

Gastrointestinal and Hepatic Toxicities

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Gastrointestinal Toxicities

PROBLEMS:

- Vomiting
- Abdominal pain
- Anorexia
- Salivation
- \pm Diarrhoea

Gastrointestinal Toxicities

Differential diagnoses:

- Metals: arsenic, copper, lead, zinc
- Cholecalciferol
- Fertiliser
- Garbage ingestion

Gastrointestinal Toxicities

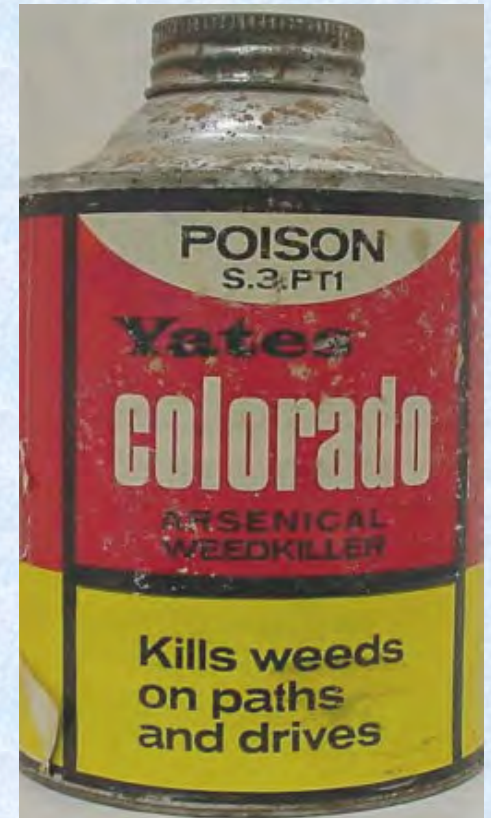
Differential diagnoses:

- Organophosphates and carbamates
- NSAIDs
- Paracetamol
- Phosphorised pesticides

Gastrointestinal Toxicities

ARSENIC SOURCES

- Pesticides
- Peltex treatment of pelts
- Dips and orchard sprays
- Arsanilic acid (feed additive)



Sodium arsenite

Gastrointestinal Toxicities

ARSENIC SOURCES

- Tanalised wood



Gastrointestinal Toxicities

ARSENIC-ORAL

- Intense abdominal pain
- Thirsty
- Salivation
- Vomiting
- Staggering gait

Gastrointestinal Toxicities

ARSENIC-ORAL

- Weakness
- Diarrhoea
- Prostration
- Hypothermia

Gastrointestinal Toxicities

ARSENILIC ACID - PIGS

- Ataxia
- incoordination
- torticollis
- blindness
- sitting dog stance

Gastrointestinal Toxicities

ARSENIC-DERMAL

- Dermal Necrosis
- Dermal sloughing
- Systemic signs
 - listlessness, anorexia
 - soft faeces, rough coat

Gastrointestinal Toxicities

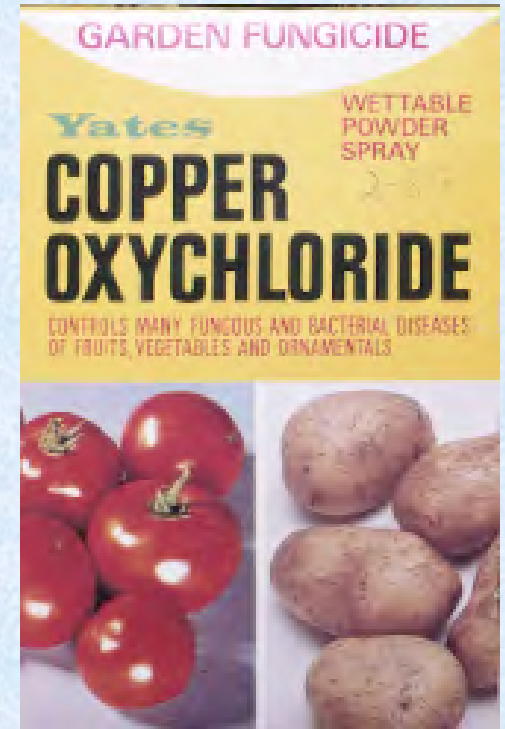
ARSENIC TREATMENT

- Chelation therapy
 - British Anti-Lewisite (BAL)
 - Succimer dimercaptosuccinic acid (DMSA)
- Intensive supportive care
 - Fluids

