FAO/IAEA International Symposium on Food Safety and Quality:
Applications of Nuclear and Related Techniques

# PREVALENCE OF MYCOTOXINS AND PESTICIDE RESIDUES IN FOOD AND ENVIRONMENT IN BURKINA FASO FROM 2012 TO 2013: CASES OF RICE, WHEAT, FLOUR, FRUITS, VEGETABLES, SOILS AND WATER.

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# Outline of presentation

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I. Introduction

II. Materials and methods

III. Results

IV. Discussions

Conclusion

# I. Introduction (1/1)

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In **Burkina Faso**, the National Public Health Laboratory (LNSP) provides control the quality of local and imported food, water and soil.

In the context of its public health mission, 30 molecules divided into 4 pesticides groups were investigated in 419 samples and mycotoxins such as total aflatoxins, aflatoxin M1 and ochratoxin A were investigated in 850 samples from January 2012 to December 2013.

# I. Introduction (1/2)

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The objectives were:

- access the quality of foods by controlling mycotoxins and pesticide residues;
- draw some key elements to convince local authorities in matter of quality control of foods
- protect consumer.

# II. Materials & methods (1/6)

## 1.Materials-Samples

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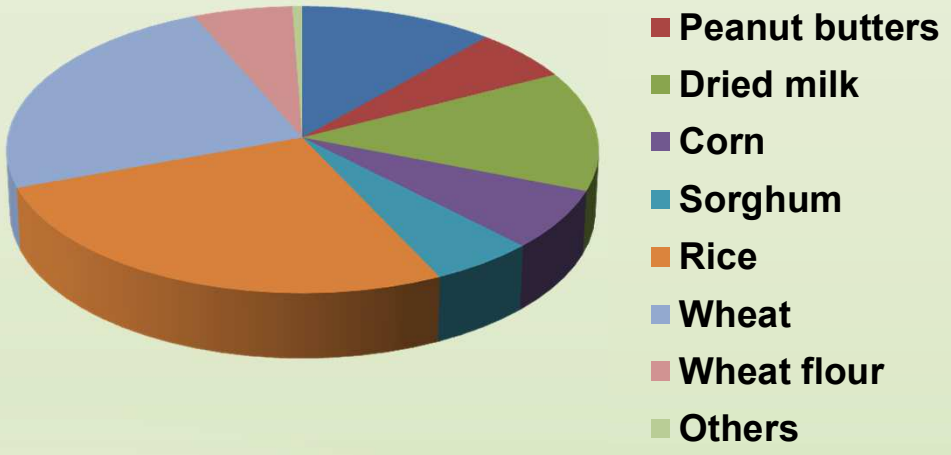
**Distribution of products for mycotoxins analysis**

| Products | % |
|---|---|
| Peanuts | 11,53 |
| Peanut butters | 5,88 |
| Dried milk | 13,53 |
| Corn | 6,71 |
| Sorghum | 5,29 |
| Rice | 26,47 |
| Wheat | 24,12 |
| Wheat flour | 5,88 |
| Others | 0,588 |



