Algal bloom wildlife post-mortem report

Government of South Australia
Department for Environment and Water

Species – Little penguin

Date collected – 29 May 2025

Location – North Shore, Granite Island

History relating to the animal

One adult male little penguin (*Eudyptula minor)* was found dead on the North Shore of Granite Island, near the Causeway on 29 May 2025.

Clinical examination

The animal was already dead and so could not be examined prior to death.

Necropsy

The necropsy (looking at the whole body) revealed that the little penguin was in good body condition and weighed 1.1kg. There was mild post-mortem autolytic change (decomposing after death). There was approximately 300mL of clear fluid within the coelomic cavity (body cavity containing organs). The lungs had some frothy fluid when cut, and the kidneys were enlarged, pale red and had fine pinpoint spots on them. The stomach contained fish material. The proventriculus (upper part of the gut) contained fish material, and a small erosion (disruption to the surface, a shallow ulcer) 8mm diameter.

Samples were collected to test for avian influenza and Newcastle disease. Tissues were collected for histopathology (looking at tissues under the microscope for more detailed information) and testing for brevetoxins and other algal biotoxins (a possibility due to the algal bloom).

Histopathology

Samples from every major body system were examined under the microscope. Examination of tissues revealed a mild interstitial pneumonia (lung inflammation) throughout the lungs. There was necrotising hepatitis (liver inflammation and areas of cell death) within the liver. There was acute (recent) renal tubular necrosis (death of cells in the tubules of the kidneys), and mild chronic renal coccidiosis (long term parasitic infection in the kidney). There were worms (Spirurids) found within the proventriculus (upper part of the gut).

Culture

Samples were collected following the histopathology findings in the liver, which suggested a possible bacterial infection. There was a heavy growth of *Clostridium perfringens*, and a moderate growth of *Escherichia coli* and other mixed bacterial organisms (all common, widespread bacteria).

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Virology

Testing results for avian influenza and Newcastle disease were negative.

Brevetoxins

No samples were above the limits of reporting.

Other algal biotoxins

No samples were above the limits of reporting.

Summary

An adult male little penguin was found dead at Granite Island. Laboratory examination could not identify the cause of death, however the signs of disease in the liver (hepatitis) and kidneys (renal tubular necrosis) may have contributed. The worms found in the gut (spirurids) was likely a subclinical process (not contributing to clinical disease) because the bird was in good body condition. The bacterial proventriculitis (inflammation of the proventriculus) is secondary (caused by) to the worm burden. The renal coccidiosis (kidney parasite) is a common finding in little penguins and is not likely to have been causing clinical disease. Testing for avian influenza and Newcastle disease was negative. Brevetoxins and other algal biotoxins were also not detected.

Outlook

PATH RESULTS: PENGUIN LITTLE, (Wi) [redacted]

From [redacted]
Date Wed 13/08/2025 5:00 PM
To [redacted]

[redacted]

[redacted]

Tested on 30/05/25
Reported on 13/08/25 17:30
Referred on 29/05/25 **by:** [redacted]

Owner:
PENGUIN LITTLE

VICTOR HARBOR 5211

Animal/s:
Wild Birds

DOB: N/A

Collected: 29/05/25 14:00 **Subm.No:** [redacted] **Lab No.:** [redacted]

Samples tested as received All Tests Complete

SUMMARY DIAGNOSES
Lung: Mild, multifocal, subacute lymphocytic plasmacytic interstitial pneumonia

Kidney: Mild, multifocal, acute renal tubular necrosis, and mild chronic renal coccidiosis

Liver: Mild, multifocal, subacute lymphocytic, histiocytic, necrotizing hepatitis

Proventriculus: Proventricular nematodiasis (spirurids)

COMMENTS
There are multiple disease processes occurring in this penguin.

The necrotizing hepatitis is suggestive of a bacterial process. Microbiological culture of the liver is recommended. Please contact the laboratory to request this test. Tissues are held for one month, in line

with the laboratory's quality assurance process.

The proventricular spirurid infection (e.g. Tetramere sp.) was likely a subclinical process because the bird was in good body condition. The bacterial proventriculitis is secondary to the nematodiasis.

The renal coccidiosis is a subclinical finding.