Gastrointestinal Toxicities

COPPER SOURCES

- Pesticides
 - Dips and orchard sprays
- Supplements (Oral & Injectables)



Gastrointestinal Toxicities

COPPER Toxicity

- Excess copper causes:
 - Haemolysis (oxidises RBCs)
 - Hepatocellular necrosis
 - Haemoglobinuria (red urine)

Gastrointestinal Toxicities

COPPER Clinical Signs:

- Abdominal pain & GI haemorrhage
- Thirst
- Salivation
- Vomiting
- Staggering gait
- Weak rapid pulse

Gastrointestinal Toxicities

COPPER Clinical Signs:

- Pale mucous membranes or jaundice
- Diarrhoea
- Prostration
- \pm Hypothermia



Pale mucous
membranes



Gastrointestinal Toxicities

COPPER Post mortem:

- Urine-Haematuria
- Liver-Swollen, bronze, nutmeg
- Kidneys-metallic sheen
- \pm Jaundice
- Gastroenteritis



Gastrointestinal Toxicities

COPPER TREATMENT

- \pm Chelation therapy
 - D-Penicillamine
- Supportive care
 - Fluids
 - Molybdenum and sulphate
 - bind to copper (gypsum CaSO_4)

COPPER Key Points:

- Sheep and calves
- Acute vs subacute vs chronic
- Haemolytic crisis (chronic)
- Liver enzyme \uparrow AST
- Copper levels in liver (?), kidney
- Prostration
- Metallic (gun metal) sheen to kidneys

Gastrointestinal Toxicities

ZINC Sources

- Facial eczema prophylaxis
- Galvanised metal fence, pipes
- Paints and zinc batteries



Gastrointestinal Toxicities

ZINC Sources

- Footrot baths
- Facial Eczema treatment cattle



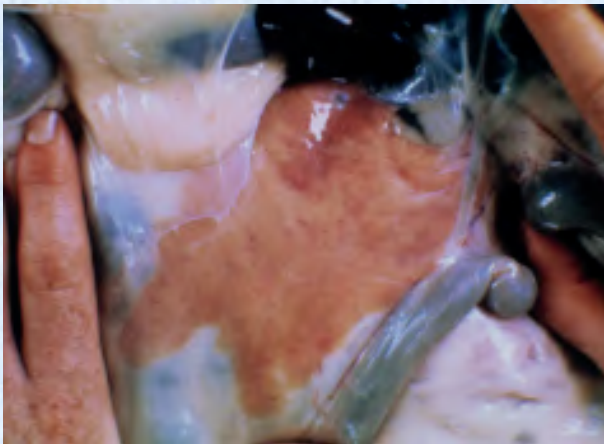
ZINC

- Vomiting
- Abdominal pain
- Dehydration
- Decreased production (e.g. milk)
- GI bleeding
- Haemolysis and haematuria
(monogastrics)

Gastrointestinal Toxicities

ZINC Diagnosis

- Post mortem pancreas & abomasum
 - abomasal oedema
 - abomasal necrosis
 - fibrotic pancreas



Gastrointestinal Toxicities

ZINC Diagnosis

Post mortem

Haemolytic crisis



Serum and Tissue zinc levels

(eg pancreas, liver, kidney)

Gastrointestinal Toxicities

ZINC TREATMENT

- Remove zinc
- Chelate zinc with baking soda, egg white and tannic acid
- Symptomatic and supportive care

- ± Chelation therapy e.g. BAL, CaEDTA
 - of questionable value in zinc toxicity but effective in birds



Gastrointestinal Toxicities

PHOSPHORISED PESTICIDES

Sources:

- Pesticide Use
 - White or yellow phosphorus
 - Toxicity - lethal dose:
 - rabbit 4 mg/kg, possum 6-10 mg/kg
 - dog < 1 mg/kg

