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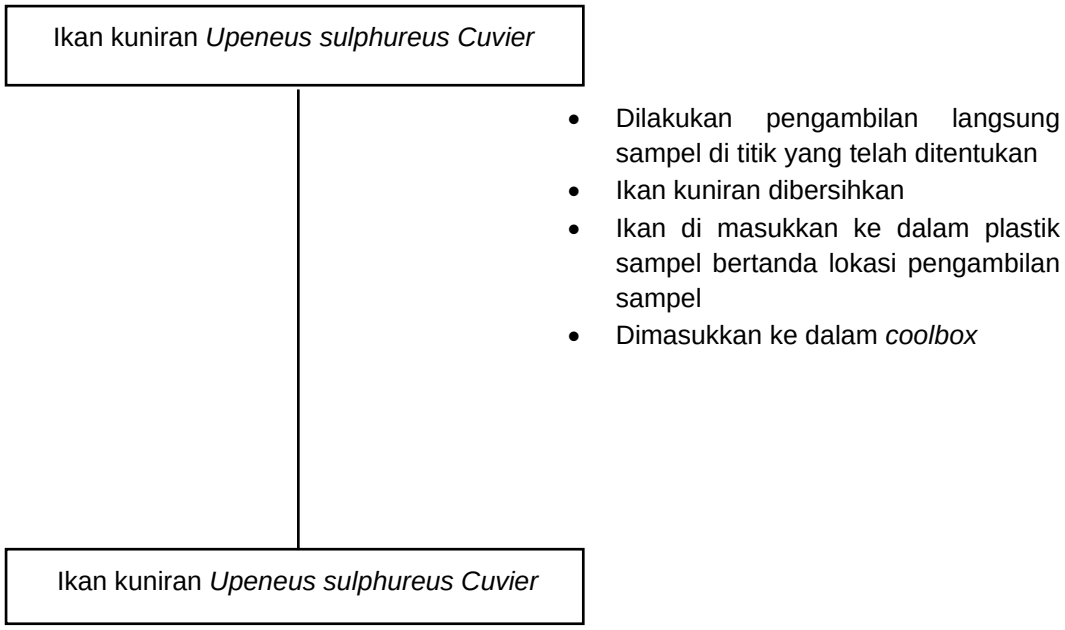
LAMPIRAN

Lampiran 1. Skema kerja pengambilan sampel ikan kuniran



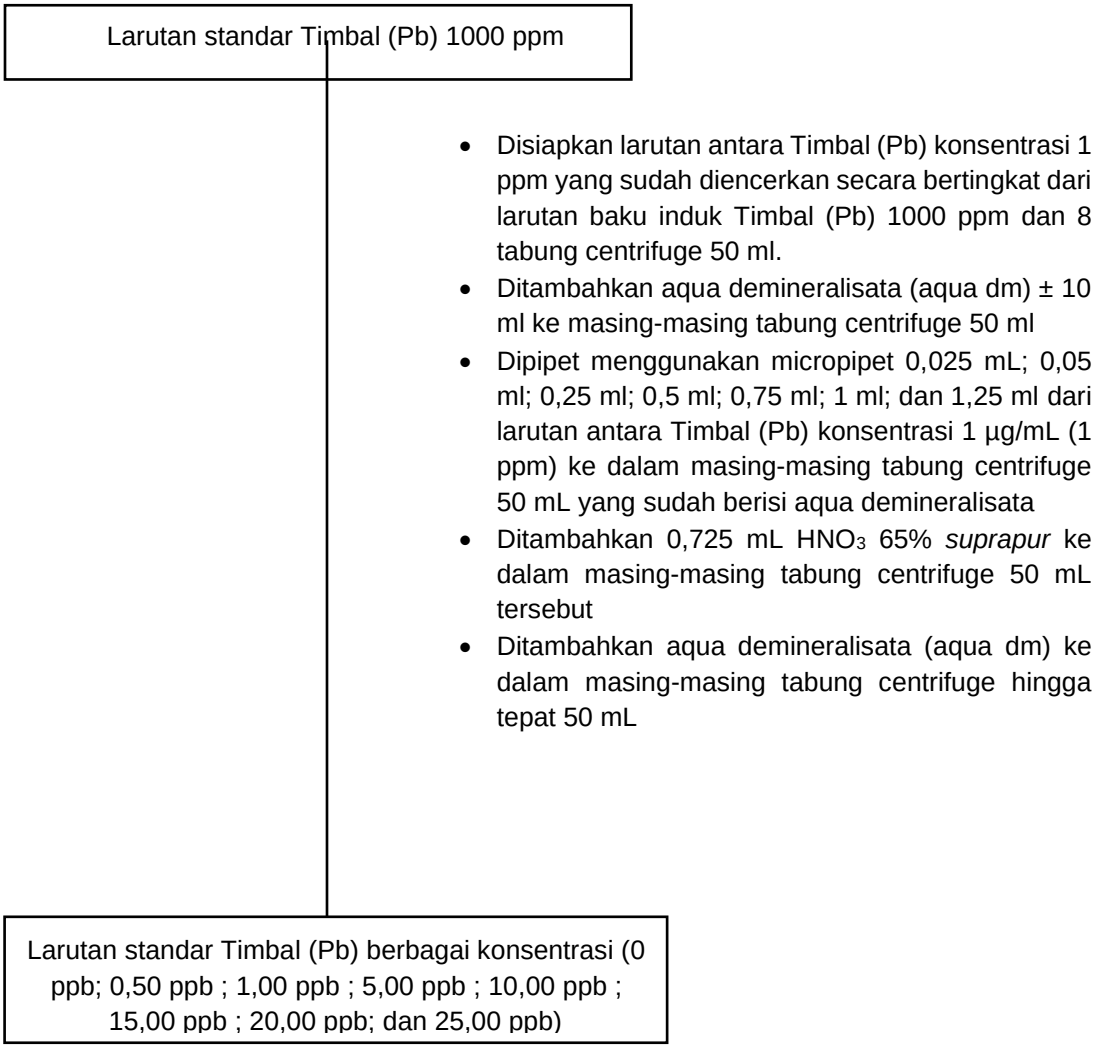
Lampiran 2. Skema kerja preparasi sampel ikan kuniran

Daging Ikan kuniran *Upeneus sulphureus Cuvier*

- Daging ikan kuniran pada masing-masing stasiun diambil menggunakan pisau dibagian *truncus* (badan).
- Daging ikan kuniran pada masing-masing stasiun di destruksi menggunakan blender dan dimasukkan ke plastik sampel bertanda
- Ditimbang vessel kosong untuk masing-masing stasiun pengambilan sampel ikan kuniran
- Ditambahkan sampel ikan kuniran sebanyak 0,5 gram dari masing-masing stasiun pengambilan sampel yang sudah didestruksi ke vessel kosong dan dicatat beratnya.
- Ditambahkan 5 ml HNO_3 65% *suprapur*, HCl 37% 1 ml, dan H_2O_2 30% 1 ml ke masing-masing vessel yang bertanda lokasi pengambilan sampel dan diamkan selama ± 10 menit.
- Dimasukkan vessel ke microwave digestion selama ± 1 jam.
- Dikeluarkan dari microwave digestion dan didinginkan.
- Dipindahkan masing-masing larutan yang berada di vessel tersebut ke tabung centrifuge ukuran 50 ml.
- ditambahkan 1 ml asam asetat glasial dan 0,25 ml larutan baku internal campuran dengan konsentrasi 0,5 µg/ml, ditepatkan hingga tanda dengan aqua demineralisata (aqua dm)

Larutan sampel Ikan kuniran *Upeneus sulphureus Cuvier*

Lampiran 3. Skema Pembuatan larutan standar Timbal (Pb)



Lampiran 4. Skema Pembuatan larutan standar Kadmium (Cd)

Larutan standar Kadmium (Cd) 1000 ppm

- Disiapkan larutan antara Kadmium (Cd) konsentrasi 1 ppm yang sudah diencerkan secara bertingkat dari larutan baku induk Kadmium (Cd) 1000 ppm dan 8 tabung centrifuge 50 ml.
- Ditambahkan aqua demineralisata (aqua dm) ± 10 ml ke masing-masing tabung centrifuge 50 ml
- Dipipet menggunakan micropipet 0,025 mL; 0,05 ml; 0,25 ml; 0,5 ml; 0,75 ml; 1 ml; dan 1,25 ml dari larutan antara Kadmium (Cd) konsentrasi 1 µg/mL (1 ppm) ke dalam masing-masing tabung centrifuge 50 mL yang sudah berisi aqua demineralisata
- Ditambahkan 0,725 mL HNO_3 65% *suprapur* ke dalam masing-masing tabung centrifuge 50 mL tersebut
- Ditambahkan aqua demineralisata (aqua dm) ke dalam masing-masing tabung centrifuge hingga tepat 50 mL

Larutan standar Kadmium (Cd) berbagai konsentrasi (0 ppb; 0,50 ppb ; 1,00 ppb ; 5,00 ppb ; 10,00 ppb ; 15,00 ppb ; 20,00 ppb; dan 25,00 ppb)

Lampiran 5. Sampel ikan kuniran *Upeneus sulphureus Cuvier* pada masing-masing stasiun

Lampiran 6. Hasil uji lab kandungan logam berat pada ikan kuniran lokasi 1

BALAI PENGAWAS OBAT DAN MAKANAN DI PALU
Jl. Undata No. 3 Palu Sulawesi Tengah 94111 Telp. (0451) 428738, Fax. 423088
BADAN POM Email: bpom_palu@pom.go.id, balaipompalu@gmail.com, ulpk_palu@yahoo.co.id

LAPORAN PENGUJIAN
Nomor : LHU.103.K.06.13.24.0003

Nama Sampel	: Ikan Kuniran Upeneus Sulphureus Cuvier (Lokasi 1) 060
Nomor Kode Sampel	: 24.103.10.13.06.0001.K
No. Bets/Lot	: -
Tanggal Kadaluarsa	:
No.Registrasi	: -
Nama Produsen	: -
Kemasan	: Pelastik bening (Baik)
Jumlah Sampel	: 1 Plastik (Netto : -)
Pengirim Sampel	: Universitas Hasanuddin
Alamat Pengirim	: Jalan Perintis Kemerdekaan KM 10
No dan Tanggal Surat Permohonan Uji	: 11495/UN4.11/PT.01.04/2024 / 19-02-2024
Tanggal sampel diterima	: 13-03-2024
Laboratorium Pelaksana Pengujian	: BALAI POM DI PALU
Alamat Laboratorium Pelaksana Pengujian	: Jln.Undata No.03 Palu, Sulawesi Tengah
Tanggal Mulai Pengujian	: 18-03-2024
Tanggal Selesai Pengujian	: 02-04-2024

Hasil Pengujian
Pemerian/organoleptis : Bentuk : Padat Warna : Pucat Bau : Normal

No	Uji yang dilakukan Jenis/Parameter Uji	Hasil	Syarat	Pustaka	Metode
1	PK Cemaran logam berat Cd	- 0,0162 mg/Kg	sesuai ketentuan	MA PPPOMN 14/PA/MA-PPPOMN/22	ICPMS
2	PK Cemaran Logam berat Pb	- 0,0594 mg/Kg	sesuai ketentuan	MA PPPOMN 14/PA/MA-PPPOMN/22	ICPMS

Kesimpulan : Sampel Memenuhi Syarat sesuai Parameter Uji yang dilakukan.

