

Monograph

lantana camara poisoning in farm animals

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Introduction

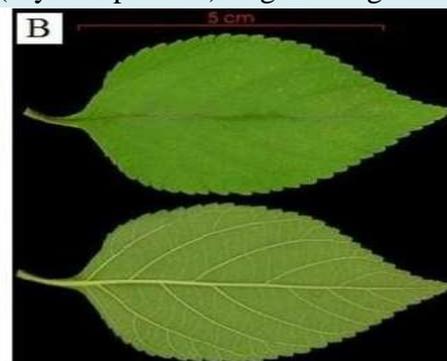
Lantana camara is one of the most commonly known noxious weed distributed worldwide. Common name of *lantana camara* is lantana; wild stage; bunch berry; family is *verbenaceae*. In India, the plant starts flowering season waves i.e., April–May and fruiting season waves continues till November–December. Identification of plant is by its red, pink-, white-, yellow-, or intermediate-colored flowers. All lantana should be treated as poisonous to stock. Red flowered varieties are thought to be the most toxic but some white and pink flowered varieties can also be highly toxic. The ingestion of plant foliage by grazing animals causes hepatotoxicity and is an important cause of livestock morbidity and mortality in lantana-infested regions.

Animal affected: -

- ❖ All ruminant including cattle (*Bos taurus* is more susceptible than *Bos indicus*) buffalo, sheep and goat.
- ❖ Non ruminant like horses, rabbit guinea pig, female rat.
- ❖ *Lantana camara* affect animal husbandry in two ways; morbidity and mortality due to ingestion of lantala foliage and loss of fodder due to its allelopathic effect so this plant called “double edges weapon”.

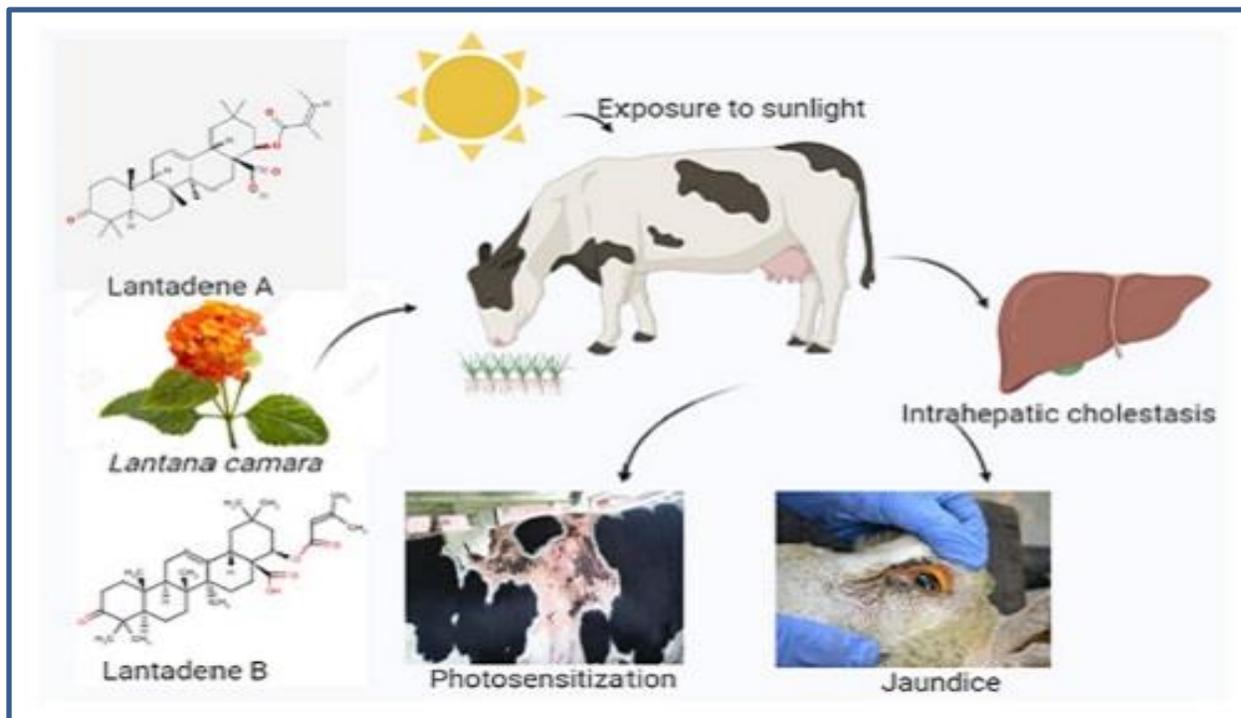
Toxic principle: -

Lantana hepatotoxins are ‘pentacyclic triterpenoid’ called lantadenes which present in leaves of lantana plant. Some major lantadenes are lantadene A, B, C and D which have a common core structure of 22-hydroxy-oleanoic acid. Most common & toxic taxa of *lantana camara* is Lantadene A. Toxic dose nearly 5g (dry leaf powder) / kg B. weight.



