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Presentation on HH (Groundnuts)/Aggregator (Maize) level test for aflatoxin.

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Presentation outline

🍃 Two sections

➤ Groundnuts

➤ Maize

✓ Introduction

✓ Methodology

✓ Results and discussion

✓ Conclusions and recommendations

Introduction

Groundnuts play a major role in the livelihood of farmers in the Northern parts of Ghana

- Provides income
- Serve as a source of protein for the Ghanaian population as whole.
- It is estimated that about 80% of Ghanaians consume groundnuts or groundnut based products at least once a week (Jolly et al. 2008)

- Groundnut production and its utilization is threatened by aflatoxin contamination
- Aflatoxin is a secondary metabolite produced by mainly *Aspergillus* spp (flavus and parasiticus)
- Aflatoxin has been listed as a group 1 carcinogen that primarily affects the liver by the Agency for Research on Cancer (IARC)
- Has effect on brain development and stunting in children

- Our (UDS afla team) recent work has shown aflatoxin to be present in almost all groundnut based products tested in Northern Ghana at different concentrations (2 – 500 ppb)
- How bad can groundnuts be?
- ✓ In trying to answer this question we have morphologically characterized “high risk aflatoxin groundnuts”
- ✓ None of the grades had aflatoxin concentration below 500 ppb
- ✓ This indicate that few nuts of such groundnuts in a bowl of groundnuts could increase significantly aflatoxin concentration



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- SPRING initiated and funded this work in line with its vision to reduce under-nutrition and prevent stunting among others
- The results of this work (test) will enable SPRING adequately target its Aflatoxin management and control interventions in the current and future projects so as to make available quality food for improved nutrition amongst project clients

Methodology - Groundnuts

- Survey to determine post harvest practices carried out by farmers (questionnaire)
- Sampling of groundnuts for aflatoxin testing
- Sampling & Testing
 - ✓ 6 districts out of the 15 SPRING operational district
 - ✓ 1 project community/district
 - ✓ 7 HH/community
 - ✓ 5 control communities, 2 HH/control community



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- ✓ 4 sampling points (4th to 9th Feb., 6th to 10th of June and 25th to 27th of August 2016).
- ✓ Samples were taken from all storage bags of farmer and composited
- ✓ Samples sent to the Lab, processed and tested using AgraStrip® Afla test kits (20ppb)
- ✓ Total of 173 groundnut samples were tested
- ✓ 50% of total samples from the first batch of samples were randomly selected for moisture analysis

Results and Discussion - Groundnuts

- Mean moisture content of groundnut samples was 3.2%
 - range 1.8 –4.2%.
- A total of 15 samples (8.7%) tested positive for presence of aflatoxin above 20ppb.
- Out of these, 11 (73.3%) of the samples were from the SPRING project communities
 - four from first sampling, three each from second and third sampling and one from last sampling.
- Four samples from the control communities tested positive for aflatoxin
 - Two each from the first two sampling points

Sampling Point 1**Sampling Point 2****Sampling point 3****Sampling point 4**

Tampia # 1 (Tolon)

Tampia # 1 (Tolon)

Tampia # 1 (Tolon)

*Katanga 1 (Salaga)

Katanga 1 (Salaga)

*Katanga 2 (Salaga)

Katanga 2 (Salaga)

Neyinkundo (Mion)

Oseido (Yendi)

Oseido (Yendi)

Chokoshi-Kakoshi
(Salaga)Chokoshi-Kakoshi
(Salaga)

Kuti Kuraa (Tolon)

Tampia # 2

Garinshanu

Any links between farmers practices and their samples testing positive for aflatoxin?

- 15 questions on post-harvest practices were asked
- Among these, 3 main practices could have accounted for samples testing positive for aflatoxin
 1. Drying of groundnuts in the field with pods still attached to the stem – 71%
 2. Inability of farmers to use clean sheets for drying groundnuts – 57%
 3. Not sorting bad nuts before storage – 57%

Mode of storage



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Maize

- Maize samples were taken at two sampling points (March and June 2016)
- For each sampling, maize samples were taken from 12 aggregators in the Northern and Upper East Regions of Ghana (six from each region) for Aflatoxin Analysis
- For maize the 10 ppb semi-quantitative Agra strips was used
- Moisture analysis was done

Methodology - Sampling

- Maize samples were taken from a maximum of 50 bags per aggregator.
- In situations where an aggregator had more than 50 bags, 50 out of the lot were randomly sampled.
- 100g sample was taken from each bag (sampling from different parts of the bag) using a sampler = 5 Kg sample from each aggregator
- When an aggregator had maize stored in more than one storage facility or place, samples from each facility was treated separately
- When an aggregator had in stock white and yellow maize, each was sampled and tested independently.

Results and Discussion

Region	District	Community	Storage Facility	Aflatoxin level
Northern	Tamale Metro	Datoyili	Warehouse	-
Northern	Saboba	Wapuli	Store	+
Northern	Gushiegu	Kpartinga	Warehouse	-
Northern	Gushiegu	Galwei	Warehouse	-
Northern	West Mamprusi	Janga	Room 1	+
Northern	West Mamprusi	Janga	Room 2	-
Northern	West Mamprusi	Walewale	Warehouse	-
Upper East	Sandema	Sandema	Warehouse	-
Upper East	Bawku East	Pusiga	Warehouse	+
Upper East	Binaba	Binaba	Warehouse	-
Upper East	Bazua	Bazua	Warehouse/ Yellow maize	-
Upper East	Bazua	Bazua	Warehouse/ White maize	-
Upper East	Zebila	Zebila	Yard	-
Upper East	Zebila	Zebila	Warehouse/ Yellow maize	-
Upper East	Zebila	Zebila	Warehouse/ White maize	-
Upper East	Garu Tempani	Garu	Container	-
Upper East	Garu Tempani	Garu	Yard	-
Upper East	Garu Tempani	Garu	Warehouse	-

Conclusions and recommendations

- Survey data shows that 3 main factors could have accounted for the presence of aflatoxin in groundnuts sampled
 - I. drying of groundnuts in the farms with pods still attached to the hulms
 - II. the inability of farmers to use clean sheets for drying
 - III. not sorting bad groundnuts from good ones before storage
- It is therefore recommended that in future SPRING trainings for farmers on good post-harvest practices to manage aflatoxin contamination in groundnuts, among all the recommended code of practices, emphasis be placed on
 - I. The use of clean sheets for drying
 - II. Sorting out bad nuts from good ones before storage
 - III. If possible groundnuts should not be dried in the farm with pods still attached to the hulms.

- It is also recommended that for subsequent studies/surveys
 - I. A quantitative method of aflatoxin analysis be carried out. This will make monitoring of aflatoxin build up in groundnuts and maize during storage more accurate
 - II. Sampling points for maize should be increased
 - III. Data loggers should be used to generate data on temperature and relative humidity in the storage facility or rooms.
 - IV. Rainfall data should be obtained from Meteorological stations in the Districts where samples will be obtained for analysis.

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