[redacted]

Specialist Veterinary Anatomic Pathologist

[redacted]

Validated by [redacted]

[redacted]

[redacted]

Tested on 30/05/25
Reported on 13/08/25 17:30
Referred on 29/05/25 **by:**
DR LYNLEY JOHNSON
ANIMAL HEALTH ADVISOR
135 GORDON STREET
NARACOORTE SA 5271

Owner:
PENGUIN LITTLE

VICTOR HARBOR 5211

Animal/s:
Wild Birds

DOB: N/A

Collected: 29/05/25 14:00 **Subm.No:** [redacted] **Lab No.:** [redacted]

Samples tested as received All Tests Complete

HISTOPATHOLOGY FROM NECROPSY

REF: [redacted]
ADDITIONAL FINDINGS 13/6/2025
CLINICAL HISTORY
Please refer to the clinical history on the request form and the clinical notes sent with the request form. A brief summary of the clinical history;

One little penguin was found today on the North shore of Granite island near the causeway on 29/5/25.

MACROSCOPY
Slides A-F contain liver, spleen, heart, lung, kidney, brain, trachea, oesophagus, proventriculus - ventriculus, duodenum, pancreas, jejunum, ileum, caecum, eye, pectoral muscle

MICROSCOPY
Liver: Multifocally, predominantly around central veins and also scattered randomly through the hepatic parenchyma, there are low numbers of lymphocytes, macrophages, fewer plasma cells and rare heterophils. Occasionally there is karyorrhectic debris admixed with the inflammation. (Mild, multifocal, subacute lymphocytic, histiocytic, necrotizing hepatitis)

Lung: Multifocally low numbers of lymphocytes and plasma cells expand the interstitium of air capillaries. Rarely heterophils form small aggregates within the lumen of infundibulum. There is diffuse hyepraemia / congestion. (Mild, multifocal, subacute lymphocytic, plasmacytic interstitial pneumonia)

Kidney : Approximately 1% of tubules are lined by necrotic epithelium (pyknotic nucleus with hypereosinophilic shrunken cytoplasm). (Mild, multifocal, acute, renal tubular necrosis)

Low numbers of epithelial cells lining the pelvis are expanded by intracytoplasmic protozoal cysts. The cysts are 20 micron diameter with abundant 1 micron long sporozoites. Within the subjacent interstitium there are moderate numbers of lymphocytes and plasma cells. (Mild, multifocal, chronic pyelitis with intraepithelial coccidial oocysts)

Proventriculus: Focally there is effacement and replacement of the

[redacted]

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Reported on 13/08/25 17:30
Referred on 29/05/25 **by:**

[redacted]

[redacted]

Owner:
PENGUIN LITTLE

VICTOR HARBOR 5211

Animal/s:
Wild Birds

DOB: N/A

Collected: 29/05/25 14:00 **Subm.No:** [redacted] **Lab No.:** [redacted]

Samples tested as received All Tests Complete

mucosal epithelium, lamina propria, submucosa and smooth muscle by lytic necrosis, large numbers of heterophils, macrophages, lymphocytes, plasma cells, extensive fibrosis. Within the inflammation are multiple colonies short rod bacteria and coccoid bacteria and multiple cross sections of nematodes. The nematodes are 30-50 micron across with smooth cuticle, platymyarian musculature, lateral cords, pseudocoelom, alimentary tract lined by a monolayer of cuboidal cells (characteristic of spirurid nematodes e.g., Tetramere sp.). (Moderate, focal chronic necrotizing proventriculitis with intralesional nematodes and bacteria)

Those tissues not described appear normal.

DIAGNOSIS
Lung: Mild, multifocal, subacute lymphocytic plasmacytic interstitial pneumonia

Kidney: Mild, multifocal, acute renal tubular necrosis, and mild chronic renal coccidiosis

Liver: Mild, multifocal, subacute lymphocytic, histiocytic, necrotizing hepatitis

Proventriculus: Proventricular nematodiasis (spirurids) and secondary bacterial proventriculitis

COMMENTS
There are multiple disease processes occurring in this penguin.

The necrotizing hepatitis is suggestive of a bacterial process. Microbiological culture of the liver is recommended. Please contact the laboratory to request this test.

