Annual Project Report
August 2023 to June 2024

Project title	Monitoring of mycotoxins and other contaminants in UK cereals used in malting, milling and animal feed		
Project number	21130040		
Start date	August 2016	**End date**	July 2024

Project aim and objectives
To survey the incidence and levels of key contaminants in samples of UK-grown and imported cereals and co-products, destined for milling, malt production, and animal feed, to determine that they meet legal and guideline limits and are safe for consumption as food and feed.

Key messages emerging from the project

- During the period August 2023 to June 2024, the project focused on monitoring of harvest and stored grain samples for trichothecenes, zearalenone, ochratoxin A, ergot alkaloids and pesticides. No further subsets of samples were taken during this sampling period. The samples analysed were milling wheat, malting barley, food oats, food barley, feed wheat, wheatfeed, feed barley, feed oats, oatfeed and barley malt. The data is not intended to provide a comprehensive monitoring of the UK grain harvest; the data represents levels likely to be found in each of the sample types within a given year of sampling. The results from the previous seven years of this study are available on the AHDB website.Selected results from 2023/4 are presented below.
- Harvest samples for mycotoxins – Although not as low as 2022, most products still returned very low DON levels (Table 1) in 2023. All products, except food oats had a mean value lower than the seven-year average. Milling wheat mean value was 29.3 µg/kg compared to 19 µg/kg in 2022. Malting barley had a mean value of 9.3 µg/kg compared to 2 µg/kg in 2022 and wheatfeed had a mean value of 80 µg/kg compared to 180 µg/kg in 2022.
- Incidence levels above the Reporting Limit (RL) were similar to those seen in 2022 and ranged from 0% in food barley to 100% in oatfeed and wheatfeed, with the other products falling between 28% and 71%. The maximum level observed was 6387 µg/kg in a sample of food oats; however, the median value for this product was <10 µg/kg. Once the two unusually high values of 6386 µg/kg and 6053 µg/kg were removed, the mean value dropped significantly from 460 µg/kg to 32.9 µg/kg. The two samples in question were treated as exceedances; they both had confirmatory analysis carried out which confirmed the original results. A summary of the mean DON levels in fresh harvest samples over the duration of the project is given in Figure 1.
- Incidence of NIV (Table 2) above the RL ranged from 0% (food barley, feed oats, feed wheat and milling wheat) to 100% (Oatfeed). The incidence level for malting barley was 13% with a mean value of 10.9 µg/kg. Feed barley and food oats had similar mean levels of 73 µg/kg and 103 µg/kg. Oatfeed

had the highest mean level of 197 µg/kg. The highest maximum level was found in a sample of food oats (860 µg/kg).

- Of the other Type B trichothecenes, 15-acetyl DON was not found above RL in any of the samples. 3-acetyl DON (Table 3) was detected in 3 food oats (10%) and 2 oatfeed samples (33%). The mean values for both products were 73 and 19.1 µg/kg, respectively. This is not representative of the product though, as the median levels were <10 µg/kg for all products. The maximum level found was 1583 µg/kg in a sample of food oats. Fusarenon X was not detected in any sample received.
- As per previous years, T-2 and HT-2 toxins (Table 4) were detected most frequently in oat products (100% in oatfeed and feed oats and 93% in food oats). The highest levels were also found in these products with maximum levels being 4292 µg/kg in oatfeed, 485 µg/kg in feed oats and 1930 µg/kg in food oats. Mean levels were broadly in line with levels measured throughout the project. In 2023 milling wheat (1.4 µg/kg in 2023 and 0.2 µg/kg in 2022) and oatfeed (1535 µg/kg in 2023 and 770 µg/kg in 2022) had higher mean values than in 2022. There are no maximum levels in force for T-2 and HT-2 in Great Britain, although maximum levels have been introduced in Europe that came into force on 1 July 2024. Three food oats samples contained values which would be ML exceedances when compared to the MLs in Commission Regulation (EU) 2024/1038. Those values were 1407 µg/kg, 1930 µg/kg and 1563 µg/kg. For the other products, malting barley had an indicence level of 45%, a mean of 9.8 µg/kg and a maximum of 95.6 µg/kg. Only 2% of milling wheat samples received had any detectable T-2 and HT-2, with a maximum value of 71.6 µg/kg measured. A summary of the mean T-2 and HT-2 toxins levels in fresh harvest samples over the duration of the project is given in Figure 2.
- For other type A trichothecenes, neosolaniol (Table 5) was measured above the RL in oatfeed (100%), food oats (45%), feed oats (17%), feed barley (7%) and malting barley (3%). Oatfeed and food oats had the highest maximum levels found of 71.8 µg/kg and 75 µg/kg, respectively. They also had the highest mean values of 33.7 µg/kg (oatfeed) and 14 µg/kg (food oats). All other products were either at or below the RL. Diacetoxyscirpenol was not detected in any sample received.
- As per previous years, the highest incidence of zearalenone (ZEN) (Table 6) was in wheatfeed (80%). The highest maximum level found was 840 µg/kg in a sample of food oats; due to this high value, the mean level found in food oats was 33 µg/kg, which is much higher than observed in previous years. Once the high value was removed, the mean value was 4.3 µg/kg. For the other products, ZEN mean values were low and broadly similar to previous years (wheatfeed (5 µg/kg), milling wheat (1.6 µg/kg), feed wheat (4 µg/kg) and oatfeed (8 µg/kg), the remaining products (except food oats) had mean values at the RL. A summary of the mean ZEN levels in fresh harvest samples over the duration of the project is given in Figure 3.

