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## **Mycotoxins in feed**

### **Deoxynivalenol, T2 and HT2 toxin, zearalenone, fumonisins and ochratoxin A**

#### **General comments**

- \* year-to-year variation : information has to be provided based on the EFSA data
- \* EURL to provide an overview of the availability of analytical methods for the analysis of the different mycotoxins in feed (screening methods and confirmatory methods)
- \* for levels for complete feed which are stricter than the EFSA Reference point for adverse animal health effects based on additional information from Member States and which are contested by stakeholders: request EFSA assessment of Member States additional information to verify reference point for adverse animal health aspect needs to be modified.
- \* occurrence data for feed materials to be verified to check if certain levels of feed materials have to be increased. → EFSA data verified - levels for feed materials are at levels significantly above the 95<sup>th</sup> percentile, except T-2 and HT-2 in oats → higher guidance level proposed

# **1) Approach**

## **Feed materials**

Establishment of guidance levels in a Commission Recommendation for feed materials, based on the available occurrence data according to As Low As Reasonably Achievable (ALARA), and taking into account the year-to-year variation, climate change, the large variety of feed materials, etc...

## **Complementary feed**

Application of Article 6 of Directive 2002/32/EC on undesirable substances: “ *Insofar as there are no special provisions for complementary feed, Member States shall prescribe that complementary feed may not, taking into account the proportion prescribed for their use in a daily ration, contain level of the undesirable substances listed in Annex I that exceed those fixed for complete feed.*”

In the Commission Recommendation with the guidance levels, some recommendations can be mentioned as regards examinations /investigations to be performed in case the complementary feed contains a level of the mycotoxin higher than the maximum level of complete feed but the level is below the maximum level for complete feed when the proportion in a daily ration is taken into account.

## **Complete feed**

Establishment of maximum level in complete feed, taking into account the Reference Point for Adverse Animal Health Effect (NOAEL/LOAEL)).

In case the current guidance level as established in Commission Recommendation 2006/576/EC is below the level reflecting the Reference Point for Adverse Animal Health Effect and there has been no problem as regards compliance with the current guidance level in the past 15 years, it might be appropriate in certain cases to establish the maximum level not at the level reflecting the Reference Point for Adverse Animal Health Effect, but lower (but not any lower than the current guidance level) as it is important to ensure that prevention measures/good practices continue to be applied by all operators in the feed chain.

## 2 ) Regulatory levels for deoxynivalenol

|  | Guidance level in mg/kg (ppm)<br>relative to a feedingstuff with a<br>moisture content of 12% |
|--|---|
| <b>Feed materials (*)</b>  |   |
| Cereals and cereal products (**) with the exception of<br>maize and maize products | 6.0   |
| Maize and maize products (***)   | 10.0  |
| Sugar beet products  | 5.0   |

(\*) Particular attention has to be paid to feed materials fed directly to the animals that their use in a daily ration should not lead to the animal being exposed to a higher level of mycotoxins than the corresponding levels of exposure where only the complete feedingstuffs are used in a daily ration.

(\*\*) The term 'Cereals and cereal products' includes primarily the feed materials listed under heading 1 'Cereal grains and products derived thereof' of the list of feed materials referred to in part C of the Annex to Commission Regulation (EU) No 2017/1017 of 15 June 2017 on the catalogue of feed materials (OJ L 159, 21.6.2017, p. 48) but also other feed materials derived from cereals in particular cereal forages and roughages.

(\*\*\*) The term 'Maize and maize products' includes not only the feed materials listed under heading 1 'Cereal grains and products derived thereof' of the list of feed materials referred to in part C of the Annex to Commission Regulation (EU) No 2017/1017 of 15 June 2017 (OJ L 159, 21.6.2017, p. 48) but also other feed materials derived from maize in particular maize forages and roughages.

|  | Maximum level in mg/kg (ppm)<br>relative to a feedingstuff with a<br>moisture content of 12% |
|--|--|
| <b>Complete feed</b>   |  |
| Complete feed with the exception of:                             | 5.0 (*)  |
| - complete feed for pigs   | 0.7  |
| - complete feed for calves (< 6 months), lambs, kids and<br>dogs | 2.0  |
| - complete feed for rabbits                                      | 4.0  |
| - complete feed for fur animals                                  | 1.0  |
| - complete feed for fish   | 0.5  |

(\*) Based on NO comments lower levels were considered (i.e. 2.0 ppm) for complete feed for horses and poultry other than laying hens → to request EFSA to assess the comments from NO as justification for lower levels.

### 3 ) Regulatory levels for the sum of T-2 and HT-2 toxin

|   | Guidance level in mg/kg (ppm)<br>relative to a feedingstuff with a<br>moisture content of 12% |
|---|---|
| <b>Feed materials (*) (**)</b>                  |   |
| Oats (with husk)                                | 1.0 → 1.5   |
| Cereals other than oats (with husk)             | 0.2   |
| Oat milling products (including husk)           | 3.0   |
| Cereal products other than oat milling products | 0.5   |

(\*) Particular attention has to be paid to cereals and cereal products fed directly to the animals that their use in a daily ration should not lead to the animal being exposed to a higher level of these mycotoxins than the corresponding levels of exposure where only the complete feedingstuffs are used in a daily ration.

