Kenya Agricultural & Livestock Research Organization (KALRO)

Mycotoxin Testing for Safer Food Production

*Cutting-edge
lab techniques to enhance food safety across Africa*

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What are mycotoxins?

- Toxic substances that contaminate foods and feeds

- Produced by naturally occurring molds

- Common types: Aflatoxins, Fumonisins, Ochratoxins, Zearalenone, Trichothecenes

- Can occur pre- and post-post harvest at various stages of the value chain

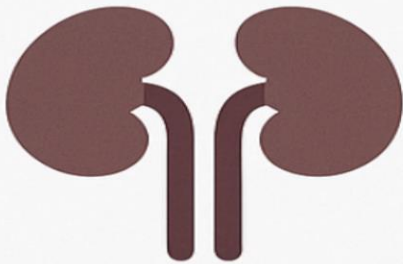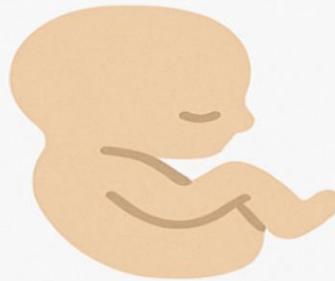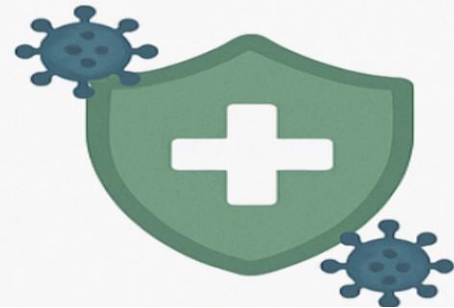- Mold growth and mycotoxin production enhanced by warm and humid conditions
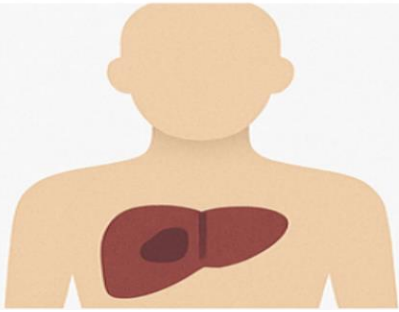
CARCINOGENIC

MUTAGENIC

TERATOGENIC

NEPHROTOXIC

DEATH

IMMUNO-SUPPRESSIVE
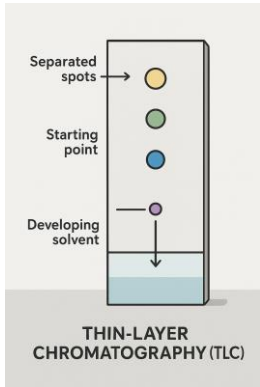
- Determination of presence and concentration of mycotoxins in foods and feeds.

- Choice of method depends on:

  ❖ the specific requirements of the testing application,

  ❖ the resources available,

  ❖ the level of sensitivity,

  ❖ Available expertise,

  ❖ and accuracy needed.

Why Test for Mycotoxins?

- Ensure food safety and consumer protection

- Supports trade through compliance to regulatory standards

- Early detection supports management of contamination

- Risk assessment

- Monitoring of trends and potential outbreaks or hotspots

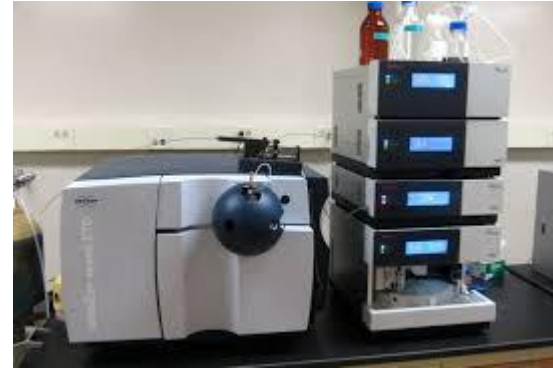- Evaluation of effectiveness of control measures in reducing aflatoxins

TLC

HPLC

LC/MS

HPTLC

ELISA

LATERAL FLOW

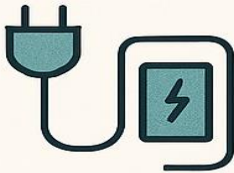*Limitations: Time-consuming, lab-bound, expensive, single-analyte*

Lateral flow strip readers connected to mobile phones using Bluetooth

Lateral flow technologies that can analyze up to 3 samples simultaneously
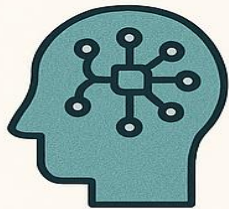
Portable ELISA readers that can be used in situ

Rechargeable lateral flow readers

ELISA and lateral flow kits that do not use organ-solvents for mycotoxin extraction

