

8 Transfer of melamine from feed to milk and from milk to cheese and whey in lactating dairy cows fed single oral doses

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8.1 Abstract

A study was conducted to evaluate the excretion pattern of melamine from feed into milk, and the transfer to cheese and whey. The presence of cyanuric acid was also investigated. Milk samples were collected from lactating dairy cows fed a single melamine dose (0.05, 0.5, 5 or 50 g per cow). Cheese was produced from melamine-tainted milk at lab-scale. Melamine and cyanuric acid were extracted using an SPE cartridge, and analyses were carried out by LC-MS/MS. The maximum melamine concentrations occurred 10-16 h after treatment and increased cubically with dose, ranging from 0.019 to 35.105 mg/kg. More than 60% of melamine was excreted into milk within 30h after melamine ingestion. Melamine was not detectable in milk 7 days after treatment (LOD = 0.002 mg/kg), and at the lowest dose disappeared already on day 5. The urea content of milk was linearly influenced by melamine ingestion. During cheese-making, melamine transferred mainly in whey. The cyanuric acid was never detected in any samples (milk, cheese and whey). The excretion pattern of melamine in milk and whey may represent a health concern when cows are fed melamine over 0.5 g day⁻¹ (about 10-fold higher than the European allowed limit for melamine in feeds). While only in cases of high melamine ingestion (5 and 50 g day⁻¹), the cheeses contained illegal amounts of melamine. The results confirmed that melamine contamination of milk and milk by-products may not be related only to direct contamination, but also to adulteration of animal feeds.

Keywords: melamine, cyanuric acid, milk, excretion pattern, cheese, whey