

# Developing a self-medication strategy for practical delivery of long-lasting analgesia to cattle

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The aim of our study was to examine the palatability and pharmacokinetics of medicated molasses lick blocks (MMLBs) when offered *ad libitum* to calves.

The experiment consisted of two 7-day phases. During the first phase, un-medicated molasses lick blocks (MLBs) were provided *ad libitum* to a group of nine calves. Amount of the MLBs consumed was measured daily. Medicated molasses lick blocks (MMLBs) were formulated with 1 g meloxicam per 1 kg molasses lick block. This dose rate was based on average daily consumption of MLBs by the group of calves and average body weight of calves, to provide an estimated dose rate of 1.5 mg meloxicam per kg body weight. Phase 2 of the experiment followed the same methodology as phase 1, except using MMLBs instead of MLBs. During phase 2 of the experiment, a blood sample was collected from each calf daily. High-pressure liquid chromatography analysis with ultraviolet detection was utilised to determine the concentration of meloxicam in plasma from each blood sample.

During stage 1 of the experiment, calves ( $n = 9$ ) consumed 2.87 kg of the MLBs daily, on average (1.51 g per kg average body weight). During stage 2 of the experiment, calves ( $n = 9$ ) consumed 3.66 kg of the MMLBs daily, on average (1.61 g per kg average body weight). Average daily plasma meloxicam concentration of the calves ( $n = 9$ ) ranged between 3.62 and 6.96 µg/mL (**Table 1**).

**Table 1. Average plasma meloxicam concentration of all calves on each day**

Day	Meloxicam concentration (µg/mL)		
	Average	SD	CV (%)
1	5.36	3.17	59.16
2	6.96	3.17	45.55
3	5.46	3.90	71.44
4	6.12	4.06	66.38
5	4.87	3.16	64.80
6	3.62	2.07	57.25
7	4.32	2.57	59.50

It did not appear that addition of meloxicam into MLBs affected palatability, with calves consuming a similar amount of MLBs and MMLBs per kg of body weight. The average daily plasma concentrations of meloxicam were similar to, and generally higher than concentrations reported in previous studies that have investigated the pharmacokinetics and efficacy of oral meloxicam in cattle (Allen *et al.* 2013; Coetzee *et al.* 2014). In such studies, oral meloxicam was shown to be effective at relieving pain caused by cautery dehorning (Allen *et al.* 2013) and experimentally induced lameness (Coetzee *et al.* 2014). The current study has demonstrated the concept of self-administration of meloxicam by calves. Based on previous literature (Allen *et al.* 2013; Coetzee *et al.* 2014), daily average plasma concentrations of meloxicam resulting from this self-administration method of delivery are likely to result in analgesia. Future research should aim to investigate efficacy and safety of MMLBs in cattle.

## References

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