Gastrointestinal Toxicities

PHOSPHORISED PESTICIDES

Toxicity

- Phosphorus oxidised to phosphate
- Protoplasmic poison
 - Extensive injury to organs and tissues
 - Strong irritant
 - damages hepatic cells - periportal

Gastrointestinal-Hepatic Toxicities

PHOSPHORISED PESTICIDES

Clinical Signs:

- Luminous vomit (+ garlic odour)
- Abdominal pain, Anorexia
- Haemorrhagic gastroenteritis
- Liver failure (latent phase)

Gastrointestinal Toxicities

PHOSPHORISED PESTICIDES

Clinical Signs/Effects

- Hypoprothrombinaemia
- Delayed photosensitivity in ruminants
- Hepatic and renal damage
- Oliguria

Gastrointestinal-Hepatic Toxicities

PHOSPHORISED PESTICIDES

- Clinical Pathology
 - Increase in liver enzymes
 - Increase in BUN (blood urea nitrogen)
 - Hypoglycaemia
 - Haematuria, albuminuria

Gastrointestinal-Hepatic Toxicities

PHOSPHORISED PESTICIDES

- Postmortem changes in liver
 - fatty degeneration
- Gastrointestinal irritation
 - haemorrhage, necrosis
- Renal tubular necrosis

Gastrointestinal Toxicities

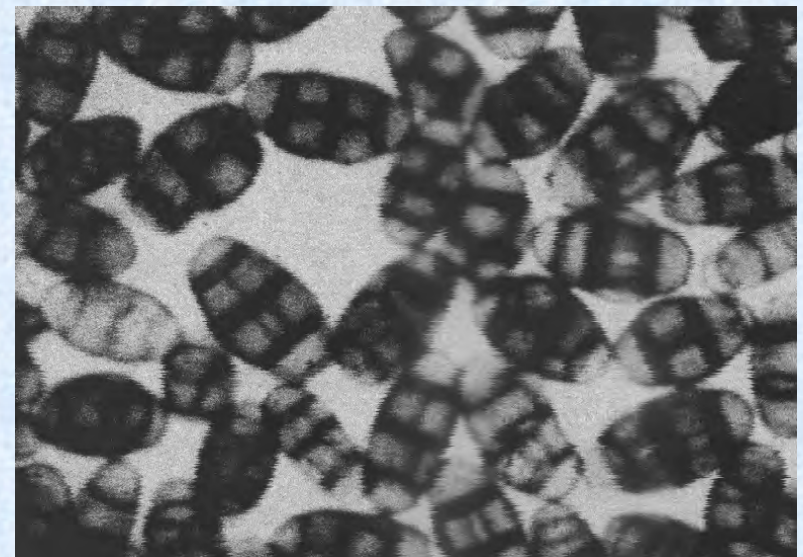
PHOSPHORISED PESTICIDES TREATMENT

- Early-copper sulphate 1%
- Symptomatic and supportive care
- DO NOT give Oils

Hepatic Toxicities

FACIAL ECZEMA

- *Pithomyces chartarum*
 - renamed as *Leptosphaerulina chartarum*
 - Sporidesmin toxin
- Ryegrass pastures