- Masked (sometimes also known as modified) forms of deoxynivalenol, T-2 toxin and zearalenone were also analysed. Deoxynivalenol 3-glucoside (DON3G) was found mainly in oatfeed and wheatfeed samples (Table 7). Incidence above the RL ranged from 83% (oatfeed) to 12% (milling wheat). The one sample of food barley did not contain any DON3G. Mean values for all products (excluding food barley) were above RL, ranging from 2.7 µg/kg (milling wheat) to 40.5 µg/kg (oatfeed), although food oats did have a very high mean level (125 µg/kg), this was not representative of the samples tested as this value was skewed by one unusually high value (2020 µg/kg). Once this was removed, the mean value in food oats was 6.3 µg/kg which is more in line with levels observed during previous years.
- T-2 glucoside (Table 8) was regularly detected in oatfeed (100%), food oats (59%) and feed oats (33%) plus a small incidence in malting barley and feed barley (0% and 7%, respectively). Only 2 products had mean values greater than the RL; oatfeed had a mean value of 224 µg/kg (which was the highest mean value for 4 years) and food oats mean value was 45 µg/kg. These two products also had the highest maximum values of 709 µg/kg and 240 µg/kg, respectively. Mean values for most products were broadly similar to values measured in previous years.
- One sample of oatfeed contained a low level (7.3 µg/kg of a modified form of zearalenone (α-zearalenol)). This sample also contained ZEN (840 µg/kg). α-zearalenol-14-glucoside was not detected in any sample.
- Two samples of food oats also contained levels of β-zearalenol (4.6 µg/kg and 37.1 µg/kg). These two samples also contained ZEN (100 µg/kg and 840 µg/kg). β-zearalenol-14-glucoside was not detected in any sample.
- Incidence of ergot alkaloids ranged from 30% in malting barley to 100% in oatfeed and wheatfeed (Table 9). The one sample of food barley did not contain ergot alkaloids. For all product types except barley (feed and malting), the mean values increased from 2022; furthermore, feed wheat and milling wheat mean values were the highest measured to date (212 µg/kg and 275 µg/kg). The highest maximum level was found in a sample of milling wheat (2967 µg/kg), followed by feed wheat (1339 µg/kg). Although both products had high maximum values, their respective median values were much lower (19.8 µg/kg and 35 µg/kg, respectively). Wheatfeed had the most consistent distribution of ergot alkaloids, with a maximum of 859 µg/kg, minimum of 60.8 µg/kg, mean of 333 µg/kg and median of 264 µg/kg. For the remaining products, the mean and maximum values were broadly similar to those measured during previous years. Mean values ranged from 10 µg/kg in malting barley to 102 µg/kg in oatfeed for the sum of 12 ergot alkaloids.

- Regulation (EU) 2021/1399 introduced maximum levels for ergot alkaloids in some cereal products for human consumption. These levels came into force in the EU on 1 January 2022, but do not apply in GB. The limits for the products in this study range from 50 µg/kg to 150 µg/kg. If these limits were in force within GB, several of the products tested during the 2023/2024 period would be ML exceedances. This would particularly affect milling wheat with at least 50% of the samples tested failing to meet the new EU limits. A summary of the mean sum ergot alkaloid levels in fresh harvest samples over the duration of the project is given in Figure 4.
- Stored samples mycotoxins – Ochratoxin A (OTA) incidence ranged from 0% (milling wheat – January and feed oats) to 83% (oatfeed and wheatfeed). This is more in-line with incidence levels seen throughout the project. The highest level in 2023 was found in a sample of food oats, the result measured was 54.5 µg/kg; however, this was not a typical result as the incidence level was only 13% with the mean value (2.0 µg/kg) and median (<0.2 µg/kg) being significantly lower. This sample of food oats was an ML exceedance (after MU was applied). No other samples analysed for OTA were above the ML. All other products received had incidence levels of less than 30%. Mean values across those products ranged from <0.2 µg/kg to 0.9 µg/kg. The maximum level for OTA in unprocessed cereals for direct human consumption is 5 µg/kg.
- Matched pairs of malting barley and malt were also analysed for *Fusarium* mycotoxins; however, very few residues were found (Table 11). In the malt samples, only DON and DON3G were detected (25% and 40%, respectively). The mean values for both were very low; for DON, the mean value was 4.5 µg/kg and for DON3G, it was 7.1 µg/kg. In the malting barley samples, more residues were detected but incidences were low (DON – 35%, DON3G – 15%, HT-2 +T-2 – 20% and NIV – 15%). Mean and maximum values for all residues detected were low, ranging from 2.4 µg/kg (mean) and 19.7 µg/kg (maximum) for DON3G to 10 µg/kg (mean) and 78.7 µg/kg (maximum) for NIV.
- The following measurement of uncertainty should be applied to all results received as part of this project. Specific MU measurement are available on request.

Method	Measurement of Uncertainty (%)
Trichothecenes	50
Zearalenone	50
Ergot Alkaloids	55
Ochratoxin A	50
Pesticides	50

Pesticides

- One sample of milling wheat (fresh harvest) contained residues of chlorpropham at 0.015 mg/kg. The maximum residue level (MRL) is set at 0.01* mg/kg for chlorpropham in wheat. The residue is at the MRL if measurement uncertainty (±50%) is taken into account.
- Two samples of malting barley (fresh harvest) contained residues of fluroxypyr at 0.18 mg/kg and 0.21 mg/kg. The maximum residue level (MRL) is set at 0.1 mg/kg for fluroxypyr in barley. The higher residue at 0.21 mg/kg is still an exceedance if measurement uncertainty (±50%) is taken into account.
- One sample of food oats (fresh harvest) contained a residue of prothioconazole at 0.064 mg/kg. The maximum residue level (MRL) was set at 0.05 mg/kg for prothioconazole in oats at the time of analysis and reporting. The residue is not an exceedance when measurement uncertainty is applied. For information, the residue is below the revised GB MRL, which was changed to 0.09 mg/kg on 10/01/2024, the EU MRL remains in place at 0.05 mg/kg.
- Other than the one sample of milling wheat with a chlorpropham residue, the two samples of malting barley with fluroxypyr residues and the one sample of food oats containing prothioconazole, no other samples contained any residues above their corresponding MRLs.
- A high incidence of residues (104) was found for the plant growth regulator chlormequat. None of these residues exceeded their corresponding MRLs.
- Other most frequently found residues were for fungicide tebuconazole (88), synergist piperonyl butoxide (83), herbicide glyphosate (59), fungicide fluxapyroxad (57), and plant growth regulator mepiquat (57). None of these residues exceeded their corresponding MRLs. No MRL is set for piperonyl butoxide.
- 143 residues were detected in feed or crops to be used for animal feed. No MRLs are currently applicable for “products or part of products exclusively used for animal feed production”.
- Figure 5 shows the distribution of 628 residues detected in the 374 samples tested. 109 samples (29%) contained no residues and 265 samples (71%) of the samples contained between 1 and 7 residues.

