Fate of ptaquiloside—A bracken fern toxin—In cattle

Ptaquiloside is a natural toxin present in bracken ferns (Pteridium sp.). Cattle ingesting bracken may develop bladder tumours and excrete genotoxins in meat and milk. However, the fate of ptaquiloside in cattle and the link between ptaquiloside and cattle carcinogenesis is unresolved. Here, we present the toxicokinetic profile of ptaquiloside in plasma and urine after intravenous administration of ptaquiloside and after oral administration of bracken. Administered intravenously ptaquiloside, revealed a volume of distribution of 1.3 L kg⁻¹ with a mean residence-time of 4 hours. A large fraction of ptaquiloside was converted to nontoxic pterosin B in the bloodstream. Both ptaquiloside and pterosin B were excreted in urine (up to 41% of the dose). Oral administration of ptaquiloside via bracken extract or dried ferns did not result in observations of ptaquiloside in body fluids, indicating deglycosidation in the rumen. Pterosin B was detected in both plasma and urine after oral administration. Hence, transport of carcinogenic ptaquiloside metabolites over the rumen membrane is indicated. Pterosin B recovered from urine counted for 7% of the dose given intravenously. Heifers exposed to bracken for 7 days (2 mg ptaquiloside kg⁻¹) developed preneoplastic lesions in the urinary bladder most likely caused by genotoxic ptaquiloside metabolites.

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