# II. Materials & methods (2/6)

## 1. Materials-Samples

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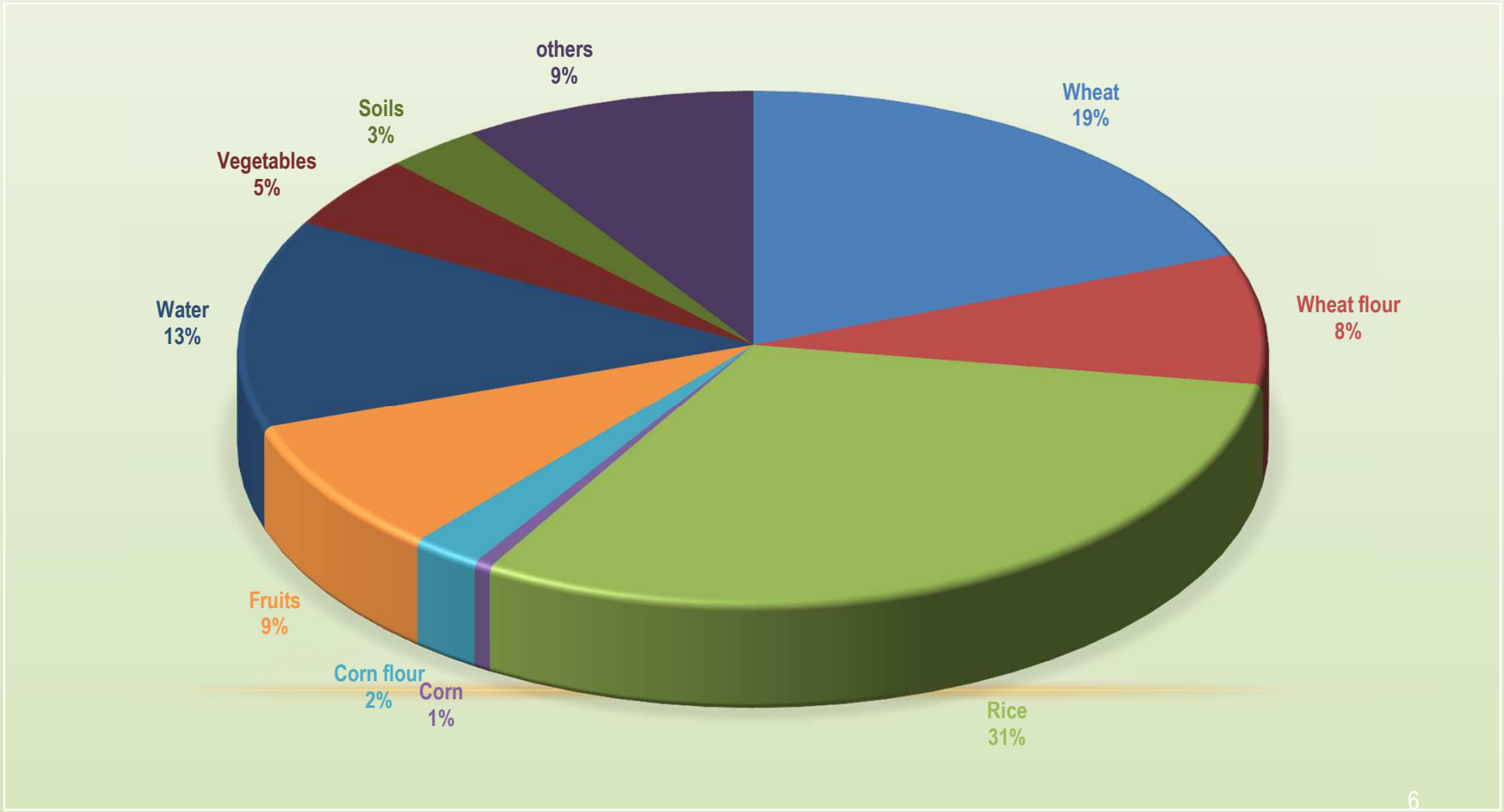
**Distribution of products for pesticides residues analysis**



# II. Materials & methods (3/6)

## 2. Sampling methods

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✓Imported and local foods and foods products:

- ❖Imported products come from regional offices located in different borders;
- ❖For Local products, a protocol agreement was signed between the producer and the National Public Health Laboratory to control its production.

✓Samples were identified with a unique code and sent for analysis.

# II. Materials & methods (4/6)

## 3. Analytical methods

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### Analytical methods for mycotoxins

| Molecules | Equipments | Product | Methods |
|---|---|---|---|
| Total aflatoxins | HPLC-FLD | Cereals | ISO 16050 : 2011 |
| Aflatoxin M1 | HPLC-FLD | Milk and milk products | ISO 14501: 2007 |
| Ochratoxin A | HPLC-FLD | Wheat and wheat products | EN **ISO** 15141-2 |

# II. Materials & methods (5/6)

## 3.Analytical methods

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### Analytical methods for pesticides residues

| Groups | Moleculars | Equipements | Standards |
|---|---|---|---|
| Organophosphates | Chlorpyrifos<br>Chlorpyrifos-Methyl<br>Diazinon<br>Diclorvos<br>Dimethoate<br>Omethoate<br>Fenitrothion<br>Fipronil<br>Malathion<br>Methidation<br>Parathion-Ethyl<br>Pyridaphenthion<br>Pyrimofos-methyl | GC-FPD<br>GC-NPD<br>GC-MS | QuEChERS-ethyl acetate developed by IAEA for cereals, fruits and vegetables<br>QuECHERS EN 15662 for cereals, fruits and vegetables<br>DFG for for cereals, fruits and vegetables, **soils, water ; plants**<br>ISO 12393 for cereals, |

