Animal &
Plant Health
Agency

Chemical Food Safety quarterly report

April to June 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 April to June 2021

FSI No	Date	APHA VIC or contracted post mortem provider (ppp)	Species	Toxin (reported toxic agent)	Likely source
2021-006	12-04-21	Carmarthen	Cattle	Lead	Geochemical
2021-007	12-04-21	Carmarthen	Cattle	Lead	Paint
2021-008	20-04-21	Starcross	Cattle	Lead	Battery
2021-009	04-05-21	Carmarthen	Cattle	Lead	Paint
2021-010	12-05-21	Shrewsbury	Cattle	Lead	Waste materials
2021-011	19-05-21	Shrewsbury	Cattle	Lead	Geochemical
2021-012	20-05-21	PPP - Nottingham	Cattle	Lead	Not found
2021-013	24-05-21	Penrith	Cattle	Lead	Plastic sheeting
2021-014	04-06-21	PPP-Aberystwyth	Cattle	Lead	Not established
2021-015	08-06-21	Thirsk	Cattle	Botulism	Broiler litter
2021-016	15-06-21	Starcross	Cattle	Lead	Bonfire ash
2021-017	17-06-21	PPP – Liverpool	Cattle	Lead	Battery
2021-018	17-06-21	PPP – Liverpool	Sheep	Lead	Geochemical
2021-019	24-06-21	Penrith	Cattle	Lead	Battery

FSI No	Date	APHA VIC or contracted post mortem provider (ppp)	Species	Toxin (reported toxic agent)	Likely source
2021-020	24-06-21	Carmarthen	Pigs	Bracken	Plants
2021-021	24-06-21	Carmarthen	Cattle	Lead	Not established
2021-022	24-06-21	Carmarthen	Cattle	(Lead)	Lead not proven. Nutritional cause.
2021-023	29-06-21	Shrewsbury	Cattle	Lead	Battery

Key: Incidents in Wales highlighted in grey.

Highlights

Year (2nd quarter)	Total FSIs (E & W)	Total FSIs Wales	Lead (E & W)	Total lead Wales	Botulism (E & W)	Total botulism Wales
2021	18	8	16	7	1	0
2020	15	7	11	5	2	1
2019	21	4	9	1	6	1
2018	15	0	8	0	1	0
2017	15	3	9	1	4	2

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 2021-006

Lead poisoning was diagnosed as the cause of mild clinical nervous signs in a group of fifty 18 to 22-month old beef suckler cattle. The majority of the affected group (44) were heifers and intended for breeding and there were 6 bullocks. The affected cattle presented dopey, drooling and blind. In total 3 cattle died and 17 others were affected but improved once housed. A postmortem examination of a heifer revealed a kidney lead concentration of 9.90 mg/kg wet weight and a blood sample 2.33µmolPb/l. The source of lead was likely to be geochemical since the area is a historic lead mining region. The field that was originally ploughed 7-8 years ago when it was reseeded with grass had been reploughed in April 2020 and fodder beet planted. Breeding sheep were initially placed on the field in December 2020 but did not take well to eating the fodder beet and were removed. Cattle were turned out into the field in March 2021 and the fodder beet strip grazed. The first clinical case occurred on 01/04/2021. Animals were moved five days later. Soil lead was analysed at >1250 ppm and fodder beet at 58.44 ppm. The investigation concluded that the lead poisoning incident was due to the ingestion of high lead soil whilst grazing fodder beet in situ. Cattle have been permanently removed from field and the farmer will repurpose the field as permanent grazing or grass for cutting.

FSI 2021-007

Lead poisoning was confirmed following postmortem of a euthanized 3-week-old crossbred dairy calf submitted to investigate clinical nervous signs and death of calves in a spring calving dairy herd. The kidney lead concentration was 108.00 mg/kg wet weight. The first bull calf died three days previously and its death was not investigated. Newly born calves are left with the dam for 6-12 hours after birth and are then housed in pens in an old farm building. The walls are lime washed and there was a painted surface on one door. The paint was analysed and had a very high lead concentration, well off the scale of analysis. This was considered to be the likely source of lead poisoning. The door has since been removed and there have been no further cases. The remaining 4 calves, which did not show any clinical signs, are not close to entering the food chain either as meat or to produce milk.