Laporan Pengujian ini dikeluarkan di Palu
Pada Tanggal: 02-04-2024

Laporan Pengujian ini hanya berlaku untuk sampel yang diuji
Pengambilan sampel di luar tanggung jawab BPOM

Ketua Tim Pengujian

Agung Darmawati, S. Farm., Apt., M. Si.
NIP. 198307012007122001

Lampiran 7. Hasil uji lab kandungan logam berat pada ikan kuniran lokasi 2

BADAN POM
BALAI PENGAWAS OBAT DAN MAKANAN DI PALU
Jl. Undata No. 3 Palu Sulawesi Tengah 94111 Telp. (0451) 428738, Fax. 423088
Email: bpom_palu@pom.go.id, balaipompalu@gmail.com, ulpk_palu@yahoo.co.id

LAPORAN PENGUJIAN
Nomor : LHU.103.K.06.13.24.0002

Nama Sampel	: Ikan Kuniran Upeneus Sulphureus Cuvier (Lokasi 2) 061
Nomor Kode Sampel	: 24.103.10.13.06.0002.K
No. Bets/Lot	: -
Tanggal Kadaluarsa	:
No.Registrasi	: -
Nama Produsen	: -
Kemasan	: Pelastik Bening (-)
Jumlah Sampel	: 1 Plastik (Netto : -)
Pengirim Sampel	: Universitas Hasanuddin
Alamat Pengirim	: Jalan Perintis Kemerdekaan KM 10
No dan Tanggal Surat Permohonan Uji	: 11495/UN4.11/PT.01.04/2024 / 19-02-2024
Tanggal sampel diterima	: 13-03-2024
Laboratorium Pelaksana Pengujian	: BALAI POM DI PALU
Alamat Laboratorium Pelaksana Pengujian	: Jln.Undata No.03 Palu, Sulawesi Tengah
Tanggal Mulai Pengujian	: 18-03-2024
Tanggal Selesai Pengujian	: 02-04-2024

Hasil Pengujian
Pemerian/organoleptis : Bentuk : Padat Warna : Putih Pucat Bau : Normal

No	Uji yang dilakukan Jenis/Parameter Uji	Hasil	Syarat	Pustaka	Metode
1	PK Cemaran Logam berat Pb	- 0,0182 mg/Kg	sesuai ketentuan	MA PPPOMN 14/PA/MA-PPPOMN/22	ICPMS
2	PK Cemaran logam berat Cd	- Negatif	sesuai ketentuan	MA PPPOMN 14/PA/MA-PPPOMN/22	ICPMS

Kesimpulan : Hasil Pengujian Seperti Tersebut

Laporan Pengujian ini dikeluarkan di Palu
Pada Tanggal: 02-04-2024

Laporan Pengujian ini hanya berlaku untuk sampel yang diuji
Pengambilan sampel di luar tanggung jawab BPOM

Ketua Tim Pengujian

Agung Darmawati, S. Farm., Apt., M. Si.
NIP. 198307012007122001

Lampiran 8. Hasil uji lab kandungan logam berat pada ikan kuniran lokasi 3

BADAN POM
BALAI PENGAWAS OBAT DAN MAKANAN DI PALU
Jl. Undata No. 3 Palu Sulawesi Tengah 94111 Telp. (0451) 428738, Fax. 423088
Email: bpom_palu@pom.go.id, balaipompalu@gmail.com, ulpk_palu@yahoo.co.id

LAPORAN PENGUJIAN
Nomor : LHU.103.K.06.13.24.0001

Nama Sampel	: Ikan Kuniran Upeneus Sulphureus Cuvier (Lokasi 3) 062
Nomor Kode Sampel	: 24.103.10.13.06.0003.K
No. Bets/Lot	: -
Tanggal Kadaluarsa	:
No.Registrasi	: -
Nama Produsen	: -
Kemasan	: Pelastik Bening (-)
Jumlah Sampel	: 1 Plastik (Netto : -)
Pengirim Sampel	: Universitas Hasanuddin
Alamat Pengirim	: Jalan Perintis Kemerdekaan KM 10
No dan Tanggal Surat Permohonan Uji	: 11495/UN4.11/PT.01.04/2024 / 19-02-2024
Tanggal sampel diterima	: 13-03-2024
Laboratorium Pelaksana Pengujian	: BALAI POM DI PALU
Alamat Laboratorium Pelaksana Pengujian	: Jln.Undata No.03 Palu, Sulawesi Tengah
Tanggal Mulai Pengujian	: 18-03-2024
Tanggal Selesai Pengujian	: 02-04-2024

Hasil Pengujian
Pemerian/organoleptis : Bentuk : Padat Warna : Putih Pucat Bau : Normal

No	Uji yang dilakukan Jenis/Parameter Uji	Hasil	Syarat	Pustaka	Metode
1	Penetapam Kadar Cemaran Logam Cd	- 0,0144 mg/Kg	sesuai ketentuan	MA PPPOMN 14/PA/MA-PPPOMN/22	ICPMS
2	Penetapan Kadar Cemaran Logam Berat Pb	- 0,0133 mg/Kg	sesuai ketentuan	MA PPPOMN 14/PA/MA-PPPOMN/22	ICPMS

Kesimpulan : Hasil Pengujian Seperti Tersebut

Laporan Pengujian ini dikeluarkan di Palu
Pada Tanggal: 02-04-2024

Laporan Pengujian ini hanya berlaku untuk sampel yang diuji
Pengambilan sampel di luar tanggung jawab BPOM

Ketua Tim Pengujian

Agung Darmawati, S. Farm., Apt., M. Si.
NIP. 198307012007122001

Lampiran 9. Perhitungan konsentrasi logam berat Timbal (Pb) pada sampel ikan kuniran di lokasi 1

No. Form : FK
Terbit/Tgl : 1/21-06-2023
Rev/Tgl

LAMPIRAN CATATAN PENGUJIAN
Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

Nama Contoh : Sampel P3 (Ikan Kuniran) Lokasi I Zat yang Diuji : Timbal (Pb)	No. Kode Contoh : 24.103.10.13.06.0001 No. Batch : -	Tgl. Diterima : 18 Maret 2024
Merk Alat Thermo Fisher Scientific	Tipe / Seri : iCAP RQ RQ03881 Gas : Argon, Helium	Recorder / Printer : HP LaserJet P1102

Pelarut	: *Aquadem + 5 ml HNO3 pekat + 1 ml H2O2 30% + 1 ml HCl 37% + 1 ml AAG + 250 µl Baku Internal*		
Forward Power	: 1500 W	*Pole Bias*	: -18
Spray Chamber Temp	: 2,70	*Sample Uptake/Wash Time*	: 110 s each
Nebulizer Flow	: 1.046 L·min-1	*Dwell Times*	: Optimized per analyte
Auxiliary Flow	: 0.8 L·min-1	*Virtual CCT Mass to Dac factor*	: 60
Cool Gas Flow	: 14.0 L·min-1	*Virtual CCT Mass parameter*	: 1
Focus Lens	: -8,00		
		Kondisi Tunning	**: *Memenuhi Syarat***

Nama Zat	Kadar teoritis baku (ng/mL)	Bobot			Faktor Pengenceran	Respon (Cps) Ratio Pb/Bi	Konsentrasi (ng/mL)	Intensitas (cps) Ratio Pb/Bi
		Wadah +Zat	Wadah +Sisa	Bobot Zat				
Baku pembanding								
STD 0	0						-0,144	0,0214
STD 1	0,50						0,500	0,2027
STD 2	1,00						0,893	0,3132
STD 3	5,00						4,819	1,4161
STD 4	10,00						9,623	2,7661
STD 5	15,00						14,802	4,2176
STD 6	20,00						20,209	5,6795
STD 7	25,00						24,858	7,0320
							a =	0,0653
							b =	0,2796
							r =	0,99998
Bobot Uji								
Sampel 1		157,4517	156,9408	0,5109	50	0,226	0,5740	
Sampel 2		157,2078	156,6867	0,5211	50	0,241	0,6279	
Blanko						0,062	-0,0125	

Perhitungan :

Perhitungan kadar (mg/Kg) = $(C - Cblk)/W \times FP/1000$

Sampel 1 = [(0,5740--0,0125)/0,5109]x50/1000
= **0,0574 mg/Kg**
Sampel 2 = [(0,6279--0,0125)/0,5211]x50/1000
= **0,0614 mg/Kg**

Rerata ***0,0594 mg/Kg***

Pustaka Metode	: 14/PA-MA PPPOMN/22	Syarat :	Maks. 0,3 mg/kg
		Pustaka Syara :	SNI 2729:2013
Kesimpulan	: Contoh tersebut di atas **memenuhi syarat** terhadap parameter uji yang dilakukan		
Penguji	: Aurikhard Lameanda	Diperiksa oleh :	Agung Darmawati
Tanggal	: **18 - 22 Maret 2024**	Tanggal :	

Lembar ..... dari ..... halaman

Lampiran 10. Perhitungan konsentrasi logam berat Timbal (Pb) pada sampel ikan kuniran di lokasi 2

No. Form : FK
Terbit/Tgl : 1/21-06-2023
Rev/Tgl

LAMPIRAN CATATAN PENGUJIAN
Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

Nama Contoh : Sampel P3 (Ikan Kuniran) Lokasi II Zat yang Diuji : Timbal (Pb)	No. Kode Contoh : 24.103.10.13.06.0002 No. Batch : -	Tgl. Diterima : 18 Maret 2024
Merk Alat Thermo Fisher Scientific	Tipe / Seri : iCAP RQ RQ03881 Gas : Argon, Helium	Recorder / Printer : HP LaserJet P1102

Pelarut : *Aquadem + 5 ml HNO3 pekat + 1 ml H2O2 30% + 1 ml HCl 37% + 1 ml AAG + 250 µl Baku Internal*

Forward Power	: 1500 W	*Pole Bias*	: -18
Spray Chamber Temp	: 2,70	*Sample Uptake/Wash Time*	: 110 s each
Nebulizer Flow	: 1.046 L·min-1	*Dwell Times*	: Optimized per analyte
Auxiliary Flow	: 0.8 L·min-1	*Virtual CCT Mass to Dac factor*	: 60
Cool Gas Flow	: 14.0 L·min-1	*Virtual CCT Mass parameter*	: 1
Focus Lens	: -8,00		

