

Follow-up of the 2013 aflatoxin issue in maize from the Balkan Area

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Background

Aflatoxin B₁ (AFB₁) present in maize based feed caused elevated concentrations of aflatoxin M₁ (AFM₁) in milk, not above European legal limits, in the Netherlands in 2013. The AFB₁ concentrations, up to 250 µg/kg, were not detected during routine controls. Recently, EU legislation on sampling procedures has been adjusted to Regulation (EU) No 691/2013. The issue also raised questions on the percentage of carry-over of AFB₁ to AFM₁ in milk.



Objective

The aims of this research were to gain more insight in the distribution of AFB₁ contamination in a large shipment of maize and to gain insight in the carry-over of AFB₁ from feed to AFM₁ in the cow's milk.



Methods

Comparison of sampling procedures

A large shipment of maize for feed from Serbia was sampled according to EU Regulation (EC) No 152/2009 which resulted into a total of four aggregate samples. The same shipment was also sampled according to EU Regulation (EU) No 691/2013 and a total of 140 samples were collected. Of these, 70 samples were analysed individually for AFB₁.

Carry over of AFB₁ in feed in milk

Scientific literature was reviewed to obtain insight into the carry-over of AFB₁ in feed into AFM₁ in the milk from dairy cows.

Results

- AFB₁ concentrations of the four aggregate samples - collected according to Regulation (EC) No 152/2009 - ranged between 12 and 58 µg/kg, with an average of 36 µg/kg.
- AFB₁ concentrations in the 70 of the 140 samples - collected according to Regulation (EU) No 691/2013 - showed a large variation, from 6 to 168 µg/kg, with an average of 51 µg/kg.
- Literature results showed large variations in carry-over percentage, partly related to milk yield (Table 1), up to 6%.

Table 1. Overview of carry-over of AFB₁ in feed to AFM₁ in milk, reported in literature.

Origin	Carry-over value (%)	Milk yield (kg/day)	Reference
AFB ₁ -in capsule (purity 99.0%)	0.9-2.3	12.5-22.5	Japanese-Food-Safety-Commission 2013
AFB ₁ -spiked on maize meal	5.8	44.7 ± 5.7	Britzi <i>et al.</i> 2013
	2.5	29.8 ± 2.6	
AFB ₁ -bolus of a naturally contaminated maize meal	2.3	34.8 ± 4.6	Masoero <i>et al.</i> 2009
	2.7	41.8 ± 8.4	
	1.5	21.7 ± 3.9	
	1.3	21.2 ± 3.8	
AFB ₁ -contaminated feed	2.3	<10	Diaz <i>et al.</i> 2004



Conclusions

- Aflatoxin B₁ is heterogeneously distributed in the maize shipment.
- Increasing the number of sub-samples led to a reduced standard deviation.
- Carry over rate of AFB₁ to AFM₁ in the milk can be as high as 6 %.

References

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