

CARDIOMYOPATHY CAUSED BY AVOCADO (*Persea Americana* Mill) LEAVES

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ABSTRACT

Six of 21 goats feeding on fresh avocado (*Persea americana*) leaves from pruned trees, showed clinical signs of cardiac distress. Some sheep subsequently dosed experimentally at different dosage rates with the same and other avocado varieties, showed clinical signs of respiratory or cardiac distress and myocardial lesions at autopsy.

Key words: Avocado, *Persea americana*, myocardial lesions, small stock poisoning

Grant R.; Basson P.A.; Booker H.H.; Hofherr J.B.; Anthonissen M. **Cardiomyopathy caused by avocado (*Persea americana* Mill) leaves.** *Journal of the South African Veterinary Association* (1991) 62 No. 1, 21-22 (En.) Central Veterinary Laboratory, P. Bag X13187, 9000 Windhoek, Namibia.

Twenty-one goats in the Tsumeb district of northern Namibia were fed on freshly cut avocado (*Persea americana* Mill) leaves to supply green fodder during a drought. Three goats died during the subsequent 3 days while another 3 showed signs of general weakness and remained in sternal recumbency. These animals breathed with difficulty at a rate of 28 to 32 cycles per min. Their mucous membranes were slightly cyanotic and their pulses were strong with rates of 84 to 112 per min. All 3 goats had normal rectal temperatures and were anorexic.

Despite the immediate withdrawal of the avocado leaves, all 3 affected goats died within a month. Unfortunately none of the animals that died on the farm were available for post mortem examination. Although the specific variety of avocado could not be identified with certainty, they apparently all originated from saplings of the Fuerte variety with under-stems of Mexicola. The above-mentioned evidence prompted experimental feeding of the avocado leaves to sheep in order to verify their toxicity.

Leaves stored at 4°C from the original Fuerte variety which poisoned the goats,

were only available for one week of the feeding trial (Sheep A and B). Subsequently, leaves from other varieties had to be used for dosing (Sheep C and D). Animals were kept in stables, had free access to water and were supplied with small quantities of lucerne. The fresh avocado leaves were ground and dosed to 4 sheep via rumen fistulae as summarised in Table 1. Blood samples were collected daily from all the experimental sheep. Samples were collected in vacutainers containing EDTA and the following determinations were done on every sample: haematocrit, leucocyte count, differential white cell count, blood urea nitrogen, gamma glutamyltransferase, alanine transaminase and alkaline phosphatase. Autopsies were performed on Sheep A, which died naturally on Day 5, and Sheep B and C which were slaughtered on Day 21 and Day 32 respectively. Sheep D was returned to pasture after being dosed for 31 d.

Specimens of the heart, lung, liver, kidney, spleen, lymph nodes, brain and intestines were preserved in 10% buffered formalin, and processed routinely for sectioning and microscopic study. Sections were stained with haematoxylin and eosin.

A summary of the most pronounced clinical signs is presented in Table 1. An elevated blood urea nitrogen concentration (10,7 mmol l⁻¹), persisted from Day 17 to Day 21 in Sheep B. An arrhythmic

heart rate was established in Sheep C at Day 30. In Sheep C, the leucocyte count increased within 2 d of dosing to $>10 \times 10^9 \text{ l}^{-1}$ and remained at this level for the rest of the experimental period. It was also observed that the blood sample from this animal took longer to clot than the other samples collected from the other sheep at the same time. Sheep D showed no clinical signs of disease. A leucocytosis was observed one day after the dosage rate was increased to 26g kg⁻¹. The leucocyte count remained above $10 \times 10^9 \text{ l}^{-1}$ for 17 d and then dropped back to normal.

Microscopic lesions were mainly confined to the heart, and were most pronounced in Sheep A. Cardiac myofibres showed multifocal hydropic degeneration, coagulative Zenker's type necrosis, fragmentation and lysis. The myocardium was intensely congested. The myofibre degeneration and necrosis were occasionally accompanied by a mild neutrophil and macrophage reaction. Cell debris was noticeable in the lumen of the capillaries. Mild changes of a non-specific, subacute, multifocal mixed-cell (neutrophils and macrophages) or mononuclear myocarditis were present in Sheep B and C. Hydropic and fatty changes were present in the livers of Sheep A and B in conjunction with mild nephrosis and mild karyorrhexis of the spleen.

Both circumstantial and experimental evidence suggest that ingestion of large quantities of avocado leaves for more than 3 d could cause mortalities in small stock. It also appears that the toxicity of different varieties of avocado trees may vary, some causing acute lesions which may be fatal, while others merely cause heart lesions without clinical manifestations or might have no effect. Unfortunately the exact strain of the trees involved could not be ascertained.

Kingsbury¹ reported that the leaves, fruit and seeds of avocado trees could be toxic to cattle, goats, rabbits, canaries and fish. Rabbits fed on leaves of Fuerte and Nabal strains died within 24 h, whereas those fed on the Mexicola variety developed no symptoms. The only symptoms described were mastitis and decreased milk production in cattle, and mortalities in goats and canaries which were fed

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Received: August 1987 Accepted: October 1990

Table 1: Summary of dosage regimens and clinical signs encountered with experimental dosing of avocado leaves to sheep

Sheep No.	Dose g kg ⁻¹ day ⁻¹	Trial period (d)	Fate	Clinical signs	Macroscopical pathological changes
A*	25	5	Died	Submandibular oedema	Submandibular oedema, ascites, hydropericardium, subepi- and endocardial haemorrhages. Mild degeneration of liver and kidneys
B*	5,5	21	Slaughtered	Condition poor	Mild ascites, hydropericardium, mild hepatic degeneration
C	2,5	32	Slaughtered	Cardiac arrhythmia	Mild hydropericardium. Mild congestion and oedema of the brain. Degeneration of the myocardium
D	13 25	15 15	Turned to pasture	Slight dyspnoea on Day 15 of dosing	

*These sheep received the suspected poisonous variety

on the fruit. No lesions were reported.

The clinical signs of the natural outbreak, resembled "slangkop" (*Urginea sanguinea*) poisoning in goats in some respects. However, diarrhoea and bloat were absent in the affected animals. The other clinical signs of "slangkop" poisoning

in goats such as cardiac arrhythmia, weakness and disinclination to move, dyspnoea and salivation were however noticeable in the sheep poisoned by the avocado leaves.

In conclusion it can be stated that avocado leaves could be toxic to stock, by causing acute heart failure, when large

amounts of leaves are consumed for longer than 3 days.

REFERENCES

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