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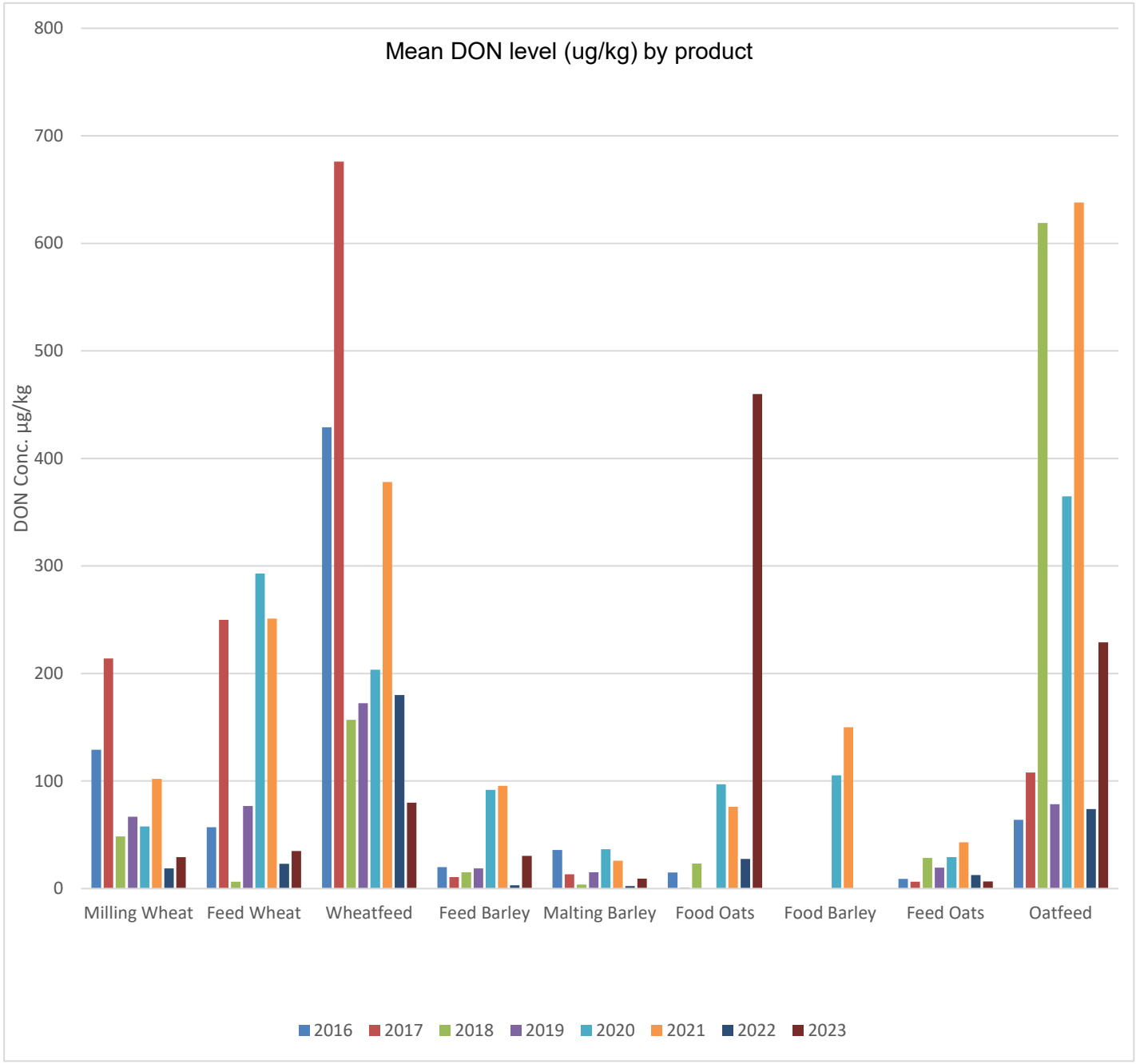
Figure 1. Mean DON levels in harvest samples (µg/kg)



The results described in this summary report are interim and relate to one year, except where stated. In all cases, the reports refer to projects that extend over a number of years.

Figure 2. Mean T-2 and HT-2 toxins levels in Harvest samples (µg/kg)

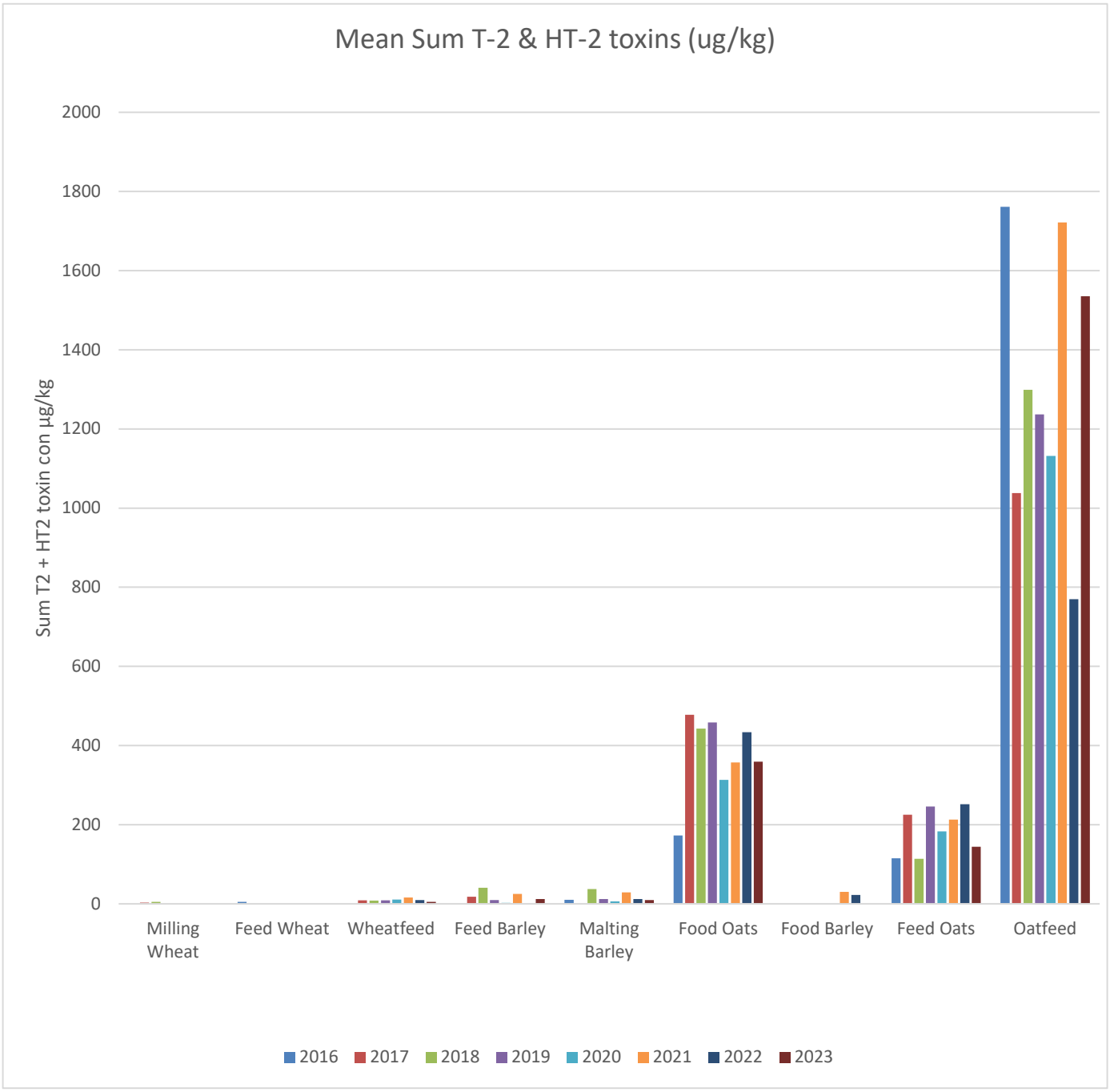


Figure 3. Mean ZEN levels in harvest samples (µg/kg)