The proventricular spirurid infection (e.g. Tetramere sp.) was likely a subclinical process because the bird was in good body condition. The bacterial proventriculitis is secondary to the nematodiasis.

The renal coccidiosis is a subclinical finding. This has been reported as a normal finding in little penguins (Obendorf et al 1980). The mild renal tubular necrosis may be an acute change due to morbidity. There are no remarkable histological findings to explain the gross appearance of the kidney.

[redacted]

[redacted]

Tested on 30/05/25
Reported on 13/08/25 17:30
Referred on 29/05/25 **by:**
[redacted]

Owner:
PENGUIN LITTLE

VICTOR HARBOR 5211

Animal/s:
Wild Birds

DOB: N/A

Collected: 29/05/25 14:00 **Subm.No:** [redacted] **Lab No.:** [redacted]

Samples tested as received All Tests Complete

Obendorf, D.L. and McColl, K., 1980. Mortality in little penguins (Eudyptula minor) along the coast of Victoria, Australia. Journal of Wildlife Diseases, 16(2), pp.251-260.

MICROSCOPY 13/6/2025
Liver: Microorganisms are not seen on Gram, PAS (no fungal hyphae or yeast are seen) , Wade fite or Ziehl Neelsen stains (no acid fast bacteria are seen).

COMMENTS
Please note that microbiological culture is more sensitive than the special stains. For this reason an infectious microbial cause for the hepatitis cannot be excluded.

As you requested, samples will be sent to Analytical Services Tasmania for biotoxin and brevetoxin testing.

[redacted]
Specialist Veterinary Anatomic Pathologist
[redacted]

Validated by [redacted]

[redacted]

[redacted]

Tested on 30/05/25
Reported on 13/08/25 17:30
Referred on 29/05/25 **by:**
[redacted]

Owner:
PENGUIN LITTLE

VICTOR HARBOR 5211

Animal/s:
Wild Birds

DOB: N/A

Collected: 29/05/25 14:00 **Subm.No:** [redacted] **Lab No.:** [redacted]

Samples tested as received All Tests Complete

MICROBIOLOGY

SPECIMEN: Liver
ANIMAL ID:Little penguin

MICROSCOPY
A small number of gram positive bacilli.

CULTURE
1. Moderate growth of Escherichia coli
2. Heavy growth of Clostridium perfringens
3. Moderate growth of Mixed organisms

COMMENT: No Salmonella sp., Listeria sp. or Yersinia sp. isolated.

These organisms were identified using the MALDI-Tof at [redacted]

_____Final Report_____
23/06/25
Validated by [redacted] Laboratory Scientist.

[redacted]

Tested on 30/05/25
Reported on 13/08/25 17:30
Referred on 29/05/25 **by:**

[redacted]

[redacted]

Owner:
PENGUIN LITTLE

VICTOR HARBOR 5211

Animal/s:
Wild Birds

DOB: N/A

Collected: 29/05/25 14:00 **Subm.No:** [redacted] **Lab No.:** [redacted]

Samples tested as received All Tests Complete

MOLECULAR DIAGNOSTICS

NEWCASTLE DISEASE VIRUS RNA PCR (REAL TIME REVERSE TRANSCRIPTASE)

Specimen type: Tracheal & cloacal swab in VTM

Number of specimens: 1

SPECIMEN ID	F Gene	M Gene	L Gene
PENGUIN	Not detected	Not detected	Not detected

Validated by [redacted] Laboratory Scientist.

[redacted]

[redacted]

Tested on 30/05/25
Reported on 13/08/25 17:30
Referred on 29/05/25 **by:**

[redacted]

Owner:
PENGUIN LITTLE

VICTOR HARBOR 5211

Animal/s:
Wild Birds

DOB: N/A

Collected: 29/05/25 14:00 **Subm.No:** [redacted] **Lab No.:** [redacted]

Samples tested as received All Tests Complete

MOLECULAR DIAGNOSTICS

INFLUENZA A RNA PCR (REAL TIME REVERSE TRANSCRIPTASE)

Specimen type: Tracheal & cloacal swab in VTM

SPECIMEN ID	Type A	H5	H7
PENGUIN	Not detected		

Validated by [redacted] Laboratory Scientist.

