Department of biology

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((Mycology))

Stage (-3-)

LEC- ((4))

MYCOTOXNS

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MYCOTOXNS

More than 100 known species are capable of elaborating mycotoxins.

The

same mycotoxin can be produced by different fungi & the same fungus can produce different mycotoxins.

Toxin production occurs only under specific conditions of moisture, temperature, suitability of substrate & appropriate oxygen tension.

The optimum conditions for toxin production are relatively specific for each fungus. For example, Fusarium elaborates its toxin at freezing temperature, while A. flavus requires a temperature of 25C

Insects may also serve as carriers of fungal spores. Therefore, the damage of seed coat by insects, mechanical harvesting may predispose crops to fungal attack.

The fungi associated with cereal grains have been divided into two types.

* Field fungi which invade the grains before harvest and require greater water activity for growth (Fusarium , Helminthosporium and Cladosporium)

*Storage fungi which invade the grains after harvest during drying and in storage (Aspergillus and Penicillium)

*Mycotoxicosis is a toxicosis produced from digesting food containing toxic secondary Metabolites (mycotoxins) of fungi.

*Mycotoxins are secondary metabolites of fungi that are recognized as toxic to other life forms.

* Allergies: a disease produced of hypersensitivity from fungal antigens and represent immune response as a result of fungal spores inhalation or direct contact to some fungi such as Aspergillus fumigatus.

*Mycetism: a toxicosis condition produced by digesting smut spores, toxic fruiting bodies or fungal sclerotia.

Characteristics of Mycotoxins

1 – Odorless

2 - Tasteless

3 - Resistant to degradation

4 - Production is variable MYCOLOGY LECTURES

5 - Produced on surfaces of spores

6 - Remain active on dead spores

7 - Cause short- & long - term effects

8 - Multiple exposure routes

9 - Produced by numerous species

Factors influencing the production of mycotoxins

1. In Stored (food Conditions of harvesting , Transporting and storage , Moisture content , Temperature , Aeration and Suitable substrate)

2. In Growing crop / pasture including Plant species and Stage of development of plant

3. Modifying factors such as (Species of fungus , Concentration of mycotoxin in food , Susceptibility of animal species , Age , sex , health status and Duration of exposure)

Factors affecting severity of mycotoxicosis in animals

Species of toxigenic fungus

Concentration of mycotoxin in the food

Age , sex and health status of the exposed animal

Target organs or tissue affected

Duration of exposure to contaminated feed

Route of entry - ingestion , inhalation or direct skin contact

Mycotoxicosis occurs in two forms

*Acute: Produced when high to moderate amounts of mycotoxins are consumed . Causes marked signs of disease or death .

* Chronic: Moderate to low levels of mycotoxin intake .

Cause low productivity , slow growth rate , reduced re - productivity and inferior market quality.

Principles features of mycotoxicosis

1. Outbreaks are often seasonal and sporadic

2. May be associated with particular batches of stored feed or certain types of pasture

3. Susceptibility can vary with the species , age and sex of the animals exposed

4. Clinical presentation may be ill – defined

5. Antimicrobial treatment is ineffective

6. Recovery depends on type and amount of mycotoxin ingested and the duration of exposure to contaminated food

7. Characteristic lesions in target organs of affected animals provide supporting diagnostic evidence

8. Confirmation requires demonstration of significant levels of a specific mycotoxin in suspect feed or in tissues of affected animals