(\*\*) The reference to cereals, oats and cereal products includes not only the feed materials listed under heading 1 'Cereal grains and products derived thereof' of the list of feed materials referred to in part C of the Annex to Commission Regulation (EU) No 2017/1017 of 15 June 2017 on the Catalogue of feed materials (OJ L 159, 21.6.2017, p. 48) but also other feed materials derived from cereals, in particular cereal forages and roughages

(Based on the EFSA data, 1.5 mg/kg in oats is significantly above the 95<sup>th</sup> percentile)

|   | Maximum level in mg/kg (ppm)<br>relative to a feedingstuff with a<br>moisture content of 12% |
|---|--|
| <b>Complete feed</b>                                      |  |
| Complete feed with the exception of                       | 0.2  |
| - complete feed for adult ruminants, laying hens and fish | 0.5  |
| - complete feed for poultry other than laying hens        | 0.1  |
| - complete feed for cats                                  | 0.05   |

#### 4 ) Regulatory levels for zearalenone

|  | Guidance level in mg/kg (ppm)<br>relative to a feedingstuff with a<br>moisture content of 12% |
|--|---|
| <b>Feed materials (*)</b>  |   |
| Cereals and cereal products (**) with the exception of<br>maize and maize products | 1.0   |
| Maize and maize products (***)   | 2.0   |
| Sugar beet products  | 0.5 → 2.0   |
| Oilseeds and derived products  | 0.5   |

(\*) Particular attention has to be paid to feed materials fed directly to the animals that their use in a daily ration should not lead to the animal being exposed to a higher level of these mycotoxins than the corresponding levels of exposure where only the complete feedingstuffs are used in a daily ration.

(\*\*) The term 'Cereals and cereal products' includes not only the feed materials listed under heading 1 'Cereal grains and products derived thereof' of the list of feed materials referred to in part C of the Annex to Commission Regulation (EU) No 2017/1017 of 15 June 2017 on the Catalogue of feed materials (OJ L 159, 21.6.2017, p. 48) but also other feed materials derived from cereals in particular cereal forages and roughages.

(\*\*\*) The term 'Maize and maize products' includes not only the feed materials listed under heading 1 'Cereal grains and products derived thereof' of the list of feed materials referred to in part C of the Annex to Commission Regulation (EU) No 2017/1017 of 15 June 2017 (OJ L 159, 21.6.2017, p. 48) but also other feed materials derived from maize in particular maize forages and roughages.

|  | Maximum level in mg/kg (ppm)<br>relative to a feedingstuff with a<br>moisture content of 12% |
|--|--|
| <b>Complete feed</b>   |  |
| Complete feed with the exception of  | 2.0  |
| - piglets, gilts (young sows), puppies, kittens, adult dogs<br>and cats for reproduction                       | 0.1  |
| - adult dogs and cats other than for reproduction  | 0.2  |
| - fish   | 0.3  |
| - dairy cattle (including calves), sheep (including lambs),<br>goats (including kids), sows and fattening pigs | 0.5  |
| - horses and cattle for fattening  | 1.0  |

## 5 ) Regulatory levels for the sum of fumonisin B1+B2

|                               | Guidance level in mg/kg (ppm)<br>relative to a feedingstuff with a<br>moisture content of 12% |
|-------------------------------|---|
| <b>Feed materials (*)</b>     |   |
| Maize and maize products (**) | 30  |

(\*) Particular attention has to be paid to maize and maize products fed directly to the animals that their use in a daily ration should not lead to the animal being exposed to a higher level of these mycotoxins than the corresponding levels of exposure where only the complete feedingstuffs are used in a daily ration.

(\*\*) The term 'Maize and maize products' includes not only the feed materials listed under heading 1 'Cereal grains and products derived thereof' of the list of feed materials referred to in part C of the Annex to Commission Regulation (EU) No 2017/1017 of 15 June 2017 (OJ L 159, 21.6.2017, p. 18) but also other feed materials derived from maize in particular maize forages and roughages.

|                                       | Maximum level in mg/kg (ppm)<br>relative to a feedingstuff with a<br>moisture content of 12% |
|---------------------------------------|--|
| <b>Complete feed</b>                  |  |
| Complete feed with the exception of : | 5.0  |
| - adult ruminants and swine           | 30   |
| - calves (< 4 months), lambs and kids | 10   |
| - poultry except ducks                | 20   |
| - horses                              | 2.0 → 5.0 (**)   |
| - rabbits                             | 1.0  |
| - pigs                                | 0.5 → 1.0 (*)  |