Kondisi Tunning : ***Memenuhi Syarat***

Nama Zat	Kadar teoritis baku (ng/mL)	Bobot			Faktor Pengenceran	Respon (Cps) Ratio Pb/Bi	Konsentrasi (ng/mL)	Intensitas (cps) Ratio Pb/Bi
		Wadah +Zat	Wadah +Sisa	Bobot Zat				
Baku pembanding								
STD 0	0						-0,144	0,0214
STD 1	0,50						0,500	0,2027
STD 2	1,00						0,893	0,3132
STD 3	5,00						4,819	1,4161
STD 4	10,00						9,623	2,7661
STD 5	15,00						14,802	4,2176
STD 6	20,00						20,209	5,6795
STD 7	25,00						24,858	7,0320
							a =	0,0653
							b =	0,2796
							r =	0,99998
Bobot Uji								
Sampel 1		158,5440	158,0337	0,5103	50	0,113	0,1711	
Sampel 2		158,3628	157,8516	0,5112	50	0,115	0,1765	
Blanko						0,062	-0,0125	

Perhitungan :

Perhitungan kadar (mg/Kg) = $(C - Cblk)/W \times FP/1000$

Sampel 1 = [(0,1711--0,0125)/0,5103]x50/1000
= **0,0180 mg/Kg**
Sampel 2 = [(0,1765--0,0125)/0,5112]x50/1000
= **0,0185 mg/Kg**

Rerata 0,0182 mg/Kg

Pustaka Metode	: 14/PA-MA PPPOMN/22	Syarat :	Maks. 0,3 mg/kg
		Pustaka Syara :	SNI 2729:2013
Kesimpulan	: Contoh tersebut di atas **memenuhi syarat** terhadap parameter uji yang dilakukan		
Penguji	: Aurikhard Lameanda	Diperiksa oleh :	Agung Darmawati
Tanggal	: **18 - 22 Maret 2024**	Tanggal :	

Lembar ……. dari ……. halaman

Lampiran 11. Perhitungan konsentrasi logam berat Timbal (Pb) pada sampel ikan kuniran di lokasi 3

No. Form : FK
Terbit/Tgl : 1/21-06-2023
Rev/Tgl

LAMPIRAN CATATAN PENGUJIAN
Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

Nama Contoh : Sampel P3 (Ikan Kuniran) Lokasi III	No. Kode Contoh : 24.103.10.13.06.0003	Tgl. Diterima : 18 Maret 2024
Zat yang Diuji : Timbal (Pb)	No. Batch : -	
Merk Alat Thermo Fisher Scientific	Tipe / Seri : iCAP RQ RQ03881 Gas : Argon, Helium	Recorder / Printer : HP LaserJet P1102

Pelarut : *Aquadem + 5 ml HNO3 pekat + 1 ml H2O2 30% + 1 ml HCl 37% + 1 ml AAG + 250 µl Baku Internal*

Forward Power	: 1500 W	*Pole Bias*	: -18
Spray Chamber Temp	: 2,70	*Sample Uptake/Wash Time*	: 110 s each
Nebulizer Flow	: 1.046 L·min-1	*Dwell Times*	: Optimized per analyte
Auxiliary Flow	: 0.8 L·min-1	*Virtual CCT Mass to Dac factor*	: 60
Cool Gas Flow	: 14.0 L·min-1	*Virtual CCT Mass parameter*	: 1
Focus Lens	: -8,00		

Kondisi Tunning : ***Memenuhi Syarat***

Nama Zat	Kadar teoritis baku (ng/mL)	Bobot			Faktor Pengenceran	Respon (Cps) Ratio Pb/Bi	Konsentrasi (ng/mL)	Intensitas (cps) Ratio Pb/Bi
		Wadah +Zat	Wadah +Sisa	Bobot Zat				
Baku pembanding								
STD 0	0						-0,144	0,0214
STD 1	0,50						0,500	0,2027
STD 2	1,00						0,893	0,3132
STD 3	5,00						4,819	1,4161
STD 4	10,00						9,623	2,7661
STD 5	15,00						14,802	4,2176
STD 6	20,00						20,209	5,6795
STD 7	25,00						24,858	7,0320
							a =	0,0653
							b =	0,2796
							r =	0,99998
Bobot Uji								
Sampel 1		158,8186	158,2779	0,5407	50	0,109	0,1546	
Sampel 2		158,2075	157,6954	0,5121	50	0,100	0,1235	
Blanko						0,062	-0,0125	

Perhitungan :

Perhitungan kadar (mg/Kg) = $(C - Cblk)/W \times FP/1000$

Sampel A = [(0,1546--0,0125)/0,5407]x50/1000
= **0,0155 mg/Kg**
Sampel B = [(0,1235--0,0125)/0,5121]x50/1000
= **0,0133 mg/Kg**

Rerata ***0,0144 mg/Kg***

Pustaka Metode	: 14/PA-MA PPPOMN/22	Syarat : Pustaka Syara :	Maks. 0,3 mg/kg SNI 2729:2013
Kesimpulan	: Contoh tersebut di atas **memenuhi syarat** terhadap parameter uji yang dilakukan		
Penguji	: Aurikhard Lameanda	Diperiksa oleh :	Agung Darmawati
Tanggal	: **18 - 22 Maret 2024**	Tanggal :	

Lembar ..... dari ..... halaman

Lampiran 12. Perhitungan konsentrasi logam berat Kadmium (Cd) pada sampel ikan kuniran di lokasi 1

No. Form : FK
Terbit/Tgl : 1/21-06-2023
Rev/Tgl

LAMPIRAN CATATAN PENGUJIAN
Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

Nama Contoh : Sampel P3 (Ikan Kuniran) Lokasi I Zat yang Diuji : Cadmium (Cd)	No. Kode Contoh : 24.103.10.13.06.0001 No. Batch : -	Tgl. Diterima : 18 Maret 2024
Merk Alat Thermo Fisher Scientific	Tipe / Seri : iCAP RQ RQ03881 Gas : Argon, Helium	Recorder / Printer : HP LaserJet P1102

Pelarut : *Aquadem + 5 ml HNO3 pekat + 1 ml H2O2 30% + 1 ml HCl 37% + 1 ml AAG + 250 µl Baku Internal*

Forward Power	: 1500 W	*Pole Bias*	: -18
Spray Chamber Temp	: 2,70	*Sample Uptake/Wash Time*	: 110 s each
Nebulizer Flow	: 1.046 L·min-1	*Dwell Times*	: Optimized per analyte
Auxiliary Flow	: 0.8 L·min-1	*Virtual CCT Mass to Dac factor*	: 60
Cool Gas Flow	: 14.0 L·min-1	*Virtual CCT Mass parameter*	: 1
Focus Lens	: -8,00		

Kondisi Tunning : ***Memenuhi Syarat***

Nama Zat	Kadar teoritis baku (ng/mL)	Bobot			Faktor Pengenceran	Respon (Cps) Ratio Cd/Rh	Konsentrasi (ng/mL)	Intensitas (cps) Ratio Cd/Rh
		Wadah +Zat	Wadah +Sisa	Bobot Zat				
Baku pembanding								
STD 0	0						-0,234	0,0000
STD 1	0,50						0,521	0,0145
STD 2	1,00						0,624	0,0162
STD 3	5,00						4,552	0,0914
STD 4	10,00						9,148	0,1801
STD 5	15,00						14,753	0,2870
STD 6	20,00						18,272	0,3552
STD 7	25,00						25,806	0,4986
							a =	0,0044
							b =	0,0192
							r =	1,00000
Bobot Uji								
Sampel 1		157,4517	156,9408	0,5109	50	0,007	0,1553	
Sampel 2		157,2078	156,6867	0,5211	50	0,008	0,1821	
Blanko						0,004	0,0013	

Perhitungan :

Perhitungan kadar (mg/Kg) = $(C - Cblk)/W \times FP/1000$

Sampel A = [(0,1553-0,0013)/0,5109]x50/1000
= **0,0151 mg/Kg**
Sampel B = [(0,1821-0,0013)/0,5211]x50/1000
= **0,0173 mg/Kg**

0,0162 mg/Kg

Pustaka Metode	: 14/PA-MA PPPOMN/22	Syarat :	Maks. 0,1 mg/kg
		Pustaka Syara :	SNI 2729:2013
Kesimpulan	: Contoh tersebut di atas **memenuhi syarat** terhadap parameter uji yang dilakukan		
Penguji	: Aurikhard Lameanda	Diperiksa oleh :	Agung Darmawati
Tanggal	: **18 - 22 Maret 2024**	Tanggal :	

Lembar ..... dari ..... halaman

Lampiran 13. Perhitungan konsentrasi logam berat Kadmium (Cd) pada sampel ikan kuniran di lokasi 2

No. Form : FK
Terbit/Tgl : 1/21-06-2023
Rev/Tgl

LAMPIRAN CATATAN PENGUJIAN
Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

Nama Contoh : Sampel P3 (Ikan Kuniran) Lokasi II	No. Kode Contoh : 24.103.10.13.06.0002	Tgl. Diterima : 18 Maret 2024
Zat yang Diuji : Cadmium (Cd)	No. Batch : -	
Merk Alat Thermo Fisher Scientific	Tipe / Seri : iCAP RQ RQ03881 Gas : Argon, Helium	Recorder / Printer : HP LaserJet P1102

Pelarut	: *Aquadem + 5 ml HNO3 pekat + 1 ml H2O2 30% + 1 ml HCl 37% + 1 ml AAG + 250 µl Baku Internal*		
Forward Power	: 1500 W	*Pole Bias*	: -18
Spray Chamber Temp	: 2,70	*Sample Uptake/Wash Time*	: 110 s each
Nebulizer Flow	: 1.046 L·min-1	*Dwell Times*	: Optimized per analyte
Auxiliary Flow	: 0.8 L·min-1	*Virtual CCT Mass to Dac factor*	: 60
Cool Gas Flow	: 14.0 L·min-1	*Virtual CCT Mass parameter*	: 1
Focus Lens	: -8,00		
		Kondisi Tunning	: ***Memenuhi Syarat***

Nama Zat	Kadar teoritis baku (ng/mL)	Bobot			Faktor Pengenceran	Respon (Cps) Ratio Cd/Rh	Konsentrasi (ng/mL)	Intensitas (cps) Ratio Cd/Rh
		Wadah +Zat	Wadah +Sisa	Bobot Zat				
Baku pembanding								
STD 0	0						-0,234	0,0000
STD 1	0,50						0,521	0,0145
STD 2	1,00						0,624	0,0162
STD 3	5,00						4,552	0,0914
STD 4	10,00						9,148	0,1801
STD 5	15,00						14,753	0,2870
STD 6	20,00						18,272	0,3552
STD 7	25,00						25,806	0,4986
							a =	0,0044
							b =	0,0192
							r =	1,00000
Bobot Uji								
Sampel 1		158,5440	158,0337	0,5103	50	0,001	-0,1584	
Sampel 2		158,3628	157,8516	0,5112	50	0,001	-0,1946	
Blanko						0,004	0,0013	