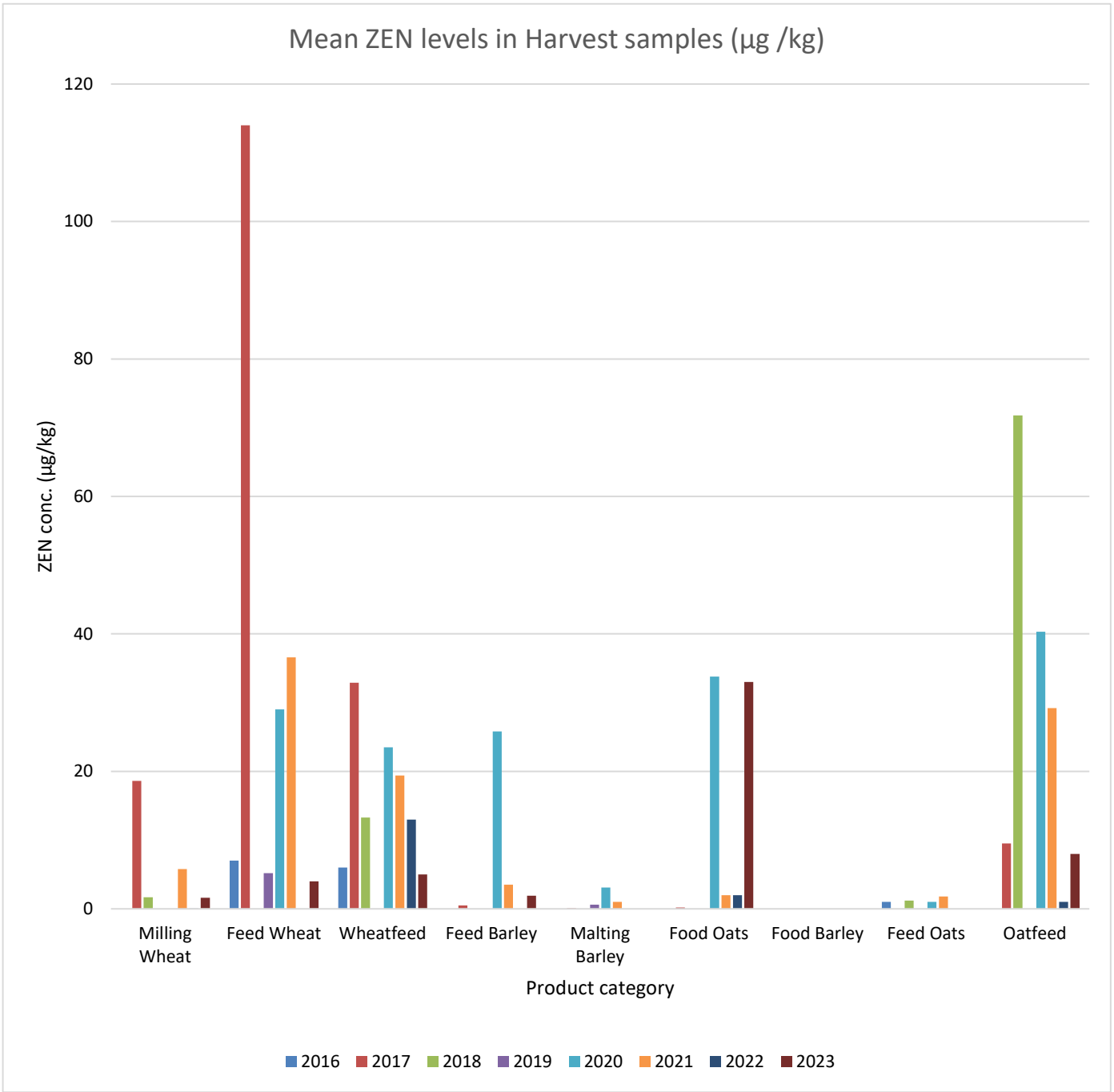
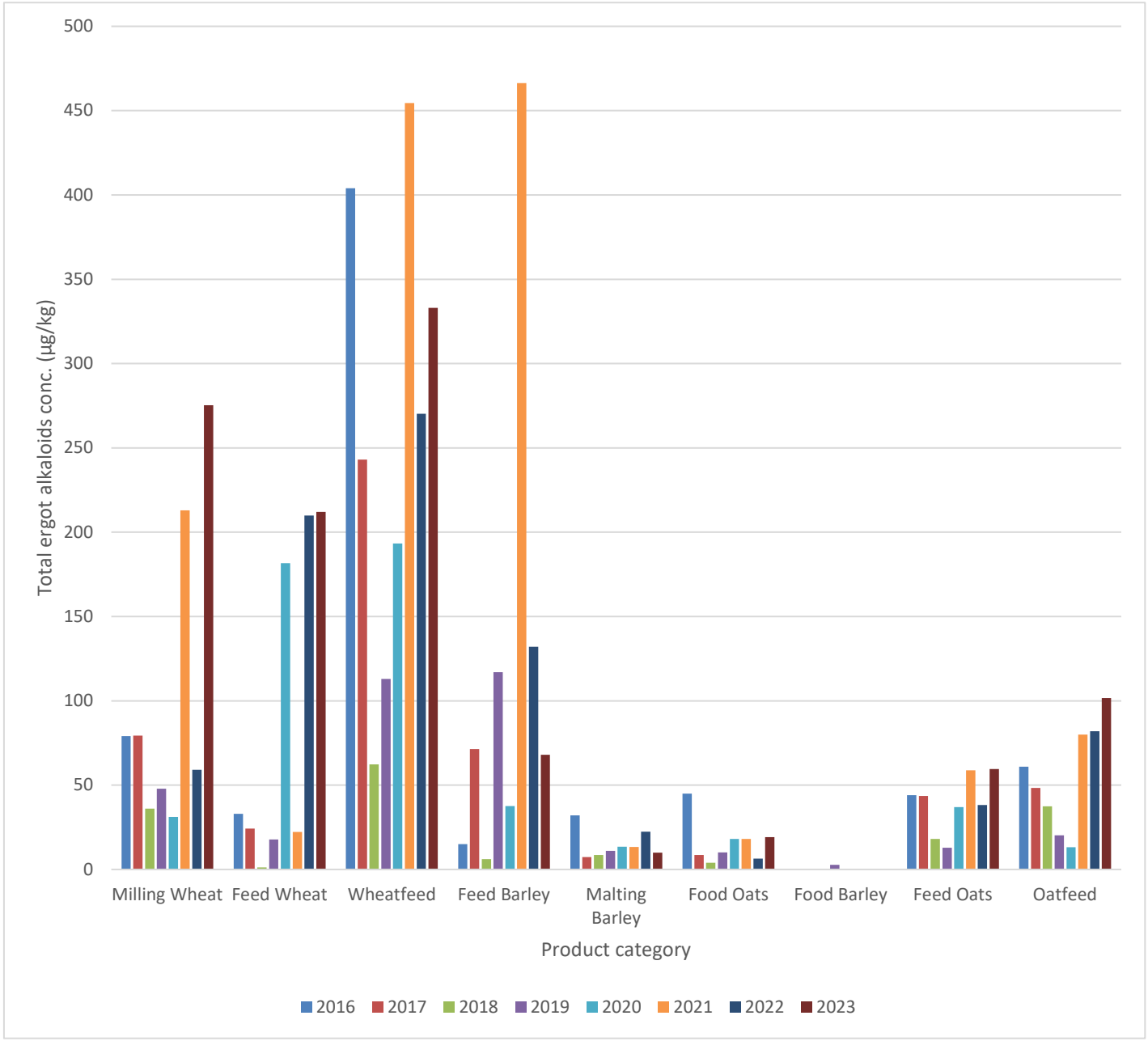
