

Aflatoxin: Food chain transfer from feed to milk

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Aflatoxins are formed by moulds of the genus *Aspergillus* under unfavourable conditions in feedstuffs. These mycotoxins are of great importance due to their high toxicity and strong carcinogenicity. Aflatoxin M₁ is a metabolite of aflatoxin B₁ formed in the liver that can be detected in milk when aflatoxin B₁ contaminated feed is used. In the WHO Global Burden of Disease (GBD) report, aflatoxin is one of the main issues. The intake of aflatoxins with food, even the regular intake of small amounts, causes serious health risks, which should be avoided at any rate. When looking at the aflatoxin problems in milk, efforts should focus on minimizing the exposure of dairy animals to aflatoxin containing feed.

After in 2013 aflatoxin contaminated feed was fed to dairy cows in Germany, some farms had to stop milk delivery and to discard the milk. Subsequent residue studies showed that the carry-over of aflatoxin B₁ from feed into milk was higher than the assumed rate of 1-2%. It seemed that high-yielding cows (> 30 kg milk yield/day) had a higher carry-over rate of approx. 6%, which is in coincidence with investigations from Israel with extremely high-yielding cows (> 11,000 kg/year).

The estimation of the transfer rate of aflatoxin M₁ is of major importance in order to determine the acceptable aflatoxin B₁ intake from feed. A maximum residue limit of 5 µg/kg in compound feed for dairy cattle, has been established for the EU (EU 574/2011). In the food sector, the maximum levels are set to achieve the following limits for aflatoxin M₁ in milk (EU Regulation 165/2010): Milk: 50 ng/kg; Infant milk formula and follow-on milk: 25 ng/kg; according to the German Contaminants Ordinance (Kmv 2010), the value for dietary foods for babies or infants has been further reduced to 10 ng/kg. If the carry-over rate exceeds 1-2%, the maximum MRL of 50 ng/kg for milk, cannot be achieved by feeding compounds fulfilling the limit of 5 µg/kg.

Therefore, a carry-over experiment of aflatoxin B₁ into milk with high-yielding cows was performed at the experimental station of the MRI. The calculated carry-over was about 2% (range 1-3%), which is consistent with literature data (1 to 6%). These results show, that the current limit for feed (5 µg/kg AFB₁) even in high-yield cows the residue level of 50 ng/kg AFM₁ in milk can be kept.

In addition to the carry-over experiment part of the milk produced was processed into cheese (Edamer type) and yoghurt after reaching the plateau of aflatoxin M₁ excretion. For cheese the distribution of toxin in whey and curd was 75% and 25% respectively. During ripening no degradation was observed. The same was due for yoghurt.