Animal &
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Agency

Chemical Food Safety quarterly report

January to March 2021

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APHA is an Executive Agency of the Department for Environment, Food and Rural Affairs and also works on behalf of the Scottish Government, Welsh Government and Food Standards Agency to safeguard animal and plant health for the benefit of people, the environment and the economy.

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Potential food safety incidents January to March 2021

FSI No	Date	APHA VIC or contracted post mortem provider (ppp)	Species	Toxin (reported toxic agent)	Likely source
2021-001	28-01-21	Starcross	Cattle	Lead	Bonfire ash
2021-002	03-02-21	PVS	Sheep	Copper	Camelid feed
2021-003	05-02-21	Bury St Edmunds	Pig	Bracken	Growing plants and roots
2021-004	03-03-21	Starcross	Wildboar	(Possible chemical)	Not applicable
2021-005	09-03-21	Shrewsbury	Cattle	Botulinum	Not established

Key: Incidents in Wales highlighted in grey**.**

Highlights

Year (1st quarter)	Total FSIs (E & W)	Total FSIs Wales	Lead (E & W)	Total lead Wales	Botulism (E & W)	Total botulism Wales
2021	5	0	1	0	1	0
2020	6	2	1	1	1	0
2019	9	1	2	1	2	0
2018	7	0	1	0	4	0
2017	6	0	3	0	0	0

Lead incidents

An incident is recorded where the kidney or liver lead concentrations exceed 0.5 parts per million (ppm) wet matter (WM), muscle lead concentration exceeds 0.1ppm WM, bulk milk lead concentration exceeds 0.02ppm or blood lead concentration exceeds 0.48µmol/l. (ppm equates to mg/kg)

Most incidents arise from cases that are submitted to APHA following animal disease outbreaks. APHA receives clinical samples or carcases for investigation enabling confirmation of lead poisoning. However, occasionally as a result of laboratory testing, we come across high blood or tissue lead levels that, although not high enough to cause clinical signs of poisoning, are still important in terms of food residues and food safety.

Risk management measures for lead incidents involve:

- Removal of animals from the source of lead.
- The implementation of a sixteen-week voluntary withdrawal from slaughter; Should emergency slaughter of any of the clinically unaffected cattle in the exposed group be required during the restriction period then the animal should be accompanied by food chain information stating that offal should be discarded.
- Further blood sampling for blood lead analysis. This is used as a biomarker of internal (carcase) lead residues.

  Should the animals be close to or at finishing weight or producing milk for dairy products, the following risk management guidance parameters should be considered:

- Bulk tank milk requires monitoring if there is evidence of exposure of milking cows to lead. The lead concentration of bulk tank milk must remain below 20 parts per billion. If there is initially uncertainty at the start of an incident then bulk tank milk must be held to allow for testing or milk discarded.
- Blood lead concentrations of < 0.15 µmol/l: no restrictions required.
- Blood lead concentrations of 0.15 µmol/l to 0.48 µmol/l: provide food chain information (FCI) to the abattoir and ensure offal is discarded. Bulk tank milk is likely to remain compliant.
- Blood lead concentrations of > 0.48 µmol/l: provide food chain information to the abattoir, ensure offal is discarded and make an additional risk assessment as to whether carcase meat requires testing prior to carcase release into the food chain.

- Blood lead concentrations of >1.21 µmol/l: Clinical toxicity is likely. Ideally a further withdrawal period should be observed. If slaughter is essential then provide FCI to the abattoir ensuring offal is discarded and that carcase meat is tested for lead residues prior to carcase release into the food chain.

Lead incidents in cattle

FSI 2021-001

Lead poisoning was confirmed as the cause of death of a yearling dairy heifer, one of a group of 24. The kidney lead level was analysed at 24 mg/kg wet weight following post mortem examination. In total four heifers were affected; Three died following nervous signs which included fitting, opisthotonos, blindness, disorientatation, ataxia and death. One animal which was affected more mildly recovered. The group were moved and housed and no further cases occurred. A search of the field revealed that the likely source of lead was bonfire ash following the burning of rubbish in the field. APHA discussed animal health and welfare and food safety issues with the farmer whom agreed that the rest of the group would observe a 16 week withdrawal restriction after a cohort would be blood sampled and tested for lead to establish whether there was ongoing exposure. The cohort would include the heifer that showed clinical signs but later recovered.

Botulism

An incident is usually recorded when more than one animal is affected with clinical signs deemed typical of botulism and with no other explanatory diagnosis following veterinary investigation.

Most incidents arise from cases that are submitted to APHA and post mortem providers for post mortem examination following animal disease outbreaks. Some botulism cases are notified verbally especially when there is an obvious association with the use of broiler litter.

Risk management measures to protect the food chain during botulism incidents is as follows:

- Clinically affected animals should not be presented for slaughter into the food chain and neither should produce from clinically affected animals be used. Recovered clinical cases should not be presented into the food chain for 17 days following recovery.