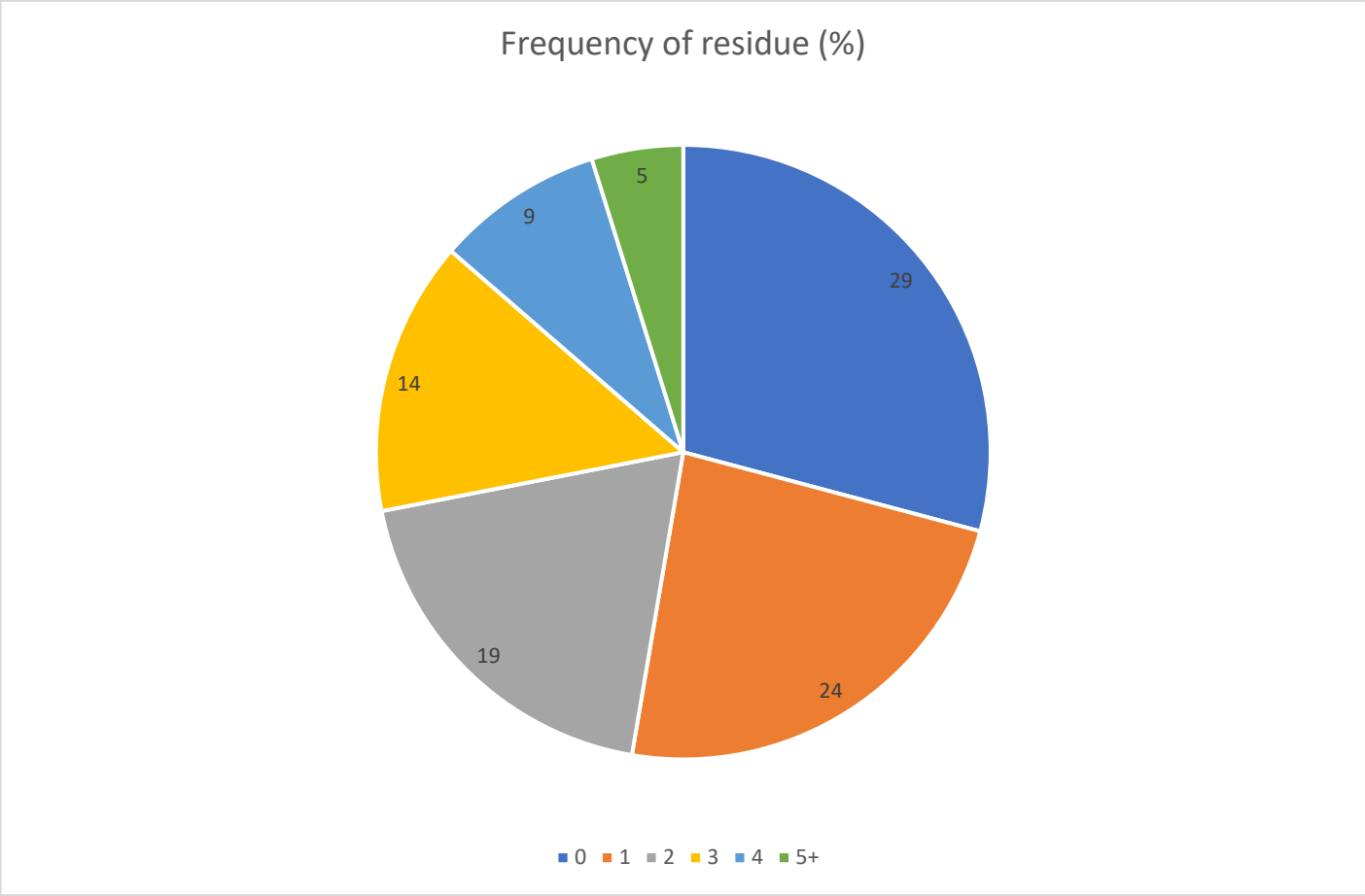