CASE MANAGEMENT DETAILS

Case Managed by:
Case Management Requested by: [redacted]
Case Management Requested on: 29/05/25

Case Details: Little penguin found dead at Granite Island.

Number of samples 5

[redacted]

[redacted]

Tested on 30/05/25
Reported on 13/08/25 17:30
Referred on 29/05/25 **by:** [redacted]

Owner:
PENGUIN LITTLE

VICTOR HARBOR 5211

Animal/s:
Wild Birds

DOB: N/A

Collected: 29/05/25 14:00 **Subm.No:** [redacted] **Lab No.:** [redacted]

Samples tested as received All Tests Complete

NECROPSY REPORT
5/6/25
The grammatical errors were corrected for the clinical history.

CLINICAL HISTORY
Please refer to the clinical history on the request form and the clinical notes sent with the request form. A brief summary of the clinical history;

One little penguin was found today on the North shore of Granite island near the causeway on 29/5/25.

The remaining three bodies were collected and frozen at DEW office Victor Harbour post algal bloom.

Date Species Location Note
22/03/2025 Little Penguin Victor Harbor Yacht Club Collected and stored in VH freezer.
27/03/2025 Little Penguin Murray Mouth Collected and stored in VH freezer.
3/04/2025 Little Penguin Victor Harbor Skate Park Collected and stored in VH freezer.

If appropriate we may investigate brevetoxin in the remaining three frozen bodies in the tissue(s) in which the toxin is most concentrated. Biotoxin testing may also be done for the penguin which was found dead on 29/5/25.
Please keep the remaining three penguins in the freezer until further advice.

SAMPLES SUBMITTED
One dead adult male little penguin (Edulyptus minor) is submitted in a bag labelled "29/5/2025 Granite island causeway"

NECROPSY FINDINGS
The bird is in good body condition and weighs 1.1 kg. The pectoral muscles are convex. There are mild post-mortem autolytic changes. There is approximately 300 ml of clear fluid within the coelomic cavity. The lungs on cut surface have abundant frothy fluid (oedema). The kidneys are enlarged, pale red and have a myriad of pale white fine pinpoint foci over the serosal surface and extending into the parenchyma.

[redacted]

[redacted]

Tested on 30/05/25
Reported on 13/08/25 17:30
Referred on 29/05/25 **by:** [redacted]

Owner:
PENGUIN LITTLE

VICTOR HARBOR 5211

Animal/s:
Wild Birds

DOB: N/A

Collected: 29/05/25 14:00 **Subm.No:** [redacted] **Lab No.:** [redacted]

Samples tested as received All Tests Complete

There is focal erosion of the proventriculus, 8mm across. The proventriculus contains macerated fish material.

GROSS SUMMARY
Pulmonary oedema
Coelomic effusion
Possible renal nephrosis / urates
Focal proventriculitis

SAMPLES COLLECTED & TESTING
As you have requested:
Cloacal and trachea swabs in virus transport media are taken and will be tested for AI and NDV by qPCR.

Formalin fixed tissues will be processed for histopathology.

We will contact analytical services Tasmania for a quote for biotoxin testing. Fresh liver, spleen, heart, lung, kidney, brain, proventricular contents are stored frozen.

COMMENTS
The range of changes including acute pulmonary oedema, coelomic effusion and possible renal nephrosis suggest multiple pathological processes such as acute vascular injury, or subacute hypoproteinaemia secondary to renal nephrosis and secondary coelomic effusion. Differential diagnoses for the gross findings include Avian influenza, Newcastle disease virus, ochratoxins (fungal toxin), lead poisoning, acute Pasteurellosis.

Avian influenza and Newcastle disease virus testing are in progress. Histopathology will clarify some of the pathological processes.

Liver is stored if microbiological culture is required.