Botulism incidents in cattle

FSI 2021-005

Botulism was considered to be a possible differential diagnosis as a cause of three cattle being found dead or found weak and recumbent and requiring euthanasia, in a group of 6 cattle that had been purchased three days earlier. Two other animals from the group were mildly affected and made a full recovery. All clinical cases occurred within a 48 hour window. On arrival at the farm premises these six 15-month-old beef fattening cattle were placed in a holding pen with 17 others that remained unaffected. This suggests that access to the source occurred at the farm of origin or during transportation. One affected animal that was euthanized was submitted to APHA for post mortem examination. Post mortem findings were unremarkable with no gross pathology observed. Intestinal content was submitted for botulinum toxin testing. Neither botulinum toxin or clostridium botulinum organism was confirmed to be present. APHA were therefore unable to reach a diagnosis. Metabolic disease and botulism remain as differentials. None of the affected cattle were intended for the food chain at this time.

Copper incidents

FSA/APHA incident trigger is when the liver copper concentration exceeds 500 mg/kg WM.

Especially in sheep, chronic copper poisoning can also occur when liver concentrations of copper are well below this incident trigger value. The same food safety advice is still provided. The APHA normal reference range for liver copper concentrations in cattle and sheep is approximately 300 to 8000 µmol/kg dry matter (DM), equivalent to approximately 5 to 125 mg/kg WM. Advice given is that copper supplementation is withdrawn from sheep where possible and additional forage fed and that a two week withdrawal period is observed.

Other diagnoses of copper poisoning do get confirmed following post-mortem examination but often do not meet the incident trigger criteria as stated above.

FSI 2021-002

Copper toxicity was confirmed as the cause of death of an adult ewe which was close to lambing. The gross post mortem findings were typical of copper toxicity with a pale orange liver, gun-metal grey kidneys and yellow subcutaneous tissues consistent with jaundice. There was also evidence of chronic liver pathology associated with fluke although the group had all recently received a flukicide. The liver copper concentration was 39,500 µmol/ Kg DM (Reference range 314-7850µmol/kg DM) and kidney 1730 µmol/ Kg DM (reference 0-787 µmol/kg DM). The liver concentration is equivalent to 632 mg/kg wet weight. This was the only confirmed case in a group of 10 ewes but blood monitoring for liver function in the rest of the ewes confirmed raised liver enzymes consistent with hepatopathy. The influencing source of copper was thought likely to be from camel/alpaca

mix that was being fed at the time. Chronic liver damage associated with fluke and a twin pregnancy in over conditioned ewes probably also contributed as precipitating factors. Advice was to stop feeding camel/alpaca mix and in the longer term to monitor blood copper concentrations and the liver status of any culls.

Other incidents

FSI 2021-004

Exposure to toxic agents was explored as a potential cause of death of wildboar. Wildboar carcases were being submitted to APHA veterinary investigations centres as part of some targeted surveillance for African Swine Fever (ASF). Various pathological conditions were identified that likely caused or contributed to the deaths however in a couple of sows no obvious cause of death was found. Tissue samples were therefore submitted for toxicology testing. Whilst the investigation was being carried out wildboar meat was withheld from the food chain. Results did not confirm the involvement of any chemicals and poisoning as a cause of death was considered unlikely.

Plant-related incidents

In general, except for ragwort and bracken fern, plant toxicity incidents are not considered to pose a significant risk to the food chain.

FSI 2021-003

Bracken poisoning was suspected to have caused the death of 9 pigs of various breeds including Berkshire pigs, from two different age groups. The total number of pigs was 15.

The issue was first noticed in two 3-4 month old pigs; one dead and the other recumbent and paddling which was immediately culled by the farmer. The older group of 6-7 month old pigs developed clinical signs a little later. The affected pigs presented with lethargy, reduced feed intake and signs of breathlessness. There was no response to antibiotic treatment. One carcase was submitted for post mortem examination. Gross findings were of congestive heart failure. A degenerative cardiomyopathy was noted at histopathological examination. The private vet and an APHA veterinary officer visited the premises and confirmed that there was bracken and rhizomes on the land that was being used for the pigs. The pigs had been moved onto the land in the summer to clear it of bracken. Other potential causes of cardiac pathology, such as exposure to ionophores, were ruled out. APHA gave advice on animal health and welfare and also gave advice on the current food safety guidance regarding withdrawal periods.

- Bracken is sometimes eaten by food-producing animals.
- Bracken contains some genotoxic or possibly genotoxic substances including ptaquiloside, kaempferol and shikimic acid.

- Ptaquiloside from bracken ingested by food producing animals (eg dairy cows) can be passed into milk that might be consumed by humans. No information is available on the mount of ptaquiloside and other possibly genotoxic substances that may be left as residues in other animal-derived foods.

- The level of human exposure to these substances should be kept as low as is reasonably practicable.

- Available data suggests a withdrawal period of at least 4 days for ptaquiloside in milk.

- Further studies are required to be able to specify a withdrawal period prior to slaughter for human consumption of meat and offal. Until this is known, a withdrawal period of 15 days should be observed prior to slaughter for human consumption of meat and offal.

Reference: COT statement on the risk to consumers of eating foods derived from animals that have eaten bracken (2008) and FSA risk assessment.

Other plant poisonings

Other plant poisoning cases investigated included yew poisoning, rhododendron poisoning, pieris poisoning and hemlock water dropwort poisoning.