Perhitungan :

Perhitungan kadar (mg/Kg) = $(C - Cblk)/W \times FP/1000$

= [(-0,1584-0,0013)/0,5103]x50/1000

= **-0,0156 mg/Kg**

Sampel = [(-0,1946-0,0013)/0,5112]x50/1000

= **-0,0192 mg/Kg**

-0,0174 mg/Kg

Pustaka Metode	: 14/PA-MA PPPOMN/22	Syarat :	Maks. 0,1 mg/kg
		Pustaka Syara :	SNI 2729:2013
Kesimpulan	: Contoh tersebut di atas **memenuhi syarat** terhadap parameter uji yang dilakukan		
Penguji	: Aurikhard Lameanda	Diperiksa oleh :	Agung Darmawati
Tanggal	: **18 - 22 Maret 2024**	Tanggal :	

Lembar ..... dari ..... halaman

Lampiran 14. Perhitungan konsentrasi logam berat Kadmium (Cd) pada sampel ikan kuniran di lokasi 3

No. Form : FK
Terbit/Tgl : 1/21-06-2023
Rev/Tgl

LAMPIRAN CATATAN PENGUJIAN
Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

Nama Contoh : Sampel P3 (Ikan Kuniran) Lokasi III	No. Kode Contoh : 24.103.10.13.06.0003	Tgl. Diterima : 18 Maret 2024
Zat yang Diuji : Cadmium (Cd)	No. Batch : -	
Merk Alat Thermo Fisher Scientific	Tipe / Seri : iCAP RQ RQ03881 Gas : Argon, Helium	Recorder / Printer : HP LaserJet P1102

Pelarut : *Aquadem + 5 ml HNO3 pekat + 1 ml H2O2 30% + 1 ml HCl 37% + 1 ml AAG + 250 µl Baku Internal*

Forward Power	: 1500 W	*Pole Bias*	: -18
Spray Chamber Temp	: 2,70	*Sample Uptake/Wash Time*	: 110 s each
Nebulizer Flow	: 1.046 L·min-1	*Dwell Times*	: Optimized per analyte
Auxiliary Flow	: 0.8 L·min-1	*Virtual CCT Mass to Dac factor*	: 60
Cool Gas Flow	: 14.0 L·min-1	*Virtual CCT Mass parameter*	: 1
Focus Lens	: -8,00		

Kondisi Tunning : ***Memenuhi Syarat***

Nama Zat	Kadar teoritis baku (ng/mL)	Bobot			Faktor Pengenceran	Respon (Cps) Ratio Cd/Rh	Konsentrasi (ng/mL)	Intensitas (cps) Ratio Cd/Rh
		Wadah +Zat	Wadah +Sisa	Bobot Zat				
Baku pembanding								
STD 0	0						-0,234	0,0000
STD 1	0,50						0,521	0,0145
STD 2	1,00						0,624	0,0162
STD 3	5,00						4,552	0,0914
STD 4	10,00						9,148	0,1801
STD 5	15,00						14,753	0,2870
STD 6	20,00						18,272	0,3552
STD 7	25,00						25,806	0,4986
							a =	0,0044
							b =	0,0192
							r =	1,00000
Bobot Uji								
Sampel 1		158,8186	158,2779	0,5407	50	0,007	0,1098	
Sampel 2		158,2075	157,6954	0,5121	50	0,008	0,1701	
Blanko						0,004	0,0013	

Perhitungan :

Perhitungan kadar (mg/Kg) = $(C - Cblk)/W \times FP/1000$

= [(0,1098-0,0013)/0,5407]x50/1000

= **0,0100 mg/Kg**

Sampel = [(0,1701-0,0013)/0,5121]x50/1000

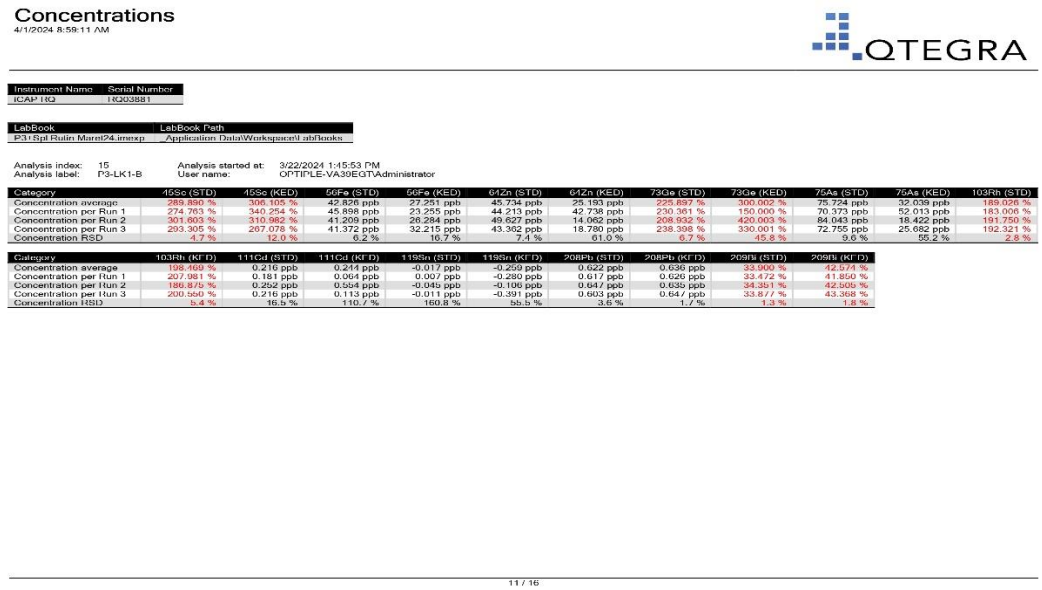
= **0,0165 mg/Kg**

0,0133 mg/Kg

Pustaka Metode	: 14/PA-MA PPPOMN/22	Syarat :	Maks. 0,1 mg/kg
		Pustaka Syara :	SNI 2729:2013
Kesimpulan	: Contoh tersebut di atas **memenuhi syarat** terhadap parameter uji yang dilakukan		
Penguji	: Aurikhard Lameanda	Diperiksa oleh :	Agung Darmawati
Tanggal	: **18 - 22 Maret 2024**	Tanggal :	

Lembar ..... dari ..... halaman

Lampiran 15. Konsentrasi Larutan Standar Pb dan Cd pada sampel ikan kuniran



Concentrations
4/1/2024 8:58:11 AM

QTEGRA

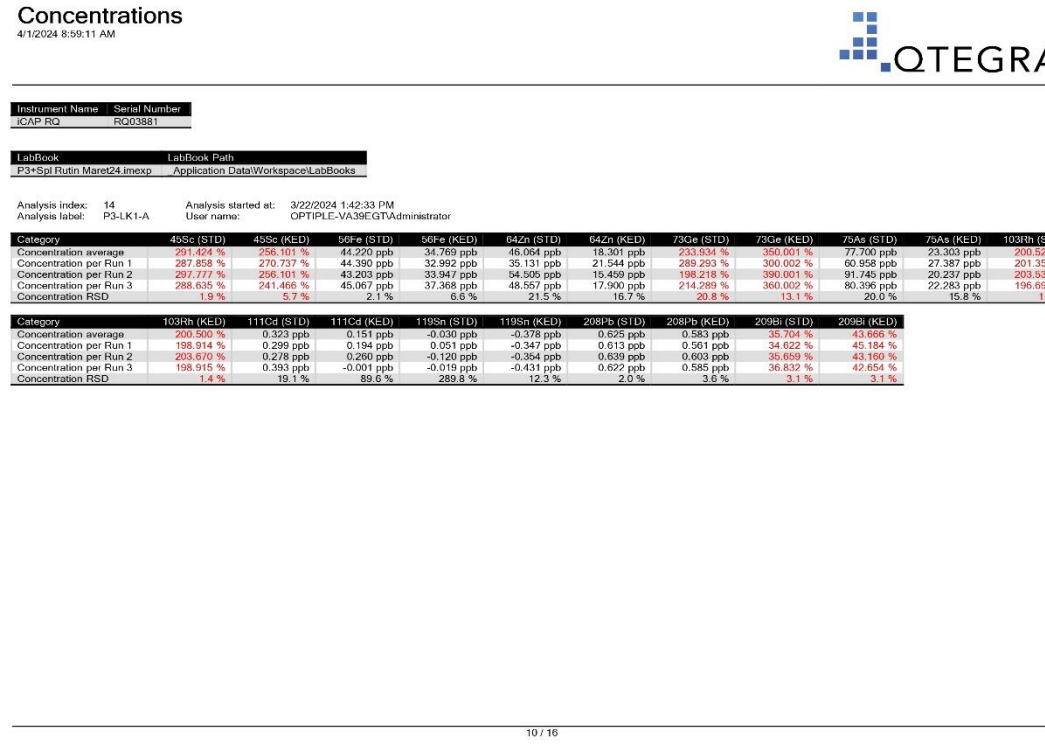
Instrument Name	Serial Number
iCAP RQ	RQ03881

LabBook	LabBook Path
P3+Spl Rutin Maret24.imexp	Application Data\Workspace\LabBooks

Analysis index: 15
Analysis label: P3-LK1-B
Analysis started at: 3/22/2024 1:45:53 PM
User name: OPTIPLE-VA39EGT\Administrator

Category	45Sc (STD)	45Sc (KED)	56Fe (STD)	56Fe (KED)	64Zn (STD)	64Zn (KED)	73Ge (STD)	73Ge (KED)	75As (STD)	75As (KED)	103Rh (STD)
Concentration average	289.890 %	306.105 %	42.826 ppb	27.251 ppb	45.734 ppb	25.193 ppb	225.897 %	300.002 %	75.724 ppb	32.039 ppb	189.026 %
Concentration per Run 1	274.763 %	340.254 %	45.898 ppb	23.255 ppb	44.213 ppb	42.738 ppb	230.361 %	150.000 %	70.373 ppb	52.013 ppb	183.006 %
Concentration per Run 2	301.603 %	310.982 %	41.209 ppb	26.284 ppb	49.627 ppb	14.062 ppb	208.932 %	420.003 %	84.043 ppb	18.422 ppb	191.750 %
Concentration per Run 3	293.305 %	267.078 %	41.372 ppb	32.215 ppb	43.362 ppb	18.780 ppb	238.398 %	330.001 %	72.755 ppb	25.682 ppb	192.321 %
Concentration RSD	4.7 %	12.0 %	6.2 %	16.7 %	7.4 %	61.0 %	6.7 %	45.8 %	9.6 %	55.2 %	2.8 %