Toxicity in Animals

Significant lantana toxins are the triterpene acids, lantadene A (rehmannic acid), lantadene B, and their reduced forms. A toxic dose for a 500 kg cow varies from about 5 to 20 kg of fresh leaf (one percent or more of an animal's body weight), depending on the toxin content of the lantana eaten.



Mechanism of Action

Ingestion of lantana foliage causes intrahepatic cholestasis, hepatotoxicity and secondary photosensitization. Lantana manifests its toxicity in mainly two phases: -

1. GIT phase
2. Hepatic and post hepatic phase.

1. GIT Phase

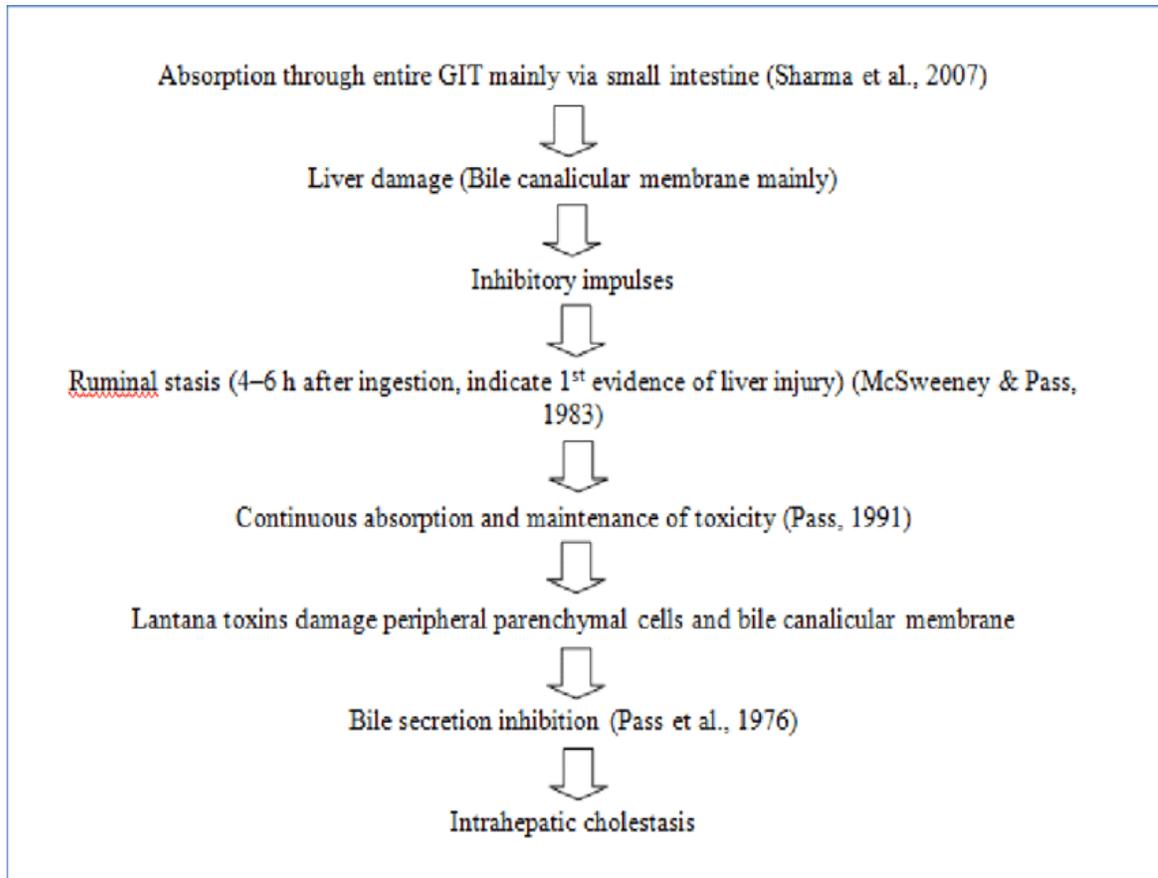
- ❖ Ingestion of lantana plant and content goes into rumen.
- ❖ Absorption of toxin from all parts of GIT but mainly from small intestine.
- ❖ Biotransformation of lantadene A and B has been observed in caecum of guinea pig.