FSI 2021-008

Lead poisoning was confirmed in a group of 20 yearling dairy heifers at grass. Four animals from the group developed neurological signs and two subsequently died. One animal was submitted to APHA for post-mortem examination. The affected animals were initially noted to be separate from the rest of the group with a dull demeanour and vacant staring and this then progressed over two days to tremors, ataxia, recumbency and death. At postmortem haemorrhages were seen throughout a number of body systems including the subcutaneous tissues, epicardium, thymus, kidneys and on the ventral surface of the brain. The kidney lead concentrations was analysed to be 69.50 mg/kg wet weight. The

field was walked by the farmer and a broken lead acid battery detected. The battery was removed and disposed. The remaining animals were moved to new pasture away from the source. The heifers are intended for milk production once calved which will not be for another year at the minimum and so there was no immediate risk to the food chain.

FSI 2021-009

Lead poisoning was confirmed in a three-week-old dairy calf, from an original group of six housed calves, which died suddenly. The carcase was submitted for postmortem examination. The kidney lead concentration was 46.40 mg/kg wet weight. One calf had died the previous week and one other five days later. The source of lead was considered likely to be paint on a door in pen, but since the calves are released from the pen into a yard to suckle other potential sources in the yard were explored but no other source found. The calves have been removed from the pen and have no further access to the painted door. The door was removed and disposed of and no other deaths occurred since.

FSI 2021-010

Lead poisoning was confirmed in a group of 60 fattening cattle on an organic holding. Clinical signs were first noticed on 25th April. Blood samples taken from affected cattle showed all to have high lead concentrations at 2.43, 2.51 2.84, 5.22 and 7.97 µmol/l.

In total there were eight affected cattle of which five died over a few days. The other three recovered and are no longer showing clinical signs. The source was suspected to be linked to some orange/brown coloured debris which was found dumped in the field along with other rubbish. The group were removed from the source into another field initially and have since been returned to the field as the dumped waste material has been fenced off.

FSI 2021-011

Exposure to very high soil lead concentrations was considered to be significant in the clinical signs observed in a group of seven 6 to 10-month-old beef steers. A group of 7 bought-in weaned calves had been housed until they were allowed access to pasture from the week of 26th April. Within a week one had died. By the second week another four had died. The blood lead concentration, taken in May from the third affected animal with clinical signs of recumbency, foaming at the mouth and later death, was 1.02µmol/l. There are some fenced off old lead mine sites on the farm but there have never been lead poisoning cases on the farm before. The cause of this outbreak was that an area of the pasture the calves were turned onto had been dug out to provide a level area for parking the tractor. This had exposed a soil bank. The calves had access to this bare soil and this was the suspected source of geochemical lead. Top soil has since been ordered and will be put over the exposed soil area and this area, designated for tractor parking, will be fenced off from the stock.

FSI 2021-012

Lead poisoning was confirmed following postmortem in a group of nineteen 14 to 15-month-old beef steers. Two animals developed clinical nervous signs and died. The blood lead concentration, taken from one animal with clinical nervous signs, was 5.6 µmol/l. The animals had been turned out onto a golf course three weeks before the first case occurred and also had access to a pond. No sources of lead were identified. The group were moved back indoors as a precaution and no further cases have occurred. The group are considered to be a couple of months off being slaughtered into the food chain. Since the full 16 week withdrawal period may not be feasible the private vet agreed that the remaining 17 animals would all be blood tested to check for evidence of subclinical exposure and identify animals that might require food chain information.

