

Aflatoxin M₁ contamination of milk in the Greater Addis Ababa milk shed, Ethiopia

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Aflatoxins

- Toxic metabolites of *Aspergillus* fungi
- Contaminate a variety of food and feeds
 - Grains, oil seeds
- Converted to AFM₁ and excreted in milk of lactating animals
- Highly carcinogenic, cause stunting and immunosuppression
- Reduced growth and productivity in livestock



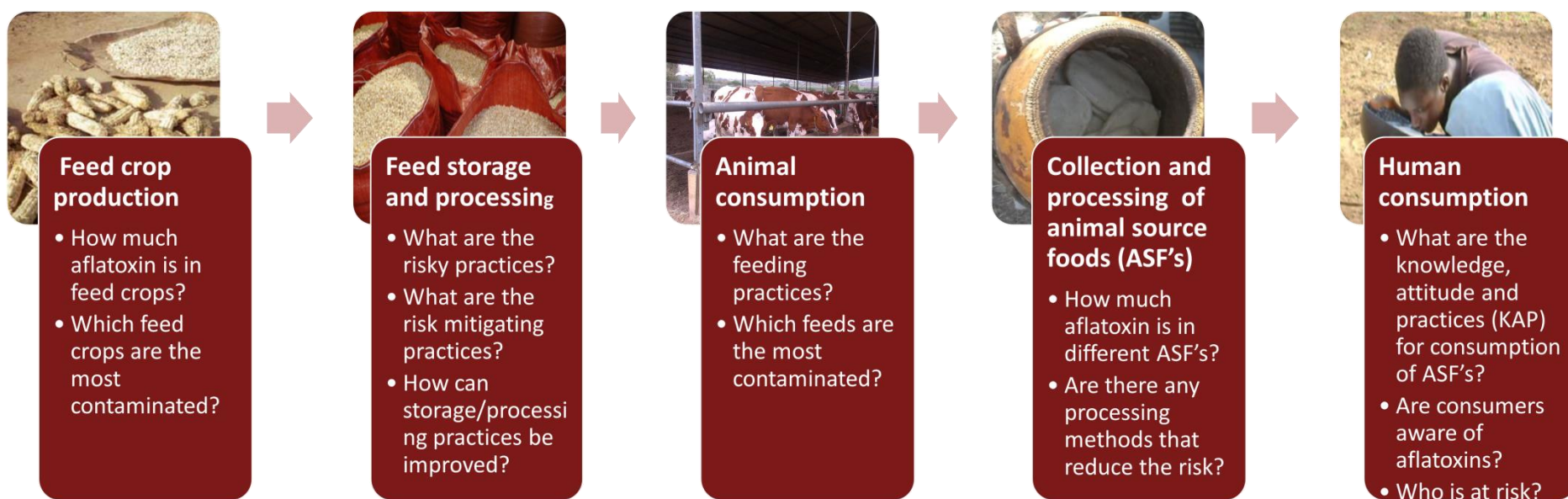
Photo: Alison Robertson, Iowa State University

The Greater Addis Ababa milk shed

- Located in the Central Highlands
- Major milk supplier to residents of the capital city
- Largest market-oriented milk producing area in Ethiopia
 - Smallholder and commercial dairy farms
- Specialized inputs
 - Improved breeds, early weaning, concentrate feeding



Methods - the value chain approach



The Greater Addis Ababa dairy value chain involves the production, processing and marketing of dairy feed as well as milk and milk products that are channeled to consumers in Addis Ababa

Methods

- Study participants:
 - 100 dairy farmers
 - 27 from Addis Ababa, 23 from Debre Zeit, 9 from Sebeta, 31 from Sendafa and 10 from Sululta
 - 10 milk collectors
 - 1 from Addis Ababa, 3 from Debre Zeit and 6 from Sululta
- A semi-structured questionnaire was administered to all study participants
- Bulk milk and/or feed samples were collected
- Commercial ELISA kit was used for quantification of AFM₁ in milk