Figure 4. Mean sum ergot alkaloid levels in harvest samples (µg/kg)



The results described in this summary report are interim and relate to one year, except where stated. In all cases, the reports refer to projects that extend over a number of years.

Figure 5. Summary of pesticides residues:



Summary of results from the reporting year

All analyses, were carried out using UKAS ISO17025 accredited methods. All data calculations presented in the following tables are reported as 'lower bound' values, i.e. any result less than the reporting limit has been presumed to be zero.

Results for key mycotoxins are shown below.

The minimum level recorded in the tables is the reporting limit, or the lowest measured value where 100% of samples contained a measurable level of analyte.

Table 1. Deoxynivalenol Harvest Results 2023

	No. of Samples Analysed	% > Reporting Limit	Minimum Level µg/kg	Maximum Level µg/kg	Mean Level µg/kg	Median Level µg/kg
Milling Wheat	50	50%	<10	400	29.3	5
Feed Wheat	14	71%	<10	209	35	19.4
Wheatfeed	20	100%	22.1	158	80	77
Feed Barley	14	43%	<10	238	30.5	<10
Malting Barley	40	28%	<10	80.3	9.3	<10
Food Oats	29	45%	<10	6387	460	<10
Food Barley	1	0%	<10	<10	<10	<10
Feed Oats	6	50%	<10	16.3	6.7	5.3
Oatfeed	6	100%	20.1	814	229	52.3

Table 2. Nivalenol Harvest Results 2023

	No. of Samples Analysed	% > Reporting Limit	Minimum Level µg/kg	Maximum Level µg/kg	Mean Level µg/kg	Median Level µg/kg
Milling Wheat	50	0%	<50	<50	<50	<50
Feed Wheat	14	0%	<50	<50	<50	<50
Wheatfeed	20	5%	<50	51.7	2.6	<50
Feed Barley	14	21%	<50	674	103	<50
Malting Barley	40	13%	<50	129	10.9	<50
Food Oats	29	38%	<50	860	73	<50
Food Barley	1	0%	<50	<50	<50	<50
Feed Oats	6	0%	<50	<50	<50	<50
Oatfeed	6	100%	134	274	197	210

Table 3. 3-AcetylDeoxynivalenol Harvest Results 2023

	No. of Samples Analysed	% > Reporting Limit	Minimum Level µg/kg	Maximum Level µg/kg	Mean Level µg/kg	Median Level µg/kg
Milling Wheat	50	0%	<10	<10	<10	<10
Feed Wheat	14	0%	<10	<10	<10	<10
Wheatfeed	20	0%	<10	<10	<10	<10
Feed Barley	14	0%	<10	<10	<10	<10
Malting Barley	40	0%	<10	<10	<10	<10
Food Oats	29	10%	<10	1583	73	<10
Food Barley	1	0%	<10	<10	<10	<10
Feed Oats	6	0%	<10	<10	<10	<10
Oatfeed	6	33%	<10	76.2	19.1	<10

Table 4. HT-2 + T-2 toxins Harvest Results 2023

	No. of Samples Analysed	% > Reporting Limit	Minimum Level µg/kg	Maximum Level µg/kg	Mean Level µg/kg	Median Level µg/kg
Milling Wheat	50	2%	<20	72	1.4	<20
Feed Wheat	14	0%	<20	<20	<20	<20
Wheatfeed	20	40%	<20	15.6	4.9	<20
Feed Barley	14	14%	<20	120	12.1	<20
Malting Barley	40	45%	<20	95.6	9.8	<20
Food Oats	29	93%	<20	1930	359	137
Food Barley	1	0%	<20	<20	<20	<20
Feed Oats	6	100%	22.7	485	144	102
Oatfeed	6	100%	515	4294	1535	910

Table 5. Neosolaniol Harvest Results 2023

	No. of Samples Analysed	% > Reporting Limit	Minimum Level µg/kg	Maximum Level µg/kg	Mean Level µg/kg	Median Level µg/kg
Milling Wheat	50	0%	<10	<10	<10	<10
Feed Wheat	14	0%	<10	<10	<10	<10
Wheatfeed	20	0%	<10	<10	<10	<10
Feed Barley	14	7%	<10	11	<10	<10
Malting Barley	40	3%	<10	13	0.3	<10
Food Oats	29	45%	<10	75	14	<10
Food Barley	1	0%	<10	<10	<10	<10
Feed Oats	6	17%	<10	10.9	1.8	<10
Oatfeed	6	100%	18.2	71.8	33.7	29.8

Table 6. Zearalenone Harvest Results 2023

	No. of Samples Analysed	% > Reporting Limit	Minimum Level µg/kg	Maximum Level µg/kg	Mean Level µg/kg	Median Level µg/kg
Milling Wheat	50	28%	<2.5	13	1.6	<2.5
Feed Wheat	14	21%	<2.5	40	4	<2.5
Wheatfeed	20	80%	<2.5	20	5	3.1
Feed Barley	14	21%	<2.5	19	2	<2.5
Malting Barley	40	0%	<2.5	<2.5	<2.5	<2.5
Food Oats	29	21%	<2.5	840	4	<2.5
Food Barley	1	0%	<2.5	<2.5	<2.5	<2.5
Feed Oats	6	0%	<2.5	<2.5	<2.5	<2.5
Oatfeed	6	50%	<2.5	24	8	2.1

Table 7. Deoxynivalenol-3-Glucoside Harvest Results 2023

	No. of Samples Analysed	% > Reporting Limit	Minimum Level µg/kg	Maximum Level µg/kg	Mean Level µg/kg	Median Level µg/kg
Milling Wheat	50	12%	<10	44	2.7	<10
Feed Wheat	14	29%	<10	34	5	<10
Wheatfeed	20	55%	<10	21	8.4	10.1
Feed Barley	14	14%	<10	66	6.7	<10
Malting Barley	40	15%	<10	39	3	<10
Food Oats	29	24%	<10	2020	125	<10
Food Barley	1	0%	<10	<10	<10	<10
Feed Oats	6	17%	<10	17.7	2.9	<10
Oatfeed	6	83%	<10	110	40.5	37.5

Table 8. T-2-α3-Glucoside Harvest Results 2023

	No. of Samples Analysed	% > Reporting Limit	Minimum Level µg/kg	Maximum Level µg/kg	Mean Level µg/kg	Median Level µg/kg
Milling Wheat	50	0%	<10	<10	<10	<10
Feed Wheat	14	0%	<10	<10	<10	<10
Wheatfeed	20	0%	<10	<10	<10	<10
Feed Barley	14	7%	<10	29	2.1	<10
Malting Barley	40	0%	<10	<10	<10	<10
Food Oats	29	59%	<10	240	45	22
Food Barley	1	0%	<10	<10	<10	<10
Feed Oats	6	33%	<10	47	10	<10
Oatfeed	6	100%	37	709	224	164

Table 9. Total Ergot Alkaloids (n=12) Harvest Results 2023

	No. of Samples Analysed	% > Reporting Limit	Minimum Level µg/kg	Maximum Level µg/kg	Mean Level µg/kg	Median Level µg/kg
Milling Wheat	50	72%	<6.0	2967	257	19.8
Feed Wheat	14	64%	<6.0	1339	212	35
Wheatfeed	20	100%	60.8	859	333	264
Feed Barley	15	64%	<6.0	490	68	12.1
Malting Barley	40	30%	<6.0	111	10	<6.0
Food Oats	29	41%	<6.0	113	19.1	<6.0
Food Barley	1	0%	<6.0	<6.0	<6.0	<6.0
Feed Oats	6	67%	<6.0	155	59.6	39.7
Oatfeed	6	100%	21.7	262	102	79.7

** This is a combined value calculated from the sum of the individual 12 alkaloids. The LOQ of each alkaloid is 0.5 µg/kg. Where no residues are detected the LOQ values are combined to give a sum LOQ, of 6.0 µg/kg. Where individual alkaloids are quantified above the LOQ, the sum is calculated from those values with results below the LOQ presumed to be equal to zero (lower bound result), which can result in values of less than 6.0 µg/kg being reported.