[redacted]

Specialist Veterinary Anatomic Pathologist

[redacted]

[redacted]

[redacted]

Tested on 30/05/25
Reported on 13/08/25 17:30
Referred on 29/05/25 **by:** [redacted]

Owner:
PENGUIN LITTLE

VICTOR HARBOR 5211

Animal/s:
Wild Birds

DOB: N/A

Collected: 29/05/25 14:00 **Subm.No:** [redacted] **Lab No.:** [redacted]

Samples tested as received All Tests Complete

[redacted]

Specialist Veterinary Anatomic Pathologist

[redacted]

Validated by [redacted]

Outlook

PATH RESULTS: PENGUIN LITTLE, (Wi) [redacted]

From [redacted]
Date Fri 20/02/2026 3:30 PM
To [redacted]

[redacted]

[redacted]

Tested on 30/05/25
Reported on 20/02/26 16:00
Referred on 29/05/25 **by:** [redacted]

Owner:
PENGUIN LITTLE

VICTOR HARBOR 5211

Animal/s:
Wild Birds

DOB: N/A

Collected: 29/05/25 14:00 **Subm.No:** [redacted] **Lab No.:** [redacted]

Samples tested as received All Tests Complete

ADDITIONAL FINDINGS 20/2/2026

SUMMARY DIAGNOSES
Lung: Mild, multifocal, subacute lymphocytic plasmacytic interstitial pneumonia

Kidney: Mild, multifocal, acute renal tubular necrosis, and mild chronic renal coccidiosis

Liver: Mixed bacterial hepatitis including E coli

Proventriculus: Proventricular nematodiasis (spirurids)

COMMENTS
There are multiple disease processes occurring in this penguin.

The proventricular spirurid infection (e.g. Tetramere sp.) was likely a

subclinical process because the bird was in good body condition. The bacterial proventriculitis was secondary to the nematodiasis. The bacterial hepatitis likely followed from the bacterial proventriculitis. Please note some of the bacteria cultured from the liver were post mortem overgrowth.

The renal coccidiosis was a subclinical finding.

AI and NDV are excluded as causes of death or interstitital pneumonia, based on the negative PCR results.

Biotoxins and brevetoxins were not detected in multiple tissues (Please refer to the report from Analytical Services Tasmania attached to the related submission [redacted].

[redacted]

Specialist Veterinary Anatomic Pathologist

[redacted]

Validated by [redacted]

Tasmanian Government

ANALYTICAL SERVICES TASMANIA

18 St Johns Avenue New Town 7008 TAS
03 6165 3300
enquiries@ast.tas.gov.au
www.analyticalservices.tas.gov.au

Submission Number: [redacted]
Report Number:
Issue Date: 11/02/2026
Status: Final

CERTIFICATE OF ANALYSIS

Customer: [redacted]
Address:
Contact:

Submission Description: Little Penguin
Sample Received Date: 11/12/2025
Contract Number:
Client Order Number:
Program/Quote Reference: [redacted] Biotoxin and Brevotoxins

Sample(s) analysed as received. Sampling date and time data supplied by the client. The document shall not be reproduced except in full.
Additional information relating to this submission can be found in the sample receipt notification.
This report supersedes any previous reports with this submission number.
Many tests specify a holding time which gives the recommended timeframe by which a sample should be preserved/extracted and/or analysed after the sample is taken.
Holding time information can be found on the AST website https://analyticalservices.tas.gov.au/our-services/containers-samples-and-submissions .
Whilst every effort is made to analyse samples within these timeframes, situations can occur where this is not possible.
Where a test has been conducted outside the recommended sample holding time this should be taken into account when interpreting results.

The results in this report were authorised by:

Name	*Position*
[redacted]	**Section Head - Organic Chemistry**

Test Information:

Method ID	*Test Description*	*Date Commenced:*
3411	Lipophilic Toxins in Shellfish by LC-MS/MS	10-02-2026
3411A	Brevetoxins in Shellfish by LC-MS/MS	06-02-2026
3416	PST in Biota by LC-MS/MS (Boundy Method)	10-02-2026

Chemistry Test Results (Biota - Food)