DFG: Deustche forchungstgemeinschaft

# II. Materials & methods (6/6)

## 3.Analytical methods

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### Analytical methods for pesticides residues

| Groups | Molecules | Equipments | Methods |
|---|---|---|---|
| Organochlorins | 2, 4 DDT<br>Aldrine<br>Lindan<br>Dieldrin<br>Endosulfan<br>heptachlore | GC-µECD<br>GC-MS | QuEChERS-ethyl acetate developed by IAEA for cereals, fruits and vegetables<br>QuECHERS EN 15662 for cereals, fruits and vegetables<br>DFG for for cereals, fruits and vegetablessoils, water ; plants<br>ISO 6468 **for** water |
| Pyrethroids | Cypermethrin<br>Deltamehtrin<br>Lamdacyhalohtrin<br>Tetramethrin<br>permethrin | GC-µECD<br>GC-MS | QuEChERS-ethyl acetate developed by IAEA<br>QuECHERS EN 15662 for cereals, fruits and vegetables<br>DFG for soils, water ; plants |
| Carbamates | Imazalil<br>Quentozen | GC-µECD<br>GC-MS | QuEChERS-ethyl acetate developed by IAEA<br>QuECHERS EN 15662 for cereals, fruits and vegetables<br>DFG for soils, water ; plants |

DFG: Deustche forchungstgemeinschaft

# III. Results (1/4)

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Aflatoxin B1 was identified in 19 samples (peanuts, peanut butters, corn) with 600 ppb levels, 150 times higher than the limit value (4ppb) according to the European Regulation No 1881/2006.

Traces of aflatoxins B1 and G1 were detected in 11 samples (corn and sorghum).

Aflatoxin M1 was identified and quantified in two samples of milk powder.

# III. Results (2/4)

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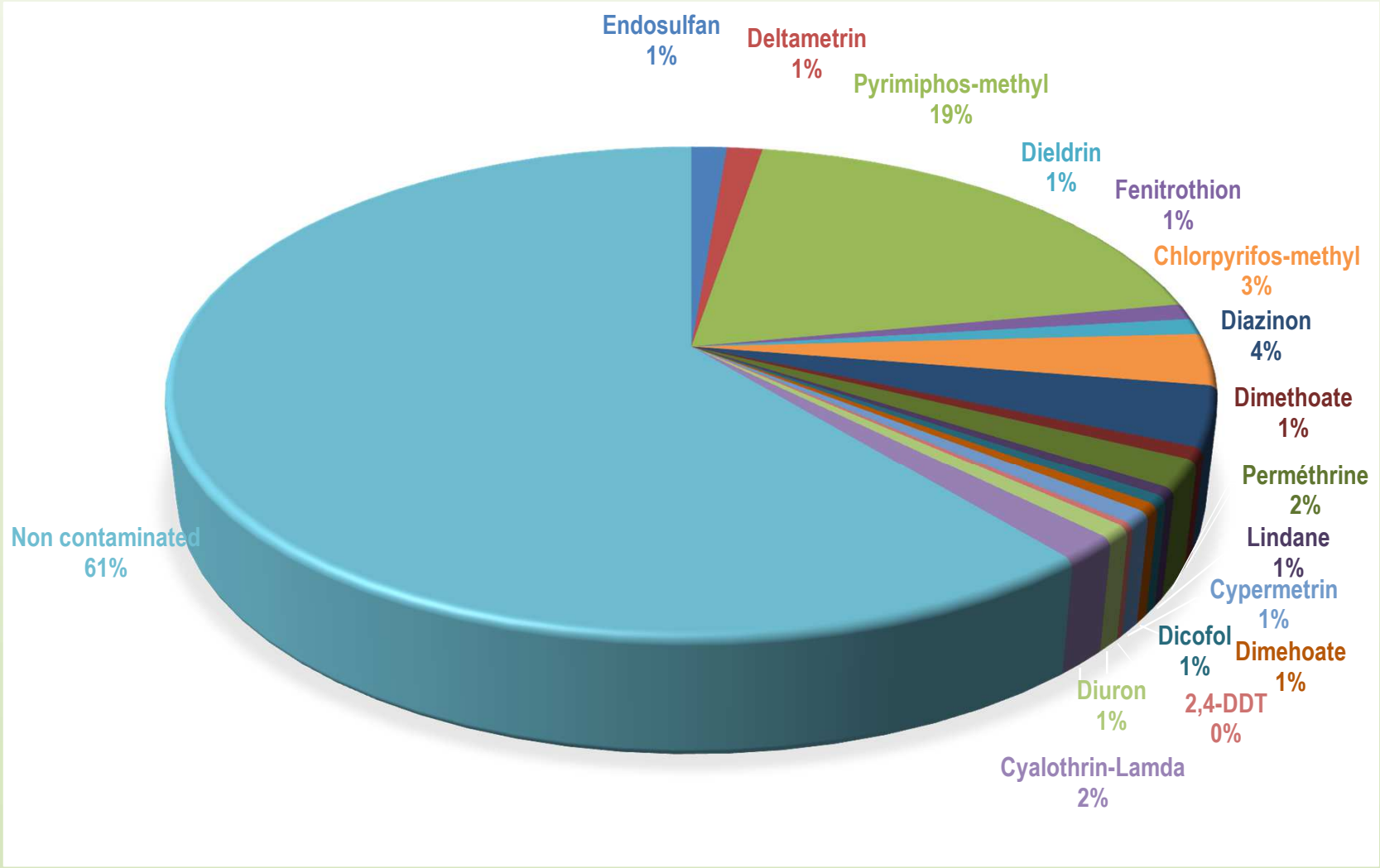