Results – dairy farm characteristics

- Total daily milk production ranged from 4.5 to 2675 litres (median = 50 litres)
- On average, 87% of all milk produced on farms was sold
- Half of producers sold at least 45 litres of fresh milk daily



Results – milk collector characteristics

- All collectors received raw milk directly from farmers
 - Minimum of 70 litres to maximum of 9000 litres per day
- Quality control of milk was limited
- Smaller collectors served as milk processors to individual customers
 - Traditional yoghurt and cheese
- Larger collectors catered to supermarkets
 - Pasteurized milk, yoghurt, butter and cheese

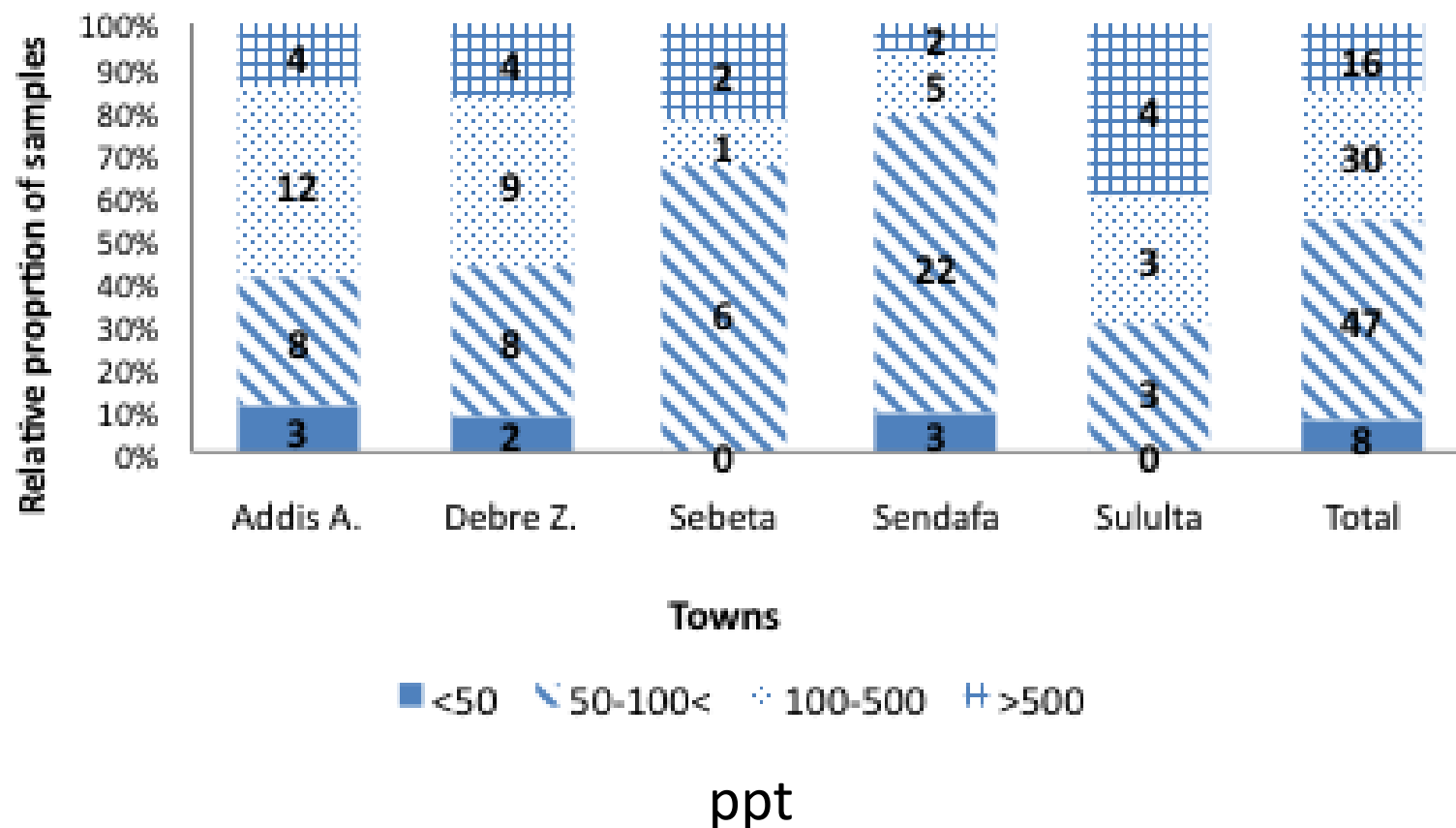


Results – aflatoxin in milk

High level of AFM1 contamination of milk in the Greater Addis Aaba milk shed

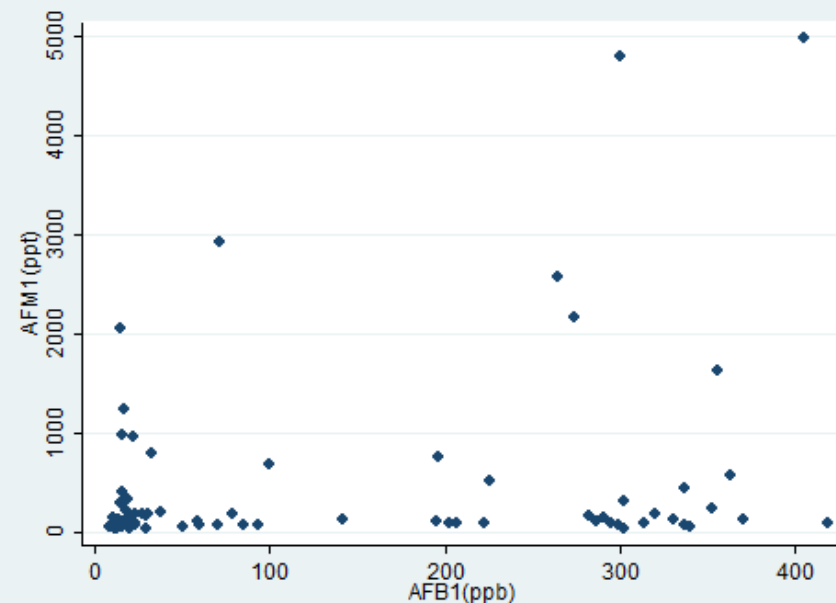
- Dairy farms:
 - All 100 milk samples were contaminated with AFM1
 - Highest was 4977 ppt
 - Lowest was 28 ppt
 - 92% exceed FAO/WHO and EU limit of 50 ppt
- Milk collectors:
 - All 10 milk samples exceeded 50 ppt
 - Highest was 2242 ppt

Results – AFM₁ in milk from 5 towns



Results – correlation between feed and milk

- Significant association between AFM₁ in milk and the presence of noug cake in the feed
- Moderate positive correlation between AFB₁ in feed and AFM₁ in milk with a correlation coefficient of 0.31
- The average pass through of AFB₁ from feed to AFM₁ in milk was about 1%



Results – awareness among dairy farmers of moulds and aflatoxins

- Only 5% of dairy farmers knew that aflatoxin could be present in milk
- 70% of farmers believed that the safety of milk could be judged by visual inspection only
- 71% of farmers were aware of the harmful effects of moulds on human and animal health
 - A few dairy producers reported that moulds could cause death and abortion in cattle
- More than half of the farmers also knew that drinking milk from cows that were fed mouldy feed was unsafe

Conclusions

- High level of aflatoxin in the Greater Addis Ababa milk shed is worrisome
 - This milk shed is major supplier of milk to over 3 million people
 - Children are especially vulnerable as they are encouraged to consume milk
- Rapidly growing sector with large potential to meet increasing demand for milk
- Milk and feed safety issues need to be addressed
- Intervention study

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