		Sample Description	Kidney	Heart	Brain	Lung	Spleen	Proventricular CT
		Sampled Date/ Time	30/05/25 0:00	30/05/25 0:00	30/05/25 0:00	30/05/25 0:00	30/05/25 0:00	30/05/25 0:00
Method ID	Analyte	Units	391421	391422	391423	391424	391425	391426
3411	AZA1	mg/kg WMB	<0.01*	<0.01*	<0.01*	<0.01*	*IS*	*IS*
	AZA2	mg/kg WMB	<0.01*	<0.01*	<0.01*	<0.01*	*IS*	*IS*
	AZA3	mg/kg WMB	<0.01*	<0.01*	<0.01*	<0.01*	*IS*	*IS*
	Domoic Acid	mg/kg WMB	<0.05*	<0.05*	<0.05*	<0.05*	*IS*	*IS*
	DTX1 Free	mg/kg WMB	<0.01*	<0.01*	<0.01*	<0.01*	*IS*	*IS*
	DTX1 Total	mg/kg WMB	<0.01*	<0.01*	<0.01*	<0.01*	*IS*	*IS*
	DTX2 Free	mg/kg WMB	<0.01*	<0.01*	<0.01*	<0.01*	*IS*	*IS*
	DTX2 Total	mg/kg WMB	<0.01*	<0.01*	<0.01*	<0.01*	*IS*	*IS*
	GYM	mg/kg WMB	<0.01*	<0.01*	<0.01*	<0.01*	*IS*	*IS*
	Homo-YTX	mg/kg WMB	<0.02*	<0.02*	<0.02*	<0.02*	*IS*	*IS*
	OA Free	mg/kg WMB	<0.01*	<0.01*	<0.01*	<0.01*	*IS*	*IS*
	OA Total	mg/kg WMB	<0.01*	<0.01*	<0.01*	<0.01*	*IS*	*IS*
	PnTx-G	mg/kg WMB	<0.01*	<0.01*	<0.01*	<0.01*	*IS*	*IS*
	PTX2	mg/kg WMB	<0.01*	<0.01*	<0.01*	<0.01*	*IS*	*IS*
	SPX1	mg/kg WMB	<0.01*	<0.01*	<0.01*	<0.01*	*IS*	*IS*
	Total DST	OA eq. mg/kg	<0.01*	<0.01*	<0.01*	<0.01*	*IS*	*IS*
	YTX	mg/kg WMB	<0.01*	<0.01*	<0.01*	<0.01*	*IS*	*IS*
3411A	Brevetoxin 1	mg/kg WMB	<0.10*	<0.10*	<0.10*	<0.10*	<0.10*	<0.10*
	Brevetoxin 2	mg/kg WMB	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*
	Brevetoxin 3	mg/kg WMB	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*
3416	C1	STX.2HCl eq. mg/kg	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
	C2	STX.2HCl eq. mg/kg	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*
	C3	STX.2HCl eq. mg/kg	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*
	C4	STX.2HCl eq. mg/kg	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*
	dcGTX1	STX.2HCl eq. mg/kg	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*
	dcGTX2	STX.2HCl eq. mg/kg	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*
	dcGTX3	STX.2HCl eq. mg/kg	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*
	dcGTX4	STX.2HCl eq. mg/kg	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*

IS- Insufficient Sample

* NATA accreditation does not cover this result

Chemistry Test Results (Biota - Food)

		Sample Description	Kidney	Heart	Brain	Lung	Spleen	Proventricular CT
		Sampled Date/ Time	30/05/25 0:00	30/05/25 0:00	30/05/25 0:00	30/05/25 0:00	30/05/25 0:00	30/05/25 0:00
Method ID	Analyte	Units	391421	391422	391423	391424	391425	391426
3416	dcNEO	STX.2HCl eq. mg/kg	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*
	dcSTX	STX.2HCl eq. mg/kg	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
	doSTX	STX.2HCl eq. mg/kg	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
	GTX1	STX.2HCl eq. mg/kg	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
	GTX2	STX.2HCl eq. mg/kg	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
	GTX3	STX.2HCl eq. mg/kg	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
	GTX4	STX.2HCl eq. mg/kg	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
	GTX5	STX.2HCl eq. mg/kg	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*
	GTX6	STX.2HCl eq. mg/kg	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*
	NEO	STX.2HCl eq. mg/kg	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*
	STX	STX.2HCl eq. mg/kg	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*
	Total PST	STX.2HCl eq. mg/kg	<0.10*	<0.10*	<0.10*	<0.10*	<0.10*	<0.10*

IS- Insufficient Sample

* NATA accreditation does not cover this result