Hepatic Toxicities

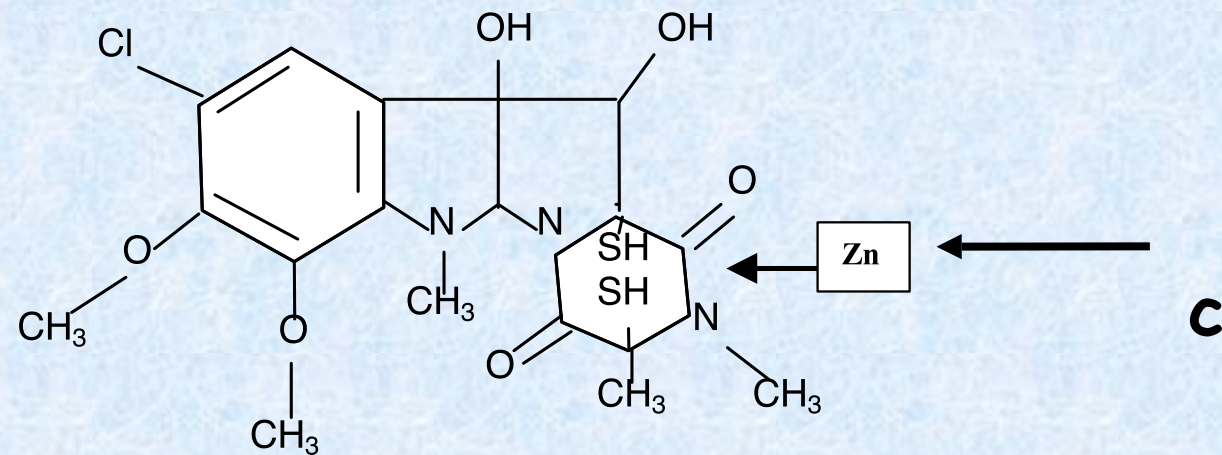
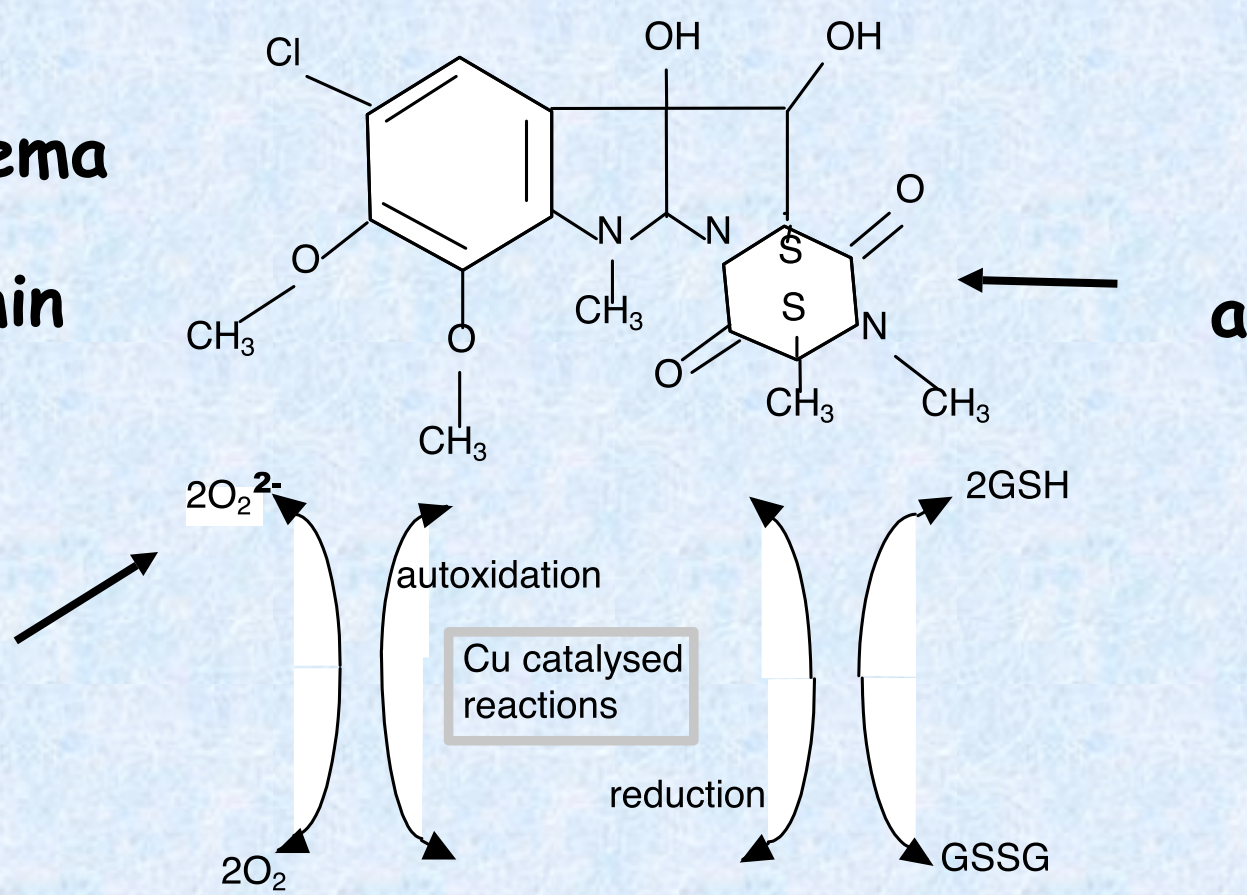
FACIAL ECZEMA