Category	103Rh (KED)	111Cd (STD)	111Cd (KED)	119Sn (STD)	119Sn (KED)	208Pb (STD)	208Pb (KED)	209Bi (STD)	209Bi (KED)
Concentration average	198.469 %	0.216 ppb	0.214 ppb	-0.017 ppb	-0.259 ppb	0.622 ppb	0.636 ppb	33.900 %	42.674 %
Concentration per Run 1	207.981 %	0.181 ppb	0.064 ppb	0.007 ppb	-0.280 ppb	0.617 ppb	0.626 ppb	33.472 %	41.850 %
Concentration per Run 2	186.875 %	0.252 ppb	0.554 ppb	-0.049 ppb	-0.106 ppb	0.647 ppb	0.635 ppb	34.351 %	42.505 %
Concentration per Run 3	200.550 %	0.216 ppb	0.113 ppb	-0.011 ppb	-0.391 ppb	0.603 ppb	0.647 ppb	33.877 %	43.368 %
Concentration RSD	5.4 %	16.5 %	110.7 %	160.8 %	55.5 %	3.6 %	1.7 %	1.3 %	1.8 %



Concentrations
4/1/2024 8:59:11 AM

QTEGRA

Instrument Name	Serial Number
iCAP RQ	RQ03881

LabBook	LabBook Path
P3+Spl Rutin Maret24.imexp	Application Data\Workspace\LabBooks

Analysis index: 14
Analysis label: P3-LK1-A
Analysis started at: 3/22/2024 1:42:33 PM
User name: OPTIPLE-VA39EGT\Administrator

Category	45Sc (STD)	45Sc (KED)	56Fe (STD)	56Fe (KED)	64Zn (STD)	64Zn (KED)	73Ge (STD)	73Ge (KED)	75As (STD)	75As (KED)	103Rh (STD)
Concentration average	291.424 %	256.101 %	44.220 ppb	34.769 ppb	46.064 ppb	18.301 ppb	233.934 %	350.001 %	77.700 ppb	23.303 ppb	200.528 %
Concentration per Run 1	287.858 %	270.737 %	44.390 ppb	32.992 ppb	35.131 ppb	21.544 ppb	289.293 %	300.002 %	60.958 ppb	27.387 ppb	201.352 %
Concentration per Run 2	297.777 %	256.101 %	43.203 ppb	33.947 ppb	54.505 ppb	15.459 ppb	198.218 %	390.001 %	91.745 ppb	20.237 ppb	203.538 %
Concentration per Run 3	288.635 %	241.466 %	45.067 ppb	37.368 ppb	48.557 ppb	17.900 ppb	214.289 %	360.002 %	80.396 ppb	22.283 ppb	196.694 %
Concentration RSD	1.9 %	5.7 %	2.1 %	6.6 %	21.5 %	16.7 %	20.8 %	13.1 %	20.0 %	15.8 %	1.7 %

Category	103Rh (KED)	111Cd (STD)	111Cd (KED)	119Sn (STD)	119Sn (KED)	208Pb (STD)	208Pb (KED)	209Bi (STD)	209Bi (KED)
Concentration average	200.500 %	0.323 ppb	0.151 ppb	-0.030 ppb	-0.378 ppb	0.625 ppb	0.583 ppb	35.704 %	43.666 %
Concentration per Run 1	198.914 %	0.299 ppb	0.194 ppb	0.051 ppb	-0.347 ppb	0.613 ppb	0.561 ppb	34.622 %	45.184 %
Concentration per Run 2	203.670 %	0.278 ppb	0.260 ppb	-0.120 ppb	-0.354 ppb	0.639 ppb	0.603 ppb	35.659 %	43.160 %
Concentration per Run 3	198.915 %	0.393 ppb	-0.001 ppb	-0.019 ppb	-0.431 ppb	0.622 ppb	0.585 ppb	36.832 %	42.654 %
Concentration RSD	1.4 %	19.1 %	89.6 %	289.8 %	12.3 %	2.0 %	3.6 %	3.1 %	3.1 %

Concentrations

4/1/2024 8:59:11 AM

QTEGRA

Instrument Name	Serial Number
ICAP RQ	RQ03881

LabBook	LabBook Path
P3+Spl Rutin Maret24.imexp	Application Data\Workspace\LabBooks

Analysis index: 17
Analysis label: P3-LK2-1
Analysis started at: 3/22/2024 1:52:33 PM
User name: OPTIPLE-VA39EGT\Administrator

Category	45Sc (STD)	45Sc (KED)	56Fe (STD)	56Fe (KED)	64Zn (STD)	64Zn (KED)	73Ge (STD)	73Ge (KED)	75As (STD)	75As (KED)	103Rh (STD)
Concentration average	326.767 %	278.055 %	51.263 ppb	59.134 ppb	63.719 ppb	30.154 ppb	225.004 %	300.001 %	46.331 ppb	15.482 ppb	211.523 %
Concentration per Run	326.767 %	278.055 %	51.263 ppb	59.134 ppb	63.719 ppb	30.154 ppb	225.004 %	300.001 %	46.331 ppb	15.482 ppb	211.523 %
Concentration RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Category	103Rh (KED)	111Cd (STD)	111Cd (KED)	119Sn (STD)	119Sn (KED)	208Pb (STD)	208Pb (KED)	209Bi (STD)	209Bi (KED)
Concentration average	213.035 %	-0.098 ppb	-0.162 ppb	-0.108 ppb	-0.328 ppb	0.261 ppb	0.182 ppb	34.216 %	42.029 %
Concentration per Run	213.035 %	-0.098 ppb	-0.162 ppb	-0.108 ppb	-0.328 ppb	0.261 ppb	0.182 ppb	34.216 %	42.029 %
Concentration RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Concentrations

4/1/2024 8:59:11 AM

QTEGRA

Instrument Name	Serial Number
ICAP RQ	RQ03881

LabBook	LabBook Path
P3+Spl Rutin Maret24.imexp	Application Data\Workspace\LabBooks

Analysis index: 18
Analysis label: P3-LK2-2
Analysis started at: 3/22/2024 1:55:48 PM
User name: OPTIPLE-VA39EGT\Administrator

Category	45Sc (STD)	45Sc (KED)	56Fe (STD)	56Fe (KED)	64Zn (STD)	64Zn (KED)	73Ge (STD)	73Ge (KED)	75As (STD)	75As (KED)	103Rh (STD)
Concentration average	308.415 %	340.252 %	52.660 ppb	45.569 ppb	54.771 ppb	25.373 ppb	254.470 %	360.002 %	40.283 ppb	12.973 ppb	199.165 %
Concentration per Run	308.415 %	340.252 %	52.660 ppb	45.569 ppb	54.771 ppb	25.373 ppb	254.470 %	360.002 %	40.283 ppb	12.973 ppb	199.165 %
Concentration RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Category	103Rh (KED)	111Cd (STD)	111Cd (KED)	119Sn (STD)	119Sn (KED)	208Pb (STD)	208Pb (KED)	209Bi (STD)	209Bi (KED)
Concentration average	211.847 %	-0.128 ppb	-0.198 ppb	-0.069 ppb	-0.326 ppb	0.191 ppb	0.187 ppb	32.006 %	40.957 %
Concentration per Run	211.847 %	-0.128 ppb	-0.198 ppb	-0.069 ppb	-0.326 ppb	0.191 ppb	0.187 ppb	32.006 %	40.957 %
Concentration RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Concentrations

4/1/2024 8:59:11 AM

QTEGRA

Instrument Name	Serial Number
iCAP RQ	RQ03881

LabBook	LabBook Path
P3+Spl Rutin Maret24.imexp	Application Data\Workspace\LabBooks

Analysis index: 26
Analysis label: P3-LK3-A
Analysis started at: 3/22/2024 2:22:11 PM
User name: OPTIPLE-VA39EGT\Administrator

Category	45Sc (STD)	45Sc (KED)	56Fe (STD)	56Fe (KED)	64Zn (STD)	64Zn (KED)	73Ge (STD)	73Ge (KED)	75As (STD)	75As (KED)	103Rh (STD)
Concentration average	239.184 %	223.173 %	-6.964 ppb	32.014 ppb	52.171 ppb	21.601 ppb	163.394 %	270.001 %	89.929 ppb	27.027 ppb	147.086 %
Concentration per Run	239.184 %	223.173 %	-6.964 ppb	32.014 ppb	52.171 ppb	21.601 ppb	163.394 %	270.001 %	89.929 ppb	27.027 ppb	147.086 %
Concentration RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Category	103Rh (KED)	111Cd (STD)	111Cd (KED)	119Sn (STD)	119Sn (KED)	208Pb (STD)	208Pb (KED)	209Bi (STD)	209Bi (KED)
Concentration average	159.679 %	0.350 ppb	0.057 ppb	-0.083 ppb	-0.536 ppb	0.180 ppb	0.165 ppb	30.855 %	36.970 %
Concentration per Run	159.679 %	0.350 ppb	0.057 ppb	-0.083 ppb	-0.536 ppb	0.180 ppb	0.165 ppb	30.855 %	36.970 %
Concentration RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Concentrations

4/1/2024 8:59:11 AM

QTEGRA

Instrument Name	Serial Number
iCAP RQ	RQ03881

LabBook	LabBook Path
P3+Spl Rutin Maret24.imexp	Application Data\Workspace\LabBooks

Analysis index: 27
Analysis label: P3-LK3-B
Analysis started at: 3/22/2024 2:25:28 PM
User name: OPTIPLE-VA39EGT\Administrator

Category	45Sc (STD)	45Sc (KED)	56Fe (STD)	56Fe (KED)	64Zn (STD)	64Zn (KED)	73Ge (STD)	73Ge (KED)	75As (STD)	75As (KED)	103Rh (STD)
Concentration average	234.392 %	245.125 %	-6.385 ppb	27.928 ppb	48.644 ppb	18.271 ppb	182.145 %	300.001 %	78.660 ppb	26.697 ppb	147.751 %
Concentration per Run	234.392 %	245.125 %	-6.385 ppb	27.928 ppb	48.644 ppb	18.271 ppb	182.145 %	300.001 %	78.660 ppb	26.697 ppb	147.751 %
Concentration RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Category	103Rh (KED)	111Cd (STD)	111Cd (KED)	119Sn (STD)	119Sn (KED)	208Pb (STD)	208Pb (KED)	209Bi (STD)	209Bi (KED)
Concentration average	159.084 %	0.236 ppb	0.107 ppb	0.037 ppb	0.092 ppb	0.246 ppb	0.135 ppb	29.638 %	40.184 %
Concentration per Run	159.084 %	0.236 ppb	0.107 ppb	0.037 ppb	0.092 ppb	0.246 ppb	0.135 ppb	29.638 %	40.184 %
Concentration RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Concentrations

4/1/2024 9:06:13 AM

QTEGRA

Instrument Name	Serial Number
iCAP RQ	RQ03881

LabBook	LabBook Path
P3+Spl Rutin Maret24.imexp	Application Data\Workspace\LabBooks