Table 10. Ochratoxin A Stored Sample Results 2024

	No. of Samples Analysed	% > Reporting Limit	Minimum Level µg/kg	Maximum Level µg/kg	Mean Level µg/kg	Median Level µg/kg
Malting Barley	20	5%	<0.2	1.3	0.1	<0.2
Malt	20	30%	<0.2	11.9	0.7	<0.2
Milling Wheat (January)	25	0%	<0.2	<0.2	<0.2	<0.2
Milling Wheat (March)	25	4%	<0.2	0.3	0.01	<0.2
Feed Wheat	40	5%	<0.2	6.6	0.2	<0.2
Wheatfeed	12	83%	<0.2	5.7	0.9	<0.2
Feed Barley	36	11%	<0.2	19.2	0.6	<0.2
Food Oats	30	13%	<0.2	54.5	2.0	<0.2

Feed Oats	6	0%	<0.2	<0.2	<0.2	<0.2
Oatfeed	6	83%	<0.2	1.4	0.6	<0.2

Table 11. Field Mycotoxins Malting Barley & Malt Results 2023-2024

	No. of Samples Analysed	% > Reporting Limit	Minimum Level µg/kg***	Maximum Level µg/kg	Mean Level µg/kg	Median Level µg/kg
Deoxynivalenol						
Malting Barley	20	35%	<10	43.9	8.1	<10
Malt	20	25%	<10	37.9	4.5	<10
Deoxynivalenol-3-Glucoside						
Malting Barley	20	15%	<10	19.7	2.4	<10
Malt	20	40%	<10	29.7	7.1	<10
3-Acetyl Deoxynivalenol						
Malting Barley	20	0%	<10	<10	<10	<10
Malt	20	0%	<10	<10	<10	<10
15-Acetyl Deoxynivalenol						
Malting Barley	20	0%	<20	<20	<20	<20
Malt	20	0%	<20	<20	<20	<20
T-2-α3-Glucoside						
Malting Barley	20	0%	<10	<10	<10	<10
Malt	20	0%	<10	<10	<10	<10
HT-2 + T-2						
Malting Barley	20	20%	<20	67.4	8.9	<20
Malt	20	0%	<20	<20	<20	<20
Nivalenol						
Malting Barley	20	15%	<50	78.7	10.0	<50
Malt	20	0%	<50	<50	<50	<50

*** Reporting limits vary by toxin due to individual response of each toxin.

Table 12. Pesticides Harvest Results 2023

	No. of Samples Analysed	% > LOD	Single Pesticide Incidence % > LOD	Multiple Pesticide Incidence % > LOD
Milling Wheat [1]	50	94	8	86
Malting Barley [2]	40	73	58	15
Food Oats [3]	29	93	21	72
Barley [4]	1	100	0	100
Feed Wheat [5]	14	29	29	
Feed Barley [6]	14	71	71	
Feed Oats [7]	6	50	50	

[1] azoxystrobin (1) 0.015 mg/kg; chlormequat (47) 0.038-0.99 mg/kg; chlorpropham (1) **0.015 (MRL set at 0.01 mg/kg)**; fluxapyroxad (6) 0.010-0.025 mg/kg; glyphosate (7) 0.12-1.0 mg/kg; mepiquat (20) 0.011-0.53 mg/kg; tebuconazole (31) 0.010-0.14 mg/kg.

[2] azoxystrobin (1) 0.034 mg/kg; bixafen (2) 0.027-0.044 mg/kg; fluxapyroxad (27) 0.011-0.24 mg/kg; prothioconazole (5) 0.011-0.052 mg/kg; trifloxystrobin (1) 0.012 mg/kg.

[3] azoxystrobin (1) 0.048 mg/kg; bixafen (2) 0.013, 0.019; chlormequat (19) 0.030-7.4 mg/kg; fluxapyroxad (1) 0.079 mg/kg; glyphosate (11) 0.40-3.2 mg/kg; mepiquat (8) 0.050-1.3 mg/kg; prothioconazole (5) 0.011-**0.064** mg/kg (MRL set at 0.05 mg/kg, 1 residue at or above MRL); spiroxamine (1) 0.015 mg/kg; tebuconazole (16) 0.011-0.15 mg/kg.

[4] Glyphosate (1) 0.90 mg/kg; chlormequat (1) 0.27 mg/kg.

[5] Glyphosate (4) 0.15-0.79 mg/kg (not tested for other pesticides).

[6] Glyphosate (10) 0.11-4.8 mg/kg (not tested for other pesticides).

[7] Glyphosate (3) 0.30-3.5 mg/kg (not tested for other pesticides).

Table 13. Harvest Results Additional Compounds 2023

	No. of Samples Analysed	% > LOD	Single Pesticide Incidence % > LOD	Multiple Pesticide Incidence % > LOD
Milling Wheat [1]	50	28	14	14
Malting Barley [2]	40	73	40	33
Food Oats [3]	29	24	17	7
Barley [4]	1	0	0	0
Feed Wheat [5]				
Feed Barley [6]				
Feed Oats [7]				

[1] cypermethrin (1) 0.056 mg/kg; deltamethrin (4) 0.015-0.058 mg/kg; *flonicamid (sum) (3) 0.011-0.076 mg/kg; fluroxypyr (3) 0.010-0.037 mg/kg; mefentrifluconazole (2) 0.010, 0.010; piperonyl butoxide (8) 0.011-0.65; pirimiphos-methyl (2) 0.011, 0.12 mg/kg; pyraclostrobin (1) 0.010 mg/kg; TFNG (3) 0.012-0.082 mg/kg.

*Sum of flonicamid,TFNA and TFNG expressed as flonicamid.

[2] benzovindiflupyr (3) 0.011-0.049 mg/kg; deltamethrin (3) 0.023-0.11 mg/kg; difenoconazole (1) 0.012 mg/kg; fluopyram (3) 0.012-0.025 mg/kg; fluroxypyr (15) 0.010-0.21 mg/kg (MRL set at 0.1 mg/kg, 2 residues at or above MRL – 0.18 mg/kg and 0.21 mg/kg); mefentrifluconazole (8) 0.011-0.054 mg/kg; piperonyl butoxide (12) 0.010-1.0 mg/kg; pyraclostrobin (4) 0.012-0.014 mg/kg.

[3] benzovindiflupyr (2) 0.011, 0.044 mg/kg; fluroxypyr (3) 0.020-0.049 mg/kg; pyraclostrobin (4) 0.011-0.024 mg/kg.

[4] No additional residues detected.

[5] Glyphosate only (Not tested for other pesticides).

[6] Glyphosate only (Not tested for other pesticides).

[7] Glyphosate only (Not tested for other pesticides).