- Mechanism of action
 - Cycle of oxidation and reduction
 - Superoxide radicals form
 - Hepatic ductular epithelium injury
 - Biliary system obstruction
(pericholangitis)

Facial Eczema

sporidesmin

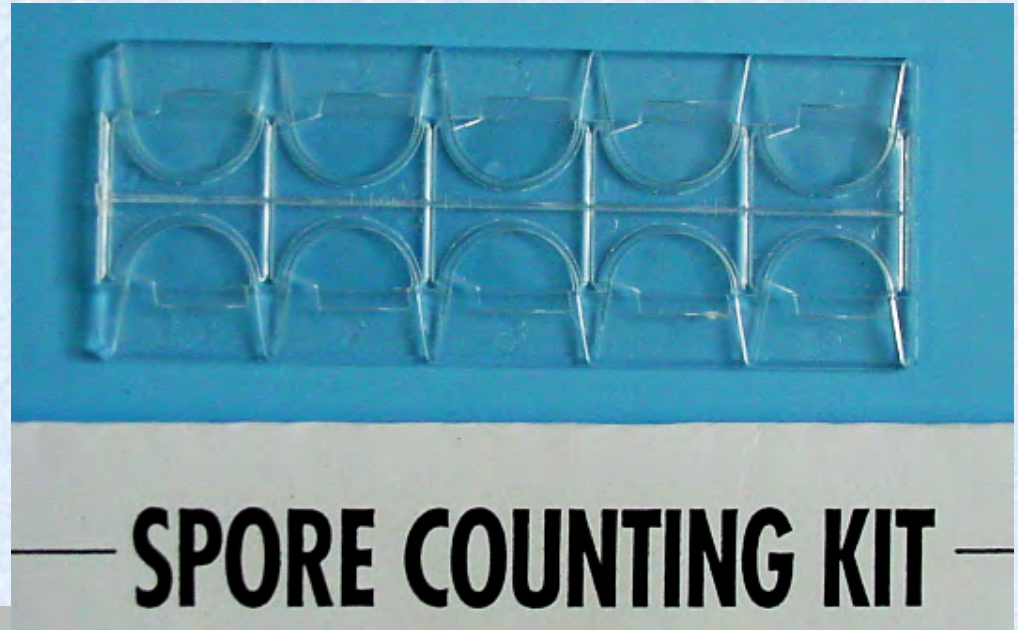
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Hepatic Toxicities

FACIAL ECZEMA

- Monitoring
- Spore counts



PRODUCTS REQUIRED:

Use Shoof monocular microscope

Shoof code: MXJX14

with 5 X eyepiece = 80 X mag.