FSI 2021-013

Lead poisoning was confirmed following postmortem in a group of 12 cattle comprising six adult suckler cows with calves at foot. The kidney lead concentration was 87.70 mg Pb /kg wet weight. Only one six-week-old calf was affected with clinical nervous signs prior to death although there had also been a single death from this pen the previous year which was not investigated. The group had been moved to a temporary pen prior to turn out onto grass and the source of lead was thought to be related to some railway sleepers used to line the pen. A visit was carried out to try to establish the source of lead. Old plastic sheeting had once been nailed to the sleepers as weather proofing and the remains of the sheeting were disintegrated and the plastic crumbling. It was suspected that this sheeting may have been the source of lead but APHA did not gain sight of the lead analysis.

FSI 2021-014

On a recently set up dairy farm there had been six cows affected with some nervous signs and death from a milking herd of 280. All initially showed signs over a two-day period. The clinical signs were of wandering aimlessly, blindness, bruxism. The initial postmortem was carried out on farm and lead toxicity was confirmed from liver analysis. Two further cows were affected with one cow presenting blind. This latter one died and was submitted for postmortem. Kidney lead was analysed at 205 mgPb/Kg wet weight detected, confirming lead toxicity. The dairy cows were at grass and receiving big bale silage and 2 kg of cake in the parlour. Investigations confirmed that some cattle had broken out off the field shortly before the onset of clinical signs and the timeline indicates that this is most likely to be when the exposure to lead occurred. No source of lead confirmed. The farmer and PVS contacted the Milk buyer to ensure food safety.

FSI 2021-016

Lead poisoning was confirmed to be the cause of clinical nervous signs in a group of 30 yearling dairy heifers. Neurological signs including ataxia, muscle tremors, and blindness.

Two of three affected animals died before veterinary intervention could occur. However the third affected animal was blood sampled prior to euthanasia and analysis revealed a blood lead concentration of 5.31µmol/l. The source of lead was considered to be associated with a bonfire site in the field. Access to the bonfire site has since been prevented.

FSI 2021-017

A raised kidney lead concentration of 7.76 mg/kg wet weight was confirmed following postmortem of a 17-month-old dairy heifer which had recently been served. The heifer was one of a group of 50. In mid-June a heifer was found dead and another frothing from the mouth and blind. A blood sample was taken by the private vet but APHA were not informed of the result. This animal died the following day and was submitted to an APHA postmortem partner for postmortem where metal fragments, consistent with battery plates, were detected in the rumen content. In total 3 heifers died and one other showed clinical signs typical of lead poisoning. The source was suspected to be fly tipping of car batteries, a known problem in the area. There is no immediate risk to the food chain. Milk from cattle will not be entering the food chain for approximately 10 months.

FSI 2021-019

Acute lead toxicity was diagnosed in 6 to 8-week-old suckler calves that were from a group of 26. Five calves died and one other was affected with clinical nervous signs. A postmortem was carried out and a blood sample from an affected calf sent for lead analysis. The lead concentration was 9.37 µmol/l/ confirming lead poisoning. Following the initial onset of clinical signs the group were moved out of field and no further cases occurred. The source of lead was confirmed to be an old battery with exposed plates and evidence of being licked at. Battery and surrounding stained soil was removed.

FSI 2021-021

Acute lead toxicity was diagnosed in two four-year-old dairy cattle from a small dairy herd of 55 milking cows, grazing day and night. The first case occurred during the first week of June. One cow had acute onset blindness and head pressing. She was immediately isolated. No milk entered the bulk tank milk from the onset of clinical signs. A second cow was affected within a week. Both cows were euthanased on 14/06/21. No further cases occurred. Blood lead concentrations were analysed at 5.12 µmol/l and 3.31 µmol/l confirming lead poisoning. The fields were extensively checked but no source of lead detected. Cows have not been allowed access to the field they were grazing when unwell. The farmer has been advised to keep searching the field. The farmer was advised to notify the dairy/milk buyer to establish that bulk tank milk met the regulatory limits.

