

Rapid Immuno-electrophoretic Assays for Pen-Side Diagnostics

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Disruption of agrobusiness has large economic consequences

US livestock is extremely vulnerable to intentional (agroterrorism) and natural outbreaks of infectious diseases and agroterrorism poses a huge threat to economical and sociopolitical well-being



2001 Foot-and-Mouth Disease (FMD) outbreak in UK led to the slaughter of 4 million animals and \$40B in lost revenue

“Agroterrorism is not about killing cows...it’s an economic assault on national security and infrastructure”
Jerry Jaax, Ex-Chief of Vet. Med., USAMRIID

Pen-side diagnostic devices are needed for early detection and consequently, containment of an outbreak

Foot-and-mouth disease is dangerous to US livestock industry

- A highly communicable viral disease of cattle and swine
- Also affects sheep, goats, deer.

Symptoms: Fever, blisters and erosions on the tongue, lips, in the mouth, and between the hooves.

Outcome: -Many affected animals recover, but are debilitated
-severe loss in the production of meat and milk
-fatal in newborn animals

Inactivated swine influenza was used in place of FMD for this work

Live FMD work can only be performed at the USDA lab at Plum Island, NY

Swine flu virus was chosen to test our ability to detect a virus, as Influenza antibodies and viral samples are available

Bovine enterovirus was used as a negative control for swine influenza experiments

Why is it a threat?

Extremely contagious

Highly stable

Can survive in food

Can survive in water

Can survive in air

Can survive in soil

Can survive in feces

Can survive in urine

Can survive in sweat

Can survive in tears

Can survive in saliva

Can survive in blood

Can survive in lymph

Can survive in milk

Can survive in semen

Can survive in eggs

Can survive in embryos

Can survive in fetuses

Can survive in placentas

Can survive in amniotic fluid

Can survive in peritoneal fluid

Can survive in cerebrospinal fluid

Can survive in urine

Can survive in feces

Can survive in soil

Can survive in water

Can survive in air

Can survive in sunlight

Can survive in cold

Can survive in heat

Can survive in freezing temperatures

Can survive in boiling water

Can survive in autoclave

Can survive in formalin

Can survive in ether

Can survive in alcohol

Can survive in bleach

Can survive in hydrogen peroxide

Can survive in sodium hypochlorite

Can survive in iodine

Can survive in silver nitrate

Can survive in mercury

Can survive in cyanide

Can survive in arsenic

Can survive in lead

Can survive in cadmium

Can survive in chromium

Can survive in cobalt

Can survive in copper

Can survive in iron

Can survive in nickel

Can survive in tin

Can survive in zinc

Can survive in selenium

Can survive in tellurium

Can survive in vanadium

Can survive in molybdenum

Can survive in niobium

Can survive in tantalum

Can survive in tungsten

Can survive in uranium

Can survive in plutonium

Can survive in americium

Can survive in curium

Can survive in berkelium

Can survive in californium

Can survive in einsteinium

Can survive in fermium

Can survive in mendelevium

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