Multiple mycotoxin detection e g. lateral flow, LC-MS/MS

AI and machine learning models for risk prediction

Early warning systems based on satellite and drone data

Molecular methods e.g. PCR, LAMP

- Timely action due to fast detection

- Wide availability and access to testing

- Reduced costs of multi-mycotoxin detection

- Environment friendly organic solvent free extraction

- Outbreaks forecasts

- Traceability

- Community empowerment

- Reduced health burden

- Eliminates need for lab infrastructure

Impacts of testing for mycotoxins in Africa

- Safer food = Reduced public health burden

- Compliance = strengthened food security and nutrition

- Improved compliance with international standards =

  increased exports = improved economic growth

- Improved uptake of technologies

- Advanced mycotoxin detection techniques are key

  to food safety

Errors during mycotoxin detection

Sampling

Non-representative sampling

Small lab sample

Sample processing

Sample and reagent preparation

Insufficient homogenization

Mishandling of samples

Insufficient particle size for extraction

Inadequate extraction

Testing

Expired/spoiled reagents

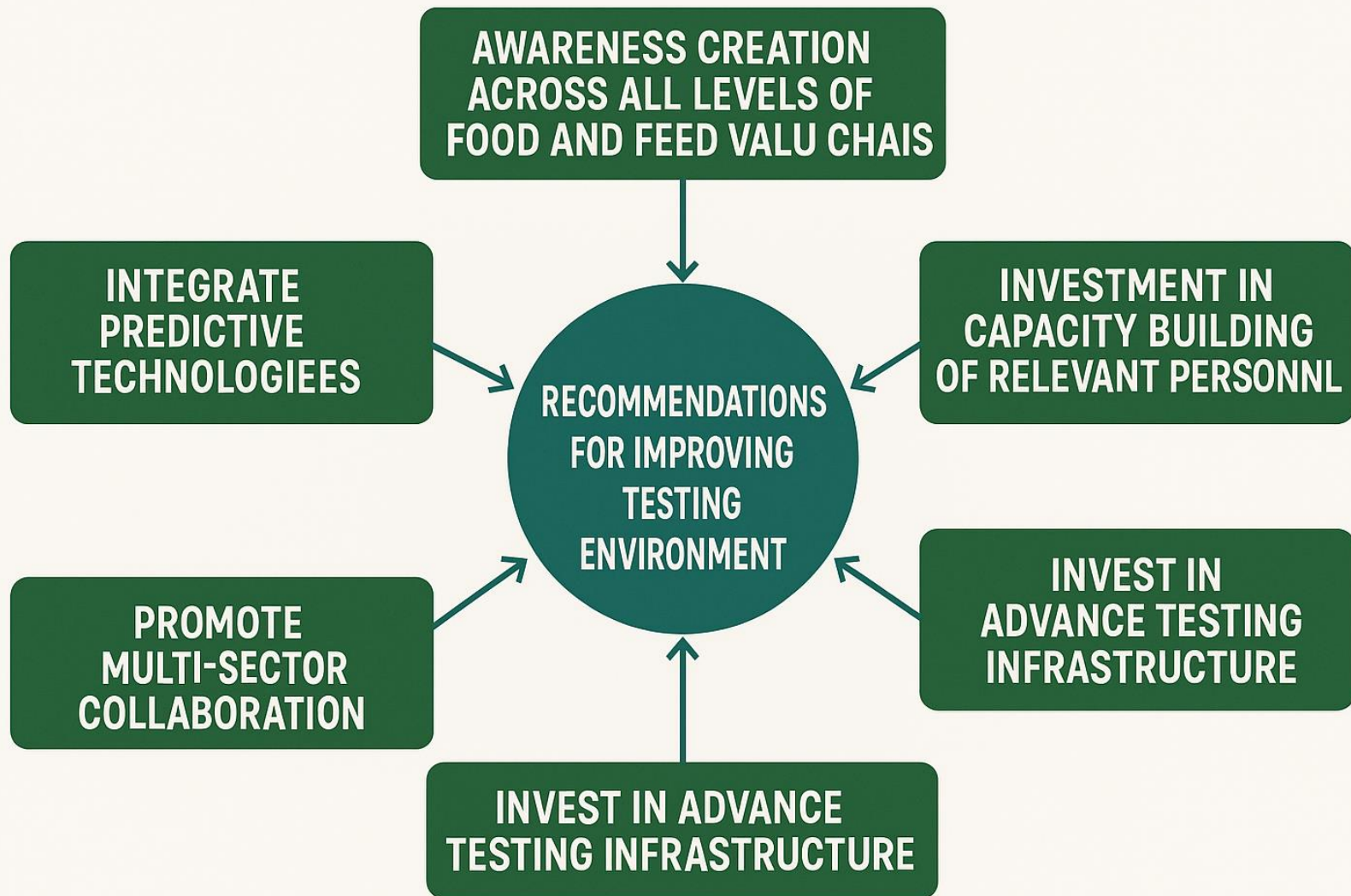Failure to strictly follow manufacturer's instructions

Matrix interference

Cross reactivity

Wrong interpretation

Improper use of analytical tools

Recommendations

THANK YOU