FSI 2021-022

Lead toxicity was suspected as a possible cause of clinical nervous signs in a milking dairy herd but this has since been able to be ruled out. This was a spring-calving dairy herd

milking 300 cows. The private veterinary surgeon (PVS) was called to examine 4 sick adult milking cows, two of which were recumbent and these were identified as older cows. One was euthanased and the PVS performed a field PME. PME findings were yellow fat, abomasitis with lots of grit, typhlitis, melena, red urine. The other animals were treated for hypomagnesaemia but did not respond and another died the next day. The two younger cows were able to walk but ataxic. These animals deteriorated overnight and were examined again the next day; one was in sternal recumbency and blind. The other was standing but ataxic. Prior to the results of analysis being available the farmer contacted the dairy as a precaution and bulk tank milk was withheld and eventually discarded. APHA visited the premises to try and help establish a cause for the disease presentation. No toxic hazards and chemical exposures seen and a nutritional deficit was suspected associated with the spring calving herd reaching peak yield at a time when grass was scarce due to the dry spring/early summer meaning that forage intake was inadequate. Cerebrocortical necrosis was confirmed in all three cows that underwent postmortem examination at APHA with further cases responding to B1 treatment. No further cases occurred after nutritional corrections were made.

FSI 2021-023

Acute lead toxicity was diagnosed in a three-month-old suckler calf from a group of 45 cattle (cows and calves). The third affected calf was submitted for postmortem examination. In total six were affected and three died. The calves presented with nervous signs which included blindness. At postmortem the cerebral hemispheres were observed to be swollen and there were metallic fragments, consistent with battery plates, in the rumen. The kidney lead concentration was 9.23 mg/kg wet weight and the metallic fragments 41,400 mgPb/kg. The group had been grazing on a river meadow having been turned out in May. It seems likely that they had come across a point source of lead eg battery. However the location of the source was not identified. The group have since been moved.

Lead incidents in sheep

FSI 2021-018

Chronic lead toxicity was confirmed in a group of sixteen sheep comprising 5 ewes and lambs. Only two lambs aged 7 to 9 weeks were affected. The first clinical sign was of a lamb unable to bear weight on front legs. She later became weak behind and died. No postmortem was carried out. A second lamb was affected a few days later. He was unable to bear weight on his back legs. He was able to sit in sternal recumbency and hold head up and was quite bright and wanted to suck milk. He also had ventral strabismus in left eye. A postmortem examination was carried out following euthanasia. Clinical signs were of a distended bladder and bilateral hydronephrosis. There was a comminuted burst fracture of L1 vertebra causing compression of spinal cord and subdural haemorrhage. A blood lead concentration was 2.13µmol/l suggestive that lead was involved in the aetiology. The source of lead is suspected to be geochemical associated with old lead

mines present at the grazing site. The owner indicated that she will likely keep the remaining sheep as pets and not sell them on or slaughter them into the food chain.

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 2021-015

Suspected botulism was diagnosed following postmortem examination of a 9-month-old beef heifer. This was the third animal to be affected in a 6-week period from a group of 25. The animal was found recumbent and did not respond to treatments. There was no specific pathology seen at postmortem and investigations into differential diagnoses were unrewarding. Botulism was diagnosed on exclusion. The source was likely to be associated with broiler litter that had been spread onto neighbouring field. APHA provided advice to the farmer on animal health and welfare, vaccination and food safety. The farmer was advised that no clinically affected animals should be slaughtered into the food chain.

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 2021-020

Bracken poisoning was suspected to have caused the death of a 9-month-old pig submitted for postmortem examination from an original group of 8. Two gilts were found dead over a period of 10 days. They were grazing paddocks that hadn't been grazed by pigs before and there was access to bracken. An on farm postmortem examination by the PVS showed orange frothy congested lungs and a pale heart. A degenerative cardiomyopathy was noted at histopathological examination consistent with bracken fern poisoning. The PVS had already advised the owner to remove all bracken including roots and fence off access to bracken. APHA gave advice on animal health and welfare and also gave advice on the current food safety guidance regarding withdrawal periods.

- 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 and dog mercury poisoning.