# III. Results (3/4)

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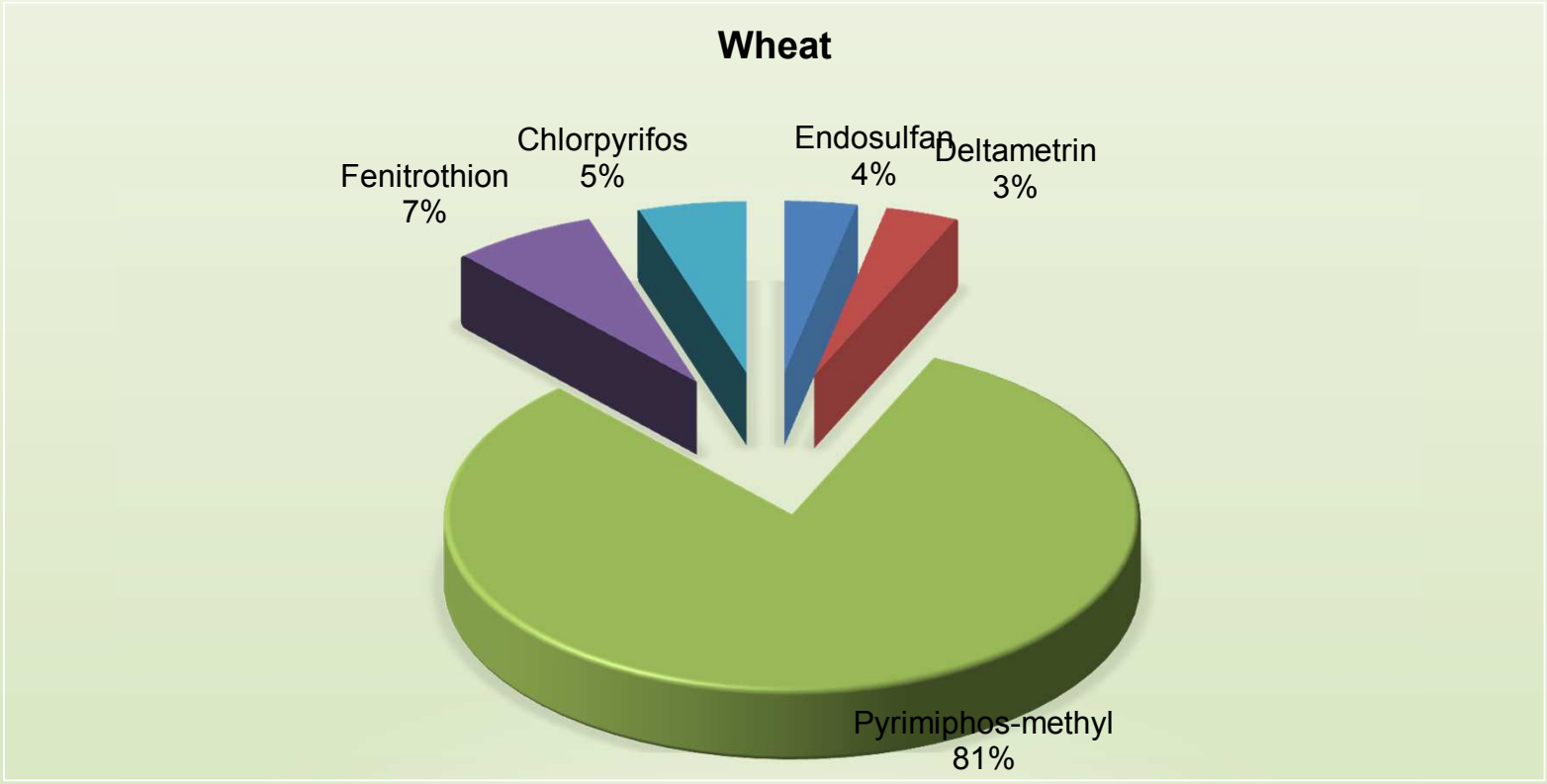