Spore Counting Kit -5 pack

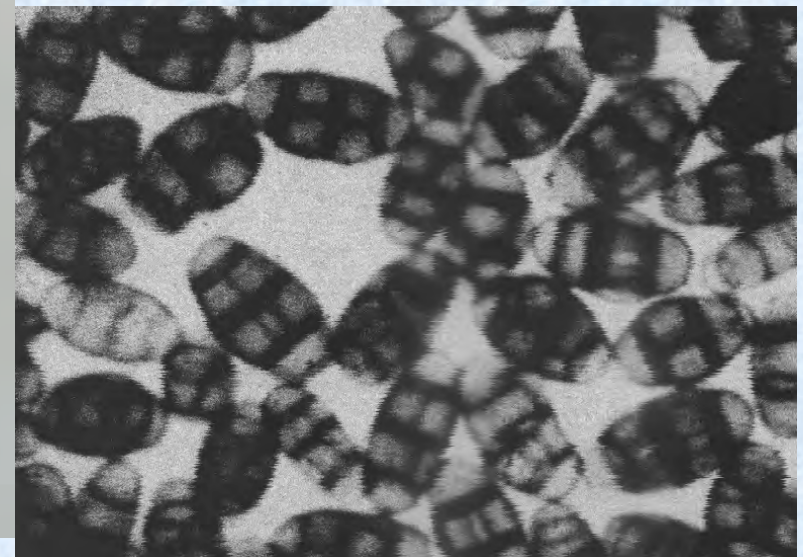
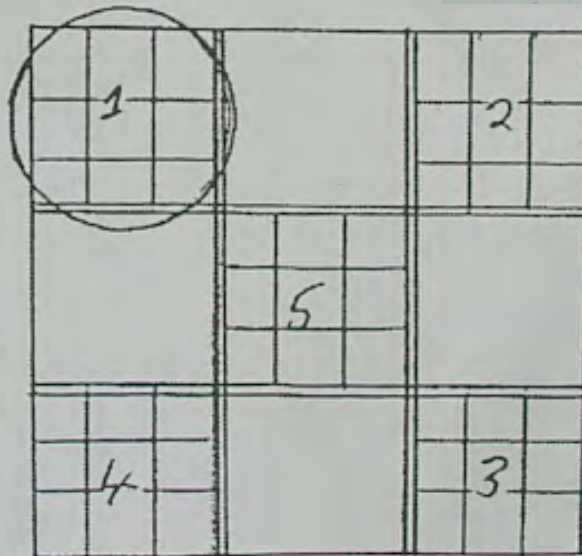
Shoof code: SCK5

Count corner and centre squares.

The small grid lines within the squares are to help counting only. In other words count all spores in the field of view. (see 1.)



Facial eczema spores look like miniature hand grenades!



Hepatic Toxicities

FACIAL ECZEMA

- Post mortem changes
 - boxing glove liver



Hepatic Toxicities

FACIAL ECZEMA PREVENTION

- Breed for resistance
- Pretreat with zinc
- Pasture treatment with fungicides
- Treatment-Symptomatic

Gastrointestinal-Hepatic Toxicities

PARACETAMOL

- Depletes glutathione
- Oxidative injury
 - dogs-liver
 - cats-RBCs

Gastrointestinal-Hepatic Toxicities

PARACETAMOL-DOGS

Also known as ACETAMINOPHEN

- Vomiting, Anorexia
- Tachycardia, Tachypnoea
- Abdominal pain
- \pm Methaemoglobinaemia
- Facial and paw oedema

Gastrointestinal-Hepatic Toxicities

PARACETAMOL-DOGS

- Acute hepatic centrilobular necrosis
 - 24-36 hours post ingestion
- * Not known to cause renal injury in dogs and cats but reported in humans

Gastrointestinal-Hepatic Toxicities

PARACETAMOL-CATS

- Cyanosis
- Vomiting
- Dyspnoea
- Oedema, face + paws



Gastrointestinal-Hepatic Toxicities

PARACETAMOL-CATS

- Methaemoglobinaemia,
 - Heinz body anaemia
- Hypothermia
- Depression

Gastrointestinal-Hepatic Toxicities

PARACETAMOL TREATMENT

- Symptomatic and supportive care
- N-acetylcysteine (Parvolex)
- Methaemoglobinaemia
 - Methylene blue or ascorbic acid

Gastrointestinal-Hepatic Toxicities

SUMMARY

- Phosphorus
 - Luminous vomit
- Chelation therapy
 - arsenic, copper, \pm zinc
- Paracetamol
 - Face and paw oedema

Gastrointestinal-Hepatic Toxicities

SUMMARY

- Facial Eczema
 - Photosensitisation
 - Boxing glove liver
- Zinc
 - Oedematous or fibrotic pancreas

Gastrointestinal-Hepatic Toxicities

BLUE-GREEN ALGAE

microcystins and nodularin

- Weakness
- Vomiting
- Diarrhoea
- Depression
- Hepatic necrosis



Gastrointestinal-Hepatic Toxicities

BLUE-GREEN ALGAE TREATMENT

- Symptomatic and Supportive care