Analysis index: 14
Analysis label: P3-LK1-A
Analysis started at: 3/22/2024 1:42:33 PM
User name: OPTIPLE-VA39EGT\Administrator

Category	45Sc (STD)	45Sc (KED)	56Fe (STD)	56Fe (KED)	64Zn (STD)	64Zn (KED)	73Ge (STD)	73Ge (KED)	75As (STD)	75As (KED)	103Rh (STD)
Concentration average	291.424 %	256.101 %	44.220 ppb	34.769 ppb	46.064 ppb	18.301 ppb	233.934 %	350.001 %	77.700 ppb	23.303 ppb	200.528 %
Concentration per Run 1	287.858 %	270.737 %	44.390 ppb	32.992 ppb	35.131 ppb	21.544 ppb	289.293 %	300.002 %	60.958 ppb	27.387 ppb	201.352 %
Concentration per Run 2	297.777 %	256.101 %	43.203 ppb	33.947 ppb	54.505 ppb	15.459 ppb	198.218 %	390.001 %	91.745 ppb	20.237 ppb	203.538 %
Concentration per Run 3	288.635 %	241.466 %	45.067 ppb	37.368 ppb	48.557 ppb	17.900 ppb	214.289 %	360.002 %	80.396 ppb	22.283 ppb	196.694 %
Concentration RSD	1.9 %	5.7 %	2.1 %	6.6 %	21.5 %	16.7 %	20.8 %	13.1 %	20.0 %	15.8 %	1.7 %

Category	103Rh (KED)	111Cd (STD)	111Cd (KED)	119Sn (STD)	119Sn (KED)	208Pb (STD)	208Pb (KED)	209Bi (STD)	209Bi (KED)
Concentration average	200.500 %	0.323 ppb	0.151 ppb	-0.030 ppb	-0.378 ppb	0.625 ppb	0.583 ppb	35.704 %	43.666 %
Concentration per Run 1	198.914 %	0.299 ppb	0.194 ppb	0.051 ppb	-0.347 ppb	0.613 ppb	0.561 ppb	34.622 %	45.184 %
Concentration per Run 2	203.670 %	0.278 ppb	0.260 ppb	-0.120 ppb	-0.354 ppb	0.639 ppb	0.603 ppb	35.659 %	43.160 %
Concentration per Run 3	198.915 %	0.393 ppb	-0.001 ppb	-0.019 ppb	-0.431 ppb	0.622 ppb	0.585 ppb	36.832 %	42.654 %
Concentration RSD	1.4 %	19.1 %	89.6 %	289.8 %	12.3 %	2.0 %	3.6 %	3.1 %	3.1 %

Concentrations

4/1/2024 9:06:13 AM

QTEGRA

Instrument Name	Serial Number
iCAP RQ	RQ03881

LabBook	LabBook Path
P3+Spl Rutin Maret24.imexp	Application Data\Workspace\LabBooks

Analysis index: 15
Analysis label: P3-LK1-B
Analysis started at: 3/22/2024 1:45:53 PM
User name: OPTIPLE-VA39EGT\Administrator

Category	45Sc (STD)	45Sc (KED)	56Fe (STD)	56Fe (KED)	64Zn (STD)	64Zn (KED)	73Ge (STD)	73Ge (KED)	75As (STD)	75As (KED)	103Rh (STD)
Concentration average	289.890 %	306.105 %	42.826 ppb	27.251 ppb	45.731 ppb	25.193 ppb	225.897 %	300.002 %	75.724 ppb	32.030 ppb	189.029 %
Concentration per Run 1	274.763 %	340.254 %	45.898 ppb	23.255 ppb	44.213 ppb	42.738 ppb	230.361 %	150.000 %	70.373 ppb	52.013 ppb	183.006 %
Concentration per Run 2	301.603 %	310.982 %	41.209 ppb	26.284 ppb	49.627 ppb	14.062 ppb	208.932 %	420.003 %	84.043 ppb	18.422 ppb	191.750 %
Concentration per Run 3	293.305 %	267.078 %	41.372 ppb	32.215 ppb	43.362 ppb	18.780 ppb	238.398 %	330.001 %	72.755 ppb	25.682 ppb	192.321 %
Concentration RSD	4.7 %	12.0 %	6.2 %	16.7 %	7.4 %	61.0 %	8.7 %	45.8 %	9.6 %	55.2 %	2.8 %

Category	103Rh (KED)	111Cd (STD)	111Cd (KED)	119Sn (STD)	119Sn (KED)	208Pb (STD)	208Pb (KED)	209Bi (STD)	209Bi (KED)
Concentration average	198.469 %	0.216 ppb	0.244 ppb	-0.017 ppb	-0.259 ppb	0.622 ppb	0.636 ppb	33.900 %	42.574 %
Concentration per Run 1	207.981 %	0.181 ppb	0.064 ppb	0.007 ppb	-0.280 ppb	0.617 ppb	0.625 ppb	33.472 %	41.850 %
Concentration per Run 2	186.875 %	0.252 ppb	0.554 ppb	-0.045 ppb	-0.106 ppb	0.647 ppb	0.635 ppb	34.351 %	42.505 %
Concentration per Run 3	200.550 %	0.216 ppb	0.113 ppb	-0.011 ppb	-0.391 ppb	0.603 ppb	0.647 ppb	33.877 %	43.368 %
Concentration RSD	5.4 %	16.5 %	110.7 %	180.8 %	55.5 %	3.6 %	1.7 %	1.3 %	1.8 %

Concentrations

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QTEGRA

Instrument Name	Serial Number
iCAP RQ	RQ03881

LabBook	LabBook Path
P3+Spl Rutin Maret24.imexp	Application Data\Workspace\LabBooks

Analysis index: 17
Analysis label: P3-LK2-1
Analysis started at: 3/22/2024 1:52:33 PM
User name: OPTIPLE-VA39EGT\Administrator

Category	45Sc (STD)	45Sc (KED)	56Fe (STD)	56Fe (KED)	64Zn (STD)	64Zn (KED)	73Ge (STD)	73Ge (KED)	75As (STD)	75As (KED)	103Rh (STD)
Concentration average	326.767 %	278.055 %	51.263 ppb	59.134 ppb	63.719 ppb	30.154 ppb	225.004 %	300.001 %	46.331 ppb	15.482 ppb	211.523 %
Concentration per Run	326.767 %	278.055 %	51.263 ppb	59.134 ppb	63.719 ppb	30.154 ppb	225.004 %	300.001 %	46.331 ppb	15.482 ppb	211.523 %
Concentration RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Category	103Rh (KED)	111Cd (STD)	111Cd (KED)	119Sn (STD)	119Sn (KED)	208Pb (STD)	208Pb (KED)	209Bi (STD)	209Bi (KED)
Concentration average	213.035 %	-0.098 ppb	-0.162 ppb	-0.108 ppb	-0.328 ppb	0.261 ppb	0.182 ppb	34.216 %	42.029 %
Concentration per Run	213.035 %	-0.098 ppb	-0.162 ppb	-0.108 ppb	-0.328 ppb	0.261 ppb	0.182 ppb	34.216 %	42.029 %
Concentration RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Concentrations

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QTEGRA

Instrument Name	Serial Number
iCAP RQ	RQ03881

LabBook	LabBook Path
P3+Spl Rutin Maret24.imexp	_Application Data\Workspace\LabBooks

Analysis index: 18
Analysis label: P3-LK2-2
Analysis started at: 3/22/2024 1:55:48 PM
User name: OPTIPLE-VA39EGT\Administrator

Category	45Sc (STD)	45Sc (KED)	56Fe (STD)	56Fe (KED)	64Zn (STD)	64Zn (KED)	73Ge (STD)	73Ge (KED)	75As (STD)	75As (KED)	103Rh (STD)
Concentration average	308.415 %	340.252 %	52.660 ppb	45.569 ppb	54.771 ppb	25.373 ppb	254.470 %	360.002 %	40.283 ppb	12.973 ppb	199.165 %
Concentration per Run	308.415 %	340.252 %	52.660 ppb	45.569 ppb	54.771 ppb	25.373 ppb	254.470 %	360.002 %	40.283 ppb	12.973 ppb	199.165 %
Concentration RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Category	103Rh (KED)	111Cd (STD)	111Cd (KED)	119Sn (STD)	119Sn (KED)	208Pb (STD)	208Pb (KED)	209Bi (STD)	209Bi (KED)
Concentration average	211.847 %	-0.128 ppb	-0.198 ppb	-0.069 ppb	-0.326 ppb	0.191 ppb	0.187 ppb	32.006 %	40.957 %
Concentration per Run	211.847 %	-0.128 ppb	-0.198 ppb	-0.069 ppb	-0.326 ppb	0.191 ppb	0.187 ppb	32.006 %	40.957 %
Concentration RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Concentrations

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QTEGRA

Instrument Name	Serial Number
iCAP RQ	RQ03881

LabBook	LabBook Path
P3+Spl Rutin Maret24.imexp	Application Data\Workspace\LabBooks

Analysis index: 27
Analysis label: P3-LK3-B
Analysis started at: 3/22/2024 2:25:28 PM
User name: OPTIPLE-VA39EGT\Administrator

Category	45Sc (STD)	45Sc (KED)	56Fe (STD)	56Fe (KED)	64Zn (STD)	64Zn (KED)	73Ge (STD)	73Ge (KED)	75As (STD)	75As (KED)	103Rh (STD)
Concentration average	234.392 %	245.125 %	-6.385 ppb	27.928 ppb	48.644 ppb	18.271 ppb	182.145 %	300.001 %	78.660 ppb	26.697 ppb	147.751 %
Concentration per Run	234.392 %	245.125 %	-6.385 ppb	27.928 ppb	48.644 ppb	18.271 ppb	182.145 %	300.001 %	78.660 ppb	26.697 ppb	147.751 %
Concentration RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Category	103Rh (KED)	111Cd (STD)	111Cd (KED)	119Sn (STD)	119Sn (KED)	208Pb (STD)	208Pb (KED)	209Bi (STD)	209Bi (KED)
Concentration average	159.084 %	0.236 ppb	0.107 ppb	0.037 ppb	0.092 ppb	0.246 ppb	0.135 ppb	29.638 %	40.184 %
Concentration per Run	159.084 %	0.236 ppb	0.107 ppb	0.037 ppb	0.092 ppb	0.246 ppb	0.135 ppb	29.638 %	40.184 %
Concentration RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Concentrations

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QTEGRA

Instrument Name	Serial Number
iCAP RQ	RQ03881

LabBook	LabBook Path
P3+Spl Rutin Maret24.imexp	Application Data\Workspace\LabBooks

Analysis index: 28
Analysis label: P3-LK3-C
Analysis started at: 3/22/2024 2:28:45 PM
User name: OPTIPLE-VA39EGT\Administrator