2. Hepatic and Post hepatic Phase

- ❖ The toxins are transported to the liver by portal blood.
- ❖ The absorbed toxin interacts with hepatocytes and causes intrahepatic cholestasis.
- ❖ Ingestion of lantana toxin causes paralysis of the gall bladder and closure of bile canaliculi, which probably elicits a decrease in bile flow.
- ❖ Cholestasis causes regurgitation of bile, which causes an increase in the level of bilirubin and phylloerythrin (biodegradation product of chlorophyll). Both bilirubin and

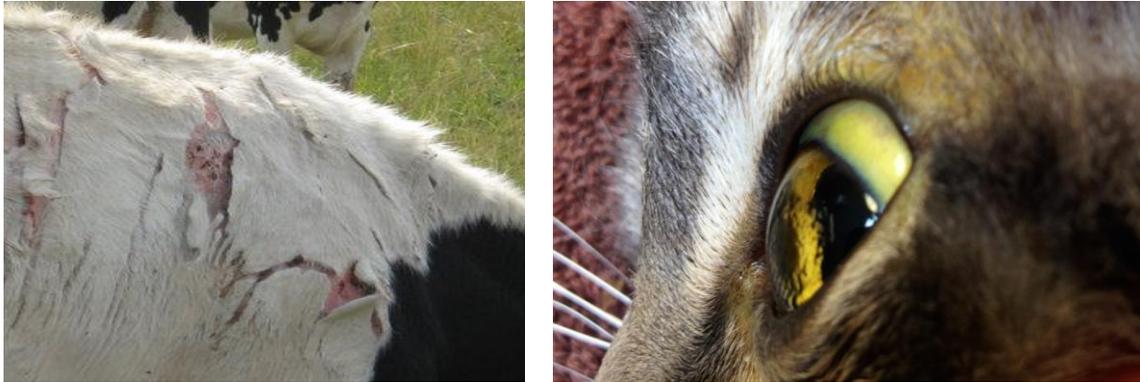
phylloerythrin bind protein and they undergo phytochemical reaction on exposure to light which causes photosensitization and associate skin lesion.

- ❖ Retention of bilirubin causes severe jaundice.
- ❖ Cholestasis causes ruminal stasis they further injury to liver.



Clinical signs

- ❖ Causes Hepatotoxicity, cholestasis and photosensitization.
- ❖ Ruminal stasis, animal goes off feed within couple of hours.
- ❖ Constipation, within 24-48 hours these develop severe jaundice.
- ❖ Conjunctiva of eye, mucous membrane of vagina rectum become icteric.
- ❖ Eyelid become swollen & fissure appear on the muzzle, ear tip and non-hairy part of body.
- ❖ Terminal renal failure occur in affected animal.
- ❖ In exposure to light photosensitization occurs and form skin lesion.



- Fig. 1. Cattle may become sun sensitive and their skin may blister after eating lantana.
- Fig. 2. Jaundice (yellow discolouration) of eye.

Postmortum findings

- ❖ Liver is ochre coloured & greatly swollen and distended gall bladder.
- ❖ Impaction of faeces in colon.
- ❖ Adrenals are enlarged & thickened cortex turns yellow.
- ❖ Rumen contents usually dry and undigested.

Clinical pathology

- ✓ Lantana intoxication in guinea pig causes a decrease in liver dry weight, protein and DNA content while the amount of lipid in liver increases.
- ✓ Activity of oxidative enzymes of mitochondria or cytosol are elevated and drug metabolism are decrease and similarly activity of cytosol glutathion s-transferase is significantly decrease.
- ✓ The output of lipid peroxides by a number of tissues of lantana affected guinea pigs decreases.
- ✓ And is attributed to enhance activity of glutathion peroxidase and hyperbilirubinamia, increase haemoglobin, urea, RBC, WBC.

Treatment

- Administered a single dose of activated charcoal (5g/kg) to bind the toxin in the rumen and prevent further absorption.
- In cattle 2.5kg of powdered charcoal in 20 lit of multiple electrolyte solution by stomach tube.
- In sheep 0.5 kg charcoal in 4 lit of fluid is enough.
- Give hepatoprotective agent to tone up liver.
- give antihistaminic and antibiotics to care secondary photosensitization lesion.
- Keep the animal in well shed area which away from direct sun light if photosensitization develop.

Aversion Therapy

- Aversion therapy involves conditioning of animal before they are left for grazing in pasture infested with poisonous plants.
- This approach has been investigated for larkspur (*Delphinium barbeyi*) toxicity.
- Yearling heifers were intraruminally infused with lithium chloride while the animal was consuming tall larkspur.

- The animal got conditioned to associating the lithium chloride induced stress with the ingestion of larkspur foliage.

Vaccination

- Antibodies against lantadene A and B could be detected in sheep and cattle after injection of the conjugates of this compound with suitable proteins.
- On the administered of lantadene A or lantana to the vaccinated animal, there was decrease in the severity but the protection was weak.

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