmer populations with high annual output.
Recommendations

• Neighbouring African countries where Nigerians by feed raw materials in very large quantity, (e.g. GNC from Chad) should be encouraged to apply similar means of reducing contamination of farm produce by aflatoxins
• Thank you