Category	45Sc (STD)	45Sc (KED)	56Fe (STD)	56Fe (KED)	64Zn (STD)	64Zn (KED)	73Ge (STD)	73Ge (KED)	75As (STD)	75As (KED)	103Rh (STD)
Concentration average	226.681 %	256.101 %	-5.828 ppb	25.503 ppb	39.174 ppb	18.597 ppb	225.004 %	270.001 %	64.592 ppb	26.452 ppb	147.275 %
Concentration per Run	226.681 %	256.101 %	-5.828 ppb	25.503 ppb	39.174 ppb	18.597 ppb	225.004 %	270.001 %	64.592 ppb	26.452 ppb	147.275 %
Concentration RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Category	103Rh (KED)	111Cd (STD)	111Cd (KED)	119Sn (STD)	119Sn (KED)	208Pb (STD)	208Pb (KED)	209Bi (STD)	209Bi (KED)
Concentration average	154.478 %	0.215 ppb	0.167 ppb	-0.007 ppb	-0.263 ppb	0.248 ppb	0.210 ppb	29.908 %	36.851 %
Concentration per Run	154.478 %	0.215 ppb	0.167 ppb	-0.007 ppb	-0.263 ppb	0.248 ppb	0.210 ppb	29.908 %	36.851 %
Concentration RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Lampiran 16. Intensitas Larutan Standar Pb dan Cd berbagai konsentrasi

Intensities
4/1/2024 8:59:36 AM

QTEGRA

Instrument Name	Serial Number
iCAP RQ	RQ03881

LabBook	LabBook Path
P3+Spl Rutin Maret24.lmexp	Application Data\Workspace\LabBooks

Analysis index: 14
Analysis label: P3-LK1-A
Analysis started at: 3/22/2024 1:42:33 PM
User name: OPTIPLE-VA39EGT\Administrator

Category	45Sc (STD)	45Sc (KED)	56Fe (STD)	56Fe (KED)	64Zn (STD)	64Zn (KED)	73Ge (STD)	73Ge (KED)	75As (STD)	75As (KED)
Intensity average	45,111 cps	700 cps	2,508,230 cps	44,466 cps	45,156 cps	9,734 cps	873 cps	117 cps	51,793 cps	6,218 cps
Intensity per Run 1	44,559.5 cps	740.0 cps	2,483,139.0 cps	45,141.7 cps	44,349.2 cps	9,823.9 cps	1,080.0 cps	100.0 cps	52,673.4 cps	6,351.7 cps
Intensity per Run 2	46,095.0 cps	700.0 cps	2,530,654.9 cps	43,696.4 cps	46,326.2 cps	9,433.6 cps	740.0 cps	130.0 cps	52,492.6 cps	6,101.5 cps
Intensity per Run 3	44,679.8 cps	660.0 cps	2,510,897.4 cps	44,559.3 cps	44,791.4 cps	9,944.0 cps	800.0 cps	120.0 cps	50,212.5 cps	6,201.6 cps
Intensity RSD	1.9 %	5.7 %	1.0 %	1.6 %	2.3 %	2.7 %	20.8 %	13.1 %	2.6 %	2.0 %

Category	103Rh (STD)	103Rh (KED)	111Cd (STD)	111Cd (KED)	119Sn (STD)	119Sn (KED)	208Pb (STD)	208Pb (KED)	209Bi (STD)	209Bi (KED)
Intensity average	21,131 cps	13,504 cps	283 cps	100 cps	307 cps	63 cps	3,307 cps	3,317 cps	15,850 cps	14,689 cps
Intensity per Run 1	21,218.2 cps	13,397.2 cps	270.0 cps	110.0 cps	380.0 cps	70.0 cps	3,160.4 cps	3,340.5 cps	15,369.5 cps	15,199.4 cps
Intensity per Run 2	21,448.6 cps	13,717.6 cps	260.0 cps	130.0 cps	230.0 cps	70.0 cps	3,360.5 cps	3,360.5 cps	15,830.1 cps	14,518.5 cps
Intensity per Run 3	20,727.3 cps	13,397.3 cps	320.0 cps	60.0 cps	310.0 cps	50.0 cps	3,400.5 cps	3,250.4 cps	16,350.8 cps	14,348.3 cps
Intensity RSD	1.7 %	1.4 %	11.3 %	36.1 %	24.5 %	18.2 %	3.9 %	1.8 %	3.1 %	3.1 %

Intensities
4/1/2024 8:59:36 AM

QTEGRA

Instrument Name	Serial Number
iCAP RQ	RQ03881

LabBook	LabBook Path
P3+Spl Rutin Maret24.lmexp	Application Data\Workspace\LabBooks

Analysis index: 15
Analysis label: P3-LK1-B
Analysis started at: 3/22/2024 1:45:53 PM
User name: OPTIPLE-VA39EGT\Administrator

Category	45Sc (STD)	45Sc (KED)	56Fe (STD)	56Fe (KED)	64Zn (STD)	64Zn (KED)	73Ge (STD)	73Ge (KED)	75As (STD)	75As (KED)
Intensity average	44,874 cps	837 cps	2,449,339 cps	43,436 cps	44,430 cps	9,414 cps	843 cps	100 cps	49,914 cps	6,188 cps
Intensity per Run 1	42,532.4 cps	930.0 cps	2,414,804.3 cps	43,255.0 cps	43,998.4 cps	9,383.6 cps	860.0 cps	50.0 cps	47,772.5 cps	6,031.5 cps
Intensity per Run 2	46,887.2 cps	850.0 cps	2,498,406.1 cps	43,365.2 cps	44,600.1 cps	9,333.6 cps	780.0 cps	140.0 cps	51,004.9 cps	5,981.5 cps
Intensity per Run 3	45,402.7 cps	730.0 cps	2,434,806.7 cps	43,686.6 cps	44,690.8 cps	9,523.7 cps	890.0 cps	110.0 cps	50,965.3 cps	6,551.7 cps
Intensity RSD	4.7 %	12.0 %	1.8 %	0.5 %	0.8 %	1.0 %	6.7 %	45.8 %	3.7 %	5.1 %

Category	103Rh (STD)	103Rh (KED)	111Cd (STD)	111Cd (KED)	119Sn (STD)	119Sn (KED)	208Pb (STD)	208Pb (KED)	209Bi (STD)	209Bi (KED)
Intensity average	19,919 cps	13,367 cps	207 cps	120 cps	300 cps	90 cps	3,130 cps	3,450 cps	15,049 cps	14,322 cps
Intensity per Run 1	19,284.9 cps	14,007.9 cps	180.0 cps	80.0 cps	310.0 cps	90.0 cps	3,070.4 cps	3,350.5 cps	14,858.9 cps	14,078.0 cps
Intensity per Run 2	20,206.4 cps	12,586.4 cps	230.0 cps	190.0 cps	280.0 cps	120.0 cps	3,270.4 cps	3,440.5 cps	15,249.4 cps	14,298.2 cps
Intensity per Run 3	20,266.5 cps	13,507.4 cps	210.0 cps	90.0 cps	310.0 cps	60.0 cps	3,050.4 cps	3,560.5 cps	15,039.1 cps	14,588.5 cps
Intensity RSD	2.8 %	5.4 %	12.2 %	50.7 %	5.8 %	33.3 %	3.9 %	3.1 %	1.3 %	1.8 %

Intensities

4/1/2024 8:59:36 AM

QTEGRA

Instrument Name	Serial Number
ICAP RQ	RQ03881

LabBook	LabBook Path
P3+Spl Rutin Maret24.imexp	_Application Data\Workspace\LabBooks

Analysis index: 17
Analysis label: P3-LK2-1
Analysis started at: 3/22/2024 1:52:33 PM
User name: OPTIPLEX-VA39EGT\Administrator

Category	45Sc (STD)	45Sc (KED)	56Fe (STD)	56Fe (KED)	64Zn (STD)	64Zn (KED)	73Ge (STD)	73Ge (KED)	75As (STD)	75As (KED)
Intensity average	50,582 cps	760 cps	3,060,595 cps	75,930 cps	61,191 cps	13,457 cps	840 cps	100 cps	32,122 cps	3,591 cps
Intensity per Run	50,582.5 cps	760.0 cps	3,060,595.5 cps	75,930.4 cps	61,190.9 cps	13,457.3 cps	840.0 cps	100.0 cps	32,121.8 cps	3,590.5 cps
Intensity RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Category	103Rh (STD)	103Rh (KED)	111Cd (STD)	111Cd (KED)	119Sn (STD)	119Sn (KED)	208Pb (STD)	208Pb (KED)	209Bi (STD)	209Bi (KED)
Intensity average	22,290 cps	14,348 cps	30 cps	20 cps	250 cps	80 cps	1,710 cps	1,600 cps	15,189 cps	14,138 cps
Intensity per Run	22,290.0 cps	14,348.3 cps	30.0 cps	20.0 cps	250.0 cps	80.0 cps	1,710.1 cps	1,600.1 cps	15,189.3 cps	14,138.0 cps
Intensity RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Intensities

4/1/2024 8:59:36 AM

QTEGRA

Instrument Name	Serial Number
ICAP RQ	RQ03881

LabBook	LabBook Path
P3+Spl Rutin Maret24.imexp	_Application Data\Workspace\LabBooks

Analysis index: 18
Analysis label: P3-LK2-2
Analysis started at: 3/22/2024 1:55:48 PM
User name: OPTIPLEX-VA39EGT\Administrator

Category	45Sc (STD)	45Sc (KED)	56Fe (STD)	56Fe (KED)	64Zn (STD)	64Zn (KED)	73Ge (STD)	73Ge (KED)	75As (STD)	75As (KED)
Intensity average	47,742 cps	930 cps	2,935,111 cps	74,140 cps	59,754 cps	13,728 cps	950 cps	120 cps	32,192 cps	3,611 cps
Intensity per Run	47,741.7 cps	930.0 cps	2,935,111.1 cps	74,139.9 cps	59,753.5 cps	13,727.7 cps	950.0 cps	120.0 cps	32,191.8 cps	3,610.5 cps
Intensity RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Category	103Rh (STD)	103Rh (KED)	111Cd (STD)	111Cd (KED)	119Sn (STD)	119Sn (KED)	208Pb (STD)	208Pb (KED)	209Bi (STD)	209Bi (KED)
Intensity average	20,988 cps	14,208 cps	10 cps	10 cps	270 cps	80 cps	1,340 cps	1,580 cps	14,208 cps	13,778 cps
Intensity per Run	20,987.8 cps	14,268.2 cps	10.0 cps	10.0 cps	270.0 cps	80.0 cps	1,340.1 cps	1,580.1 cps	14,208.1 cps	13,777.6 cps
Intensity RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Intensities

4/1/2024 8:59:36 AM

QTEGRA

Instrument Name	Serial Number
iCAP RQ	RQ03881

LabBook	LabBook Path
P3+Spl Rutin Maret24.imexp	_Application Data\Workspace\LabBooks

Analysis index: 26
Analysis label: P3-I.K3-A
Analysis started at: 3/22/2024 2:22:11 PM
User name: OPTIPI.I-VA39FGT\Administrator