(\*) 0.5 was proposed based on evidence provided by Norway. **To be confirmed by EFSA before lowering (EFSA NOAEL = 1.0 mg/kg)**

(\*\*) DE: On the basis of the available evaluations on case reports in horses, it can be assumed that intoxication can occur with fumonisin levels in the ration that are significantly lower than the suggested maximum level of 5 mg fumonisin B1 + B2 / kg in the daily ration. On the basis of all these uncertainties, a safety factor of 3 should be taken into account, which would reduce the originally proposed maximum level of 5 mg / kg to 1.7 mg fumonisin B1 + B2 per kg of daily ration → **to be confirmed by EFSA before lowering (EFSA NOAEL is 8.8 mg/kg)**

## **6 ) Regulatory levels for ochratoxin A (OTA)**

|                                  | Guidance level in mg/kg (ppm)<br>relative to a feedingstuff with a<br>moisture content of 12% |
|----------------------------------|---|
| <b>Feed materials (*)</b>        |   |
| Cereals and cereal products (**) | 0.25  |

(\*) Particular attention has to be paid to feed materials fed directly to the animals that their use in a daily ration should not lead to the animal being exposed to a higher level of these mycotoxins than the corresponding levels of exposure where only the complete feedingstuffs are used in a daily ration.

(\*\*) The term 'Cereals and cereal products' includes not only the feed materials listed under heading 1 'Cereal grains and products derived thereof' of the list of feed materials provided in part C of the Annex to Commission Regulation (EU) No 2017/1017 of 15 June 2017 on the Catalogue of feed materials (OJ L 159, 21.6.2017, p. 48) but also other feed materials derived from cereals in particular cereal forages and roughages

|                          | Maximum level in mg/kg (ppm)<br>relative to a feedingstuff with a<br>moisture content of 12% |
|--------------------------|--|
| <b>Complete feed (*)</b> |  |
| Complete feed for        |  |
| - pigs                   | 0.05   |
| - poultry                | 0.1  |
| - cats and dogs          | 0.01   |

(\*) the latest EFSA opinion on OTA as undesirable substance in feed dates from 2004. EFSA shall be requested to provide an update to this opinion as regards possible adverse animal health effects as the consequence of presence of ochratoxin A in feed.

**Comparative table abovementioned levels, levels in QS, action and rejection levels in GMP+ (specific levels)**

**(examples) – red regular – stricter action/guidance levels / red bold – stricter maximum/rejection levels**

| <b>Mycotoxin</b> | <b>Feed</b>                                     | <b>Level as proposed (ppm)</b> | <b>Guidance value (ppm)</b> | <b>GMP+ Action level (*) (ppm)</b> | <b>GMP+ Rejection level (**) (ppm)</b> |
|------------------|---|--------------------------------|-----------------------------|------------------------------------|--|
| Deoxynivalenol   | Sugar beet products                             | 5.0                            | 1-5 (species)               |                                    |  |
|                  | Complete feed for pigs                          | 0.7                            |                             | 0.8                                | 1                                      |
|                  | Complete feed for cattle                        | 5.0                            |                             | 4.0                                | 5                                      |
|                  | Complete feed for calves                        | 2.0                            |                             | 1.6                                | 2                                      |
|                  | Complete feed for dairy cattle                  | 5.0                            |                             | 2.4                                | 3                                      |
|                  | Complete feed for poultry                       |                                |                             | 3.2                                | 4                                      |
|                  |   |                                |                             |                                    |  |
| Zearalenone      | Sugar beet products                             | 2.0                            | 0.1-0.5 (species)           |                                    |  |
|                  | Complete feed for sows and pigs                 | 0.5                            |                             | 0.2                                | 0.25                                   |
|                  | Complete feed for young pigs                    | 0.1                            |                             | 0.08                               | 0.1                                    |
|                  | Complete feed for young calves and dairy cattle | 0.5                            |                             | 0.4                                | 0.5                                    |
| Ochratoxin A     | Complete feed for sows, pigs and piglets        | 0.5                            |                             | 0.04                               | 0.05                                   |
|                  | Complete feed for poultry                       | 0.1                            |                             | 0.16                               | 0.2                                    |
|                  | Complete feed for cats and dogs                 | 0.01                           |                             | 0.01                               |  |
|                  |   |                                |                             |                                    |  |

(\*) Action limit: A feasible limit agreed in consultation with the sector, supplier or customer. If this limit is exceeded then an investigation into the cause should be undertaken and corrective measures should be taken to remove or control that cause. Maximum levels in mg/kg (ppm) of the feed materials or compound feeds, derived to a moisture content of 12% unless mentioned differently.

(\*\*) Rejection limit: A feasible limit agreed in consultation with the sector, supplier or customer. If this limit is exceeded then the product is not suitable for use as feed material or animal feed. Maximum levels in mg/kg (ppm) of the feed materials or compound feeds, derived to a moisture content of 12% unless mentioned differently.