Table 14. Pesticides Malting Barley & Malt Stored Sample Results 2023-2024

	No. of Samples Analysed	% > LOD	Single Pesticide Incidence % > LOD	Multiple Pesticide Incidence % > LOD
Malt [1]	20	95%	0%	95%
Malting Barley [2]	20	95%	10%	85%

[1] chlormequat (19) 0.013-0.48 mg/kg; deltamethrin (5) 0.015-0.18 mg/kg; glyphosate (8) 0.11-0.35 mg/kg; mepiquat (18) 0.014-0.28 mg/kg.

[2] chlormequat (18) 0.010-0.58 mg/kg; deltamethrin (3) 0.078-0.14 mg/kg; glyphosate (15) 0.10-2.2 mg/kg; mepiquat (11) 0.012-0.34 mg/kg; pirimiphos-methyl (1) 0.079 mg/kg.

Table 15. Pesticides Malting Barley & Malt Additional Compounds Results 2023-2024

	No. of Samples Analysed	% > LOD	Single Pesticide Incidence % > LOD	Multiple Pesticide Incidence % > LOD
Malt [1]	20	60%	45%	15%
Malting Barley [2]	20	65%	40%	25%

[1]azoxystrobin (1) 0.013 mg/kg; bixafen (1) 0.023 mg/kg; fluxapyroxad (6) 0.011-0.028 mg/kg; piperonyl butoxide (7) 0.011-0.58 mg/kg.

[2] azoxystrobin (1) 0.019 mg/kg; benzovindiflupyr (2) 0.010, 0.018 mg/kg; bixafen (2) 0.012, 0.024 mg/kg; fluopyram (1) 0.012 mg/kg; fluxapyroxad (5) 0.011-0.036 mg/kg; piperonyl butoxide (7) 0.012-1.3 mg/kg; prothioconazole (2) 0.016, 0.018 mg/kg.

Table 16. Chlorpropham & Additional Compounds Stored Sample Results 2024

	No. of Samples Analysed	% > LOD	Single Pesticide Incidence % > LOD	Multiple Pesticide Incidence % > LOD
Milling Wheat	25	0%	0%	0%
No residues of chlorpropham detected.				

	No. of Samples Analysed	% > LOD	Single Pesticide Incidence % > LOD	Multiple Pesticide Incidence % > LOD
Milling Wheat	25	12%	12%	0%
deltamethrin (3) 0.029 – 0.15 mg/kg.				

Table 17. Pesticides Stored Sample Results 2024

	No. of Samples Analysed	% > LOD	Single Pesticide Incidence % > LOD	Multiple Pesticide Incidence % > LOD
Food Oats [1]	30	10%	10%	0%
Milling Wheat [2]	25	12%	12%	0%
Feed Wheat [3]	40	7.5%	7.5%	0%
Wheatfeed [4]	12	58.3%	33.3%	25%
Feed Barley [5]	36	28%	28%	0%
Feed Oats [6]	6	0%	0%	0%
Oatfeed [7]	6	83.33%	16.66%	66.66%

[1] deltamethrin (3) 0.016-0.061 mg/kg.

[2] cypermethrin (1) 0.019 mg/kg; deltamethrin (2) 0.015, 0.18 mg/kg.

[3] deltamethrin (2) 0.069, 0.13 mg/kg; pirimiphos-methyl (1) 0.015 mg/kg.

[4] chlorpropham (1) 0.027 mg/kg; cypermethrin (1) 0.026 mg/kg; deltamethrin (6) 0.014-0.055 mg/kg; pirimiphos-methyl (3) 0.012-0.072 mg/kg.

[5] chlorpropham (1) 0.016 mg/kg; deltamethrin (9) 0.010-0.032 mg/kg.

6 No residues detected.

[7] cypermethrin (4) 0.025-0.27 mg/kg; deltamethrin (5) 0.015-0.036 mg/kg.

No MRLs are set for feed or crops meant for animal feed in UK or EU

Table 18. Pesticides Stored Additional Compounds Results 2024

	No. of Samples Analysed	% > LOD	Single Pesticide Incidence % > LOD	Multiple Pesticide Incidence % > LOD
Food Oats [1]	30	40%	33.3%	6.7%
Milling Wheat [2]	25	72%	40%	32%
Feed Wheat [3]	40	52.5%	45%	7.5%
Wheatfeed [4]	12	91.66%	83.33%	8.33%
Feed Barley [5]	36	69%	44%	25%
Feed Oats [6]	6	33.33%	16.66%	16.66%
Oatfeed [7]	6	100%	50%	50%

[1] 2,4-D (1) 0.043 mg/kg; azoxystrobin (1) 0.019 mg/kg; benzovindiflupyr (1) 0.012 mg/kg; metazachlor (1) 0.018 mg/kg; piperonyl butoxide (6) 0.012-0.59 mg/kg; pyraclostrobin (1) 0.048 mg/kg; tebuconazole (2) 0.019, 0.052 mg/kg; thiabendazole (1) 0.012 mg/kg.

[2] BTS 44595 (1) 0.014 mg/kg; fluroxypyr (2) 0.011, 0.022 mg/kg; piperonyl butoxide (8) 0.010-1.27 mg/kg; prochloraz (sum) (1) 0.017 mg/kg; tebuconazole (17) 0.010-0.034 mg/kg. No residues of prochloraz parent were detected, prochloraz (sum) reported due to detection of metabolite BTS 44595 as per residue definition - Prochloraz (sum of prochloraz, BTS 44595 (M201-04) and BTS 44596 (M201-03), expressed as prochloraz).

[3] fluxapyroxad (1) 0.011 mg/kg; mefentrifluconazole (1) 0.011 mg/kg; piperonyl butoxide (5) 0.014-0.83 mg/kg; tebuconazole (17) 0.011-0.035 mg/kg.

[4] piperonyl butoxide (11) 0.011-0.37 mg/kg; tebuconazole (1) 0.012 mg/kg.

[5] azoxystrobin (1) 0.017 mg/kg; benzovindiflupyr (5) 0.014-0.076 mg/kg; bixafen (2) 0.11, 0.14 mg/kg; fluopyram (2) 0.14, 0.19 mg/kg; fluxapyroxad (11) 0.012-0.075 mg/kg; mefentrifluconazole (2) 0.010, 0.011 mg/kg; piperonyl butoxide (13) 0.010-0.20 mg/kg; prothioconazole-desthio (4) 0.014-0.028 mg/kg; pyraclostrobin (4) 0.023-0.045 mg/kg; tebuconazole (1) 0.012 mg/kg.

[6] azoxystrobin (2) 0.013, 0.017 mg/kg; tebuconazole (1) 0.010 mg/kg.

[7] azoxystrobin (1) 0.014 mg/kg; piperonyl butoxide (6) 0.012-0.79 mg/kg; tebuconazole (2) 0.015, 0.018 mg/kg.

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