Category	45Sc (STD)	45Sc (KED)	56Fe (STD)	56Fe (KED)	64Zn (STD)	64Zn (KED)	73Ge (STD)	73Ge (KED)	75As (STD)	75As (KED)	103Rh (STD)
Intensity average	37,025 cps	610 cps	740,696 cps	36,323 cps	36,604 cps	8,863 cps	610 cps	90 cps	42,473 cps	5,641 cps	15,500 cps
Intensity per Run	37,024.9 cps	610.0 cps	740,696.2 cps	36,322.8 cps	36,604.3 cps	8,863.2 cps	610.0 cps	90.0 cps	42,473.2 cps	5,641.3 cps	15,499.7 cps
Intensity RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Category	103Rh (KED)	111Cd (STD)	111Cd (KED)	119Sn (STD)	119Sn (KED)	208Pb (STD)	208Pb (KED)	209Bi (STD)	209Bi (KED)
Intensity average	10,755 cps	220 cps	60 cps	190 cps	20 cps	1,250 cps	1,350 cps	13,698 cps	12,436 cps
Intensity per Run	10,754.7 cps	220.0 cps	60.0 cps	190.0 cps	20.0 cps	1,250.1 cps	1,350.1 cps	13,697.6 cps	12,436.2 cps
Intensity RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Intensities

4/1/2024 8:59:36 AM

QTEGRA

Instrument Name	Serial Number
iCAP RQ	RQ03881

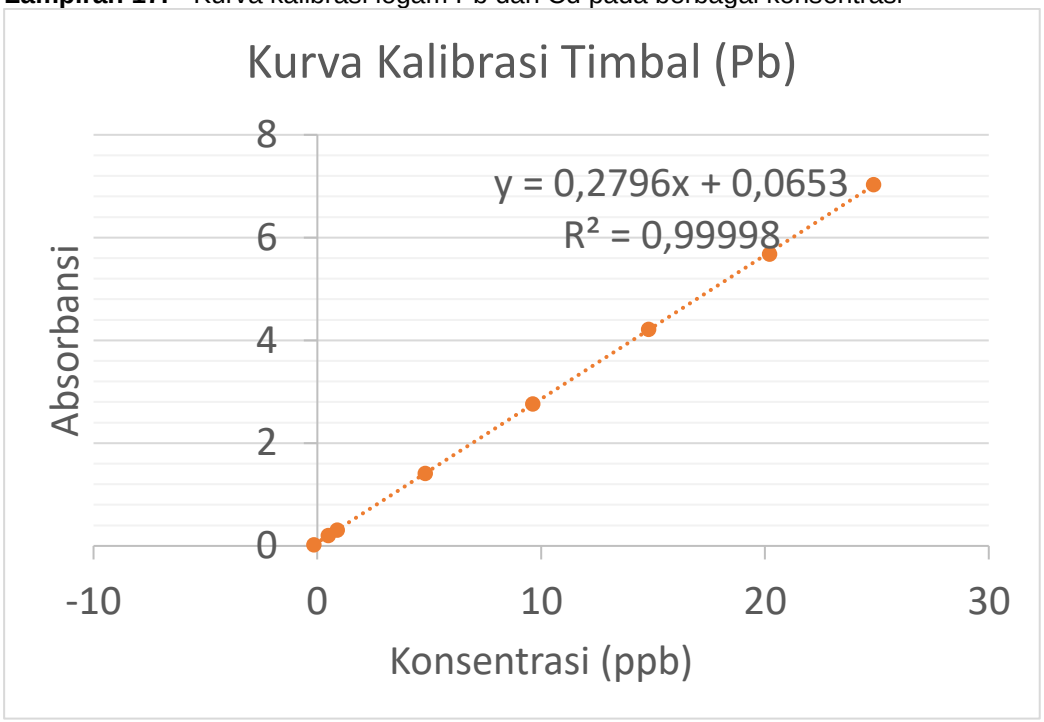
LabBook	LabBook Path
P3+Spl Rutin Maret24.imexp	_Application Data\Workspace\LabBooks

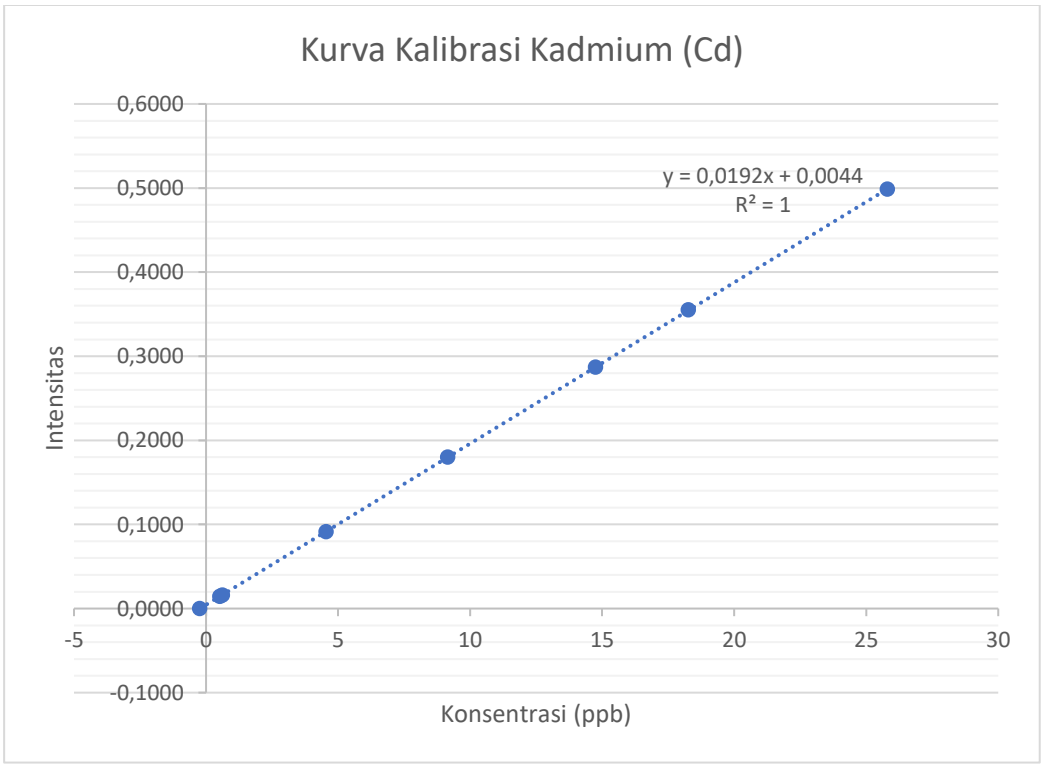
Analysis index: 27
Analysis label: P3-I.K3-B
Analysis started at: 3/22/2024 2:25:28 PM
User name: OPTIPI.I-VA39FGT\Administrator

Category	45Sc (STD)	45Sc (KED)	56Fe (STD)	56Fe (KED)	64Zn (STD)	64Zn (KED)	73Ge (STD)	73Ge (KED)	75As (STD)	75As (KED)	103Rh (STD)
Intensity average	36,283 cps	670 cps	740,461 cps	35,822 cps	38,139 cps	8,443 cps	680 cps	100 cps	41,830 cps	6,192 cps	15,570 cps
Intensity per Run	36,283.1 cps	670.0 cps	740,461.3 cps	35,821.6 cps	38,138.8 cps	8,442.9 cps	680.0 cps	100.0 cps	41,830.3 cps	6,191.6 cps	15,569.8 cps
Intensity RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

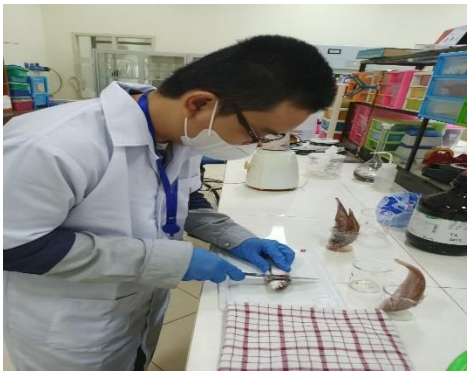
Category	103Rh (KED)	111Cd (STD)	111Cd (KED)	119Sn (STD)	119Sn (KED)	208Pb (STD)	208Pb (KED)	209Bi (STD)	209Bi (KED)
Intensity average	10,715 cps	170 cps	70 cps	270 cps	140 cps	1,430 cps	1,350 cps	13,157 cps	13,517 cps
Intensity per Run	10,714.6 cps	170.0 cps	70.0 cps	270.0 cps	140.0 cps	1,430.1 cps	1,350.1 cps	13,157.0 cps	13,517.4 cps
Intensity RSD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Lampiran 17. Kurva kalibrasi logam Pb dan Cd pada berbagai konsentrasi





Lampiran 18. Kegiatan selama penelitian

<table>
<tr>
<td>1. Pengambilan sampel ikan kuniran di Teluk Palu
  </td>
<td>2. Sampel dikeluarkan dari coolbox
  </td>
</tr>
<tr>
<td>3. Ikan kuniran diambil dagingnya pada bagian truncus (badan) menggunakan Pisau.
  </td>
<td>4. Proses destruksi sampel ikan Kuniran
  </td>
</tr>
<tr>
<td>5. Ditimbang 6 vessel kosong dan di-Catat beratnya.
  </td>
<td>6. Ditambahkan sampel ikan kuniran Sebanyak 0,5 gram ke masing-masing vessel dan dicatat beratnya
  </td>
</tr>
</table>

<table>
<tr>
<td>7. Ditambahkan 5 ml HNO_3 65% suprapur, HCl 37% 1 ml, dan H_2O_2 30% 1 ml ke masing-masing vessel.
  </td>
<td>8. Vessel ditutup dan dimasukkan ke rak vessel.
  </td>
</tr>
<tr>
<td>9. Rak vessel kemudian di masukkan ke dalam alat Microwave digestion selama ± 1 jam.
  </td>
<td>10. Vessel yang telah di microwave digestion dan didinginkan se lanjutnya di pindahkan ke tabung centrifuge 50 mL dan ditambahkan 1 ml asam asetat glasial dan 0,25 ml larutan baku internal campuran dengan konsentrasi 0,5 µg/ml, ditepatkan hingga tanda dengan aqua dm.
  </td>
</tr>
</table>

11. Pembuatan larutan baku standar Timbal (Pb) dan Kadmium (Cd) konsentrasi 0 ppb; 0,50 ppb ; 1,00 ppb ; 5,00 ppb ; 10,00 ppb ; 15,00 ppb ; 20,00 ppb; dan 25,00 ppb. 	12. Sampel ikan kuniran dan larutan baku standar Timbal (Pb) dan Kadmium (Cd) siap di uji di alat ICP-MS. 

Lampiran 19. Penampakan lokasi pengambilan sampel ikan kuniran