# III. Results (4/4)

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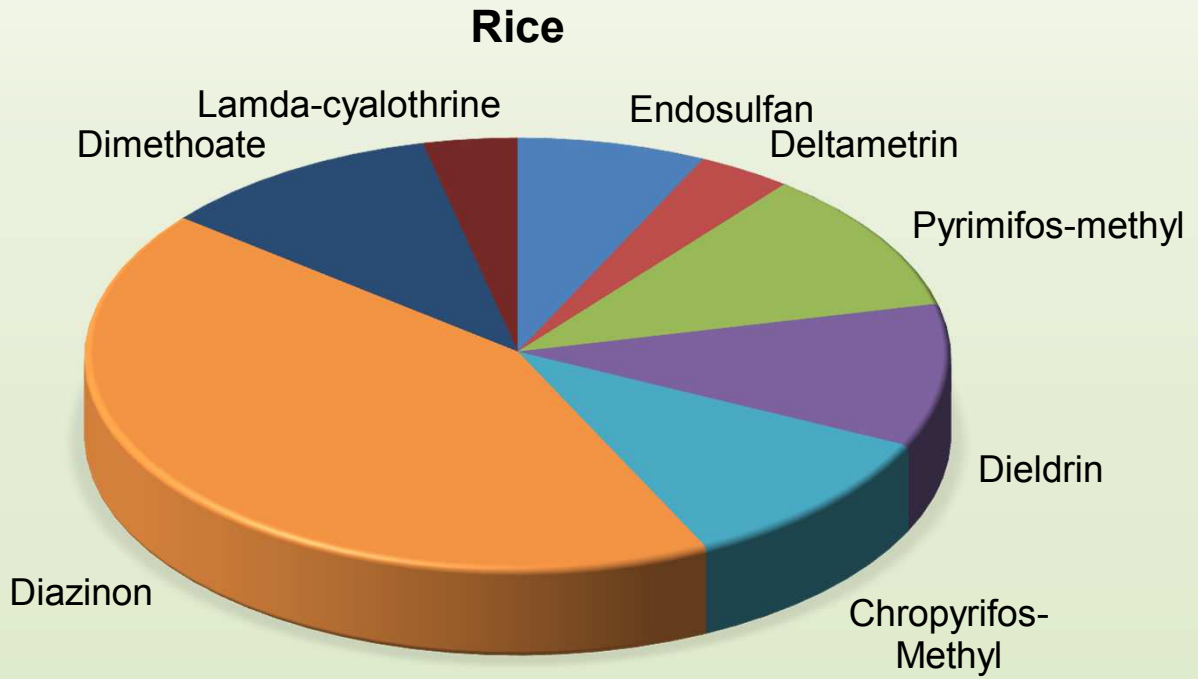


Diuron, endosulfan, dieldrin, alletrin were found in waters and soils in cotton regions.

# IV. Discussions (1/2)

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High levels of aflatoxins found in peanuts, peanut butter and corn.

This causes many diseases and economic losses.

Producers use all kinds of grain of peanuts, corn without any selection.

We started to educate and to train producers on Good Manufacturing Practices

# IV. Discussions (2/2)

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Endosulfan was found in some local products (wheat, soil, water).

Endosulfan was banned since 2007.

Its presence in water and soil is probably due to its permanent nature.

We will work with the other actors to stop its use and also for GAP.

# Conclusion

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Mycotoxins and pesticide residues levels that are found in foods, water, soil and the environment are a real public health problem in Burkina Faso.

NHPL through its expertise contributes to control and monitoring actions, awareness and information risk management.

# Acknowledgement

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# THANK YOU

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