

TRANSFER OF CADMIUM TO ANIMALS FROM FORAGES

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Knowledge that forage crops will accumulate a significantly higher concentration of cadmium (Cd) than ryegrass and clover has been well publicised in New Zealand scientific communications over the past three years. Chicory, in particular, can accumulate a Cd concentration in the order of 5 mg/kg (dry weight DW) which is 50 times more than rye grass (0.1 mg/kg). The question that must be asked is 'so what'? Guidelines already prohibit the human consumption of offal from sheep and beef older than 30 months to mitigate risk of Cd exposure, and there has been no reports of Cd accumulation in meat and milk. So from the perspective of animal residue levels, Cd in forage crops is only an issue if retention in animal's bodies is at a rate much quicker than is currently expected.

Over the summer of 2016/2017, groups of lambs at four locations around the North Island (Tangimoana, Waipukurau, and two farms near Taihape), were separately fed ryegrass or one of lucerne, chicory or plantain. Serial liver biopsy samples were taken at up to four time points, over an approximately four-month period. The Cd concentration in liver samples was determined, and compared with the Cd concentration in forage at the time. The maximum Cd concentration in chicory (0.85 mg/kg FW) was significantly higher than in rye grass at the same farm (0.04 mg/kg) and this transferred to a significantly higher concentration of Cd in liver (0.74 and 0.13 DW for chicory and rye grass respectively). However, at no time did the Cd concentration in liver exceed the European Commission or New Zealand maximum limit (fresh weight) for Cd in foodstuffs.

The results from this initial study have provided a first insight into the impact of forage crops on trace element cycling in animals. Ongoing work will assess whether Cd is excreted once diet changes, and the interactive effect of other elements such as Zn and Cu (which can also be high in forage crops) on Cd retention.

Editor's Note: An extended manuscript has not been submitted for this presentation.