

CERTIFICATE OF ANALYSIS
COA3V1.1

Client: Contact Biosolutions
Specimen Type: Firehawk Biohericide Concentrate
Shipment temp: Ambient
Contact information: studentofthesoil@gmail.com

Received Date: 20240909
Sampling Date: 20240916
LCMS/MS Testing date: 20240916
Report Date: 20241009

HRI Sample ID#	Client ID#	Glyphosate Average (ng/g)	AMPA Average (ng/g)	Total Effective Glyphosate (ng/g)
S11979	Firehawk Biohericide Concentrate	Not Detected	Not Detected	Not Detected

ND indicates levels were below the limit of detection, which is 0.020 ng/g for glyphosate and 0.013 ng/g for AMPA
 D indicates a level below the Limit of Quantitation but above the Limit of Detection. LOQ is 0.05 ng/g for both glyphosate and AMPA

ISO 17025:2017-Accredited HRI Method TM #8 Glyphosate and AMPA Detection by Mass Spectrometry

Glyphosate LOQ = 0.05 ppb, LOD = 0.02 ppb
 AMPA LOQ = 0.05 ppb, LOD = 0.013 ppb

Terms: "Trace" is between LOD and LOQ
 "Not Detected" is less than LOD

Sample preparation employed a modification of the method described in Chamkasem, Narong, Cynthia Morris, and Tiffany Harmon. 2016.

"Direct Determination of Glyphosate, Glufosinate, and AMPA in Milk by Liquid Chromatography/tandem Mass Spectrometry."
 - *Journal of Regulatory Science* 3 (2): 20–26.

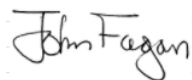
LC-MS/MS analysis employed a modification of the method described in Jensen, Pamela K., Chad E. Wujcik, Michelle K. McGuire, and Mark A. McGuire. 2016.

"Validation of Reliable and Selective Methods for Direct Determination of Glyphosate and Aminomethylphosphonic Acid in Milk and Urine Using LC-MS/MS."
 - *Journal of Environmental Science and Health, Part B* 51 (4): 254–59. doi:10.1080/03601234.2015.1120619.

Limit of Quantitation (LOQ) and Limit of Detection (LOD) are sub-part per billion for this method and are determined for each sample.
 All values are based on equipment and reference materials that are traceable to ISO 17025 compliant calibrations.
 Measurement uncertainties are calculated and are available upon request.
 Results apply to the sample as received and relate only to the sample which is tested on an "as is" basis.

Effective Glyphosate Level calculated according to Food and Agriculture Organization (FAO) method where total glyphosate residue is the sum of the weight of glyphosate + 1.5 × the weight of its metabolite AMPA.

Released on Behalf of HRI Laboratories by:



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ISO 17025
 ACCREDITED LABORATORY

ISO/IEC 17025:2017



Accreditation # 92657

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Form No.: FM-017

Issue Date: 09/29/2023

LF-Rev: 09/29/2025

COA6V1.1 Certificate of Analysis			
Client Details:	Contact Biosolutions	Sample Receipt Date:	20240909
	studentofthesoil@gmail.com	Test Date:	20241031
		LC-MS/MS Analysis Date:	20241031
Sample Size (g or L):	NA	Report Date:	20241118

Sample ID Number	Sample Description	Lot Number	Pesticide residues Conc. (ng/g) or (µg/kg) in Test samples
S11979	Firehwak Biohericide Concentrate	NA	Please refer in CoA Page 2
Details on Following Page			

1. Multi-Analyst, Multi-Matrix Performance of the QuEChERS Approach for Pesticide Residues in Foods and Feeds Using HPLC/MS/MS Analysis with Different Calibration Techniques. Lehotay et al., Journal of AOAC International 93 355-367 (2010). Our method's limit of quantitation (LOQ) is 1.10 ng/g for all the pesticide residues.

2. Validation of a Multi-Residue Analysis Method for 287 Pesticides in Citrus Fruits Mandarin Orange and Grapefruit Using Liquid Chromatography–Tandem Mass Spectrometry. Xiu Yuan, Chang Jo Kim et al., Foods 2022, 11, 3522. <https://doi.org/10.3390/foods11213522>. <https://www.mdpi.com/journal/foods>

3. FAO Corporate Document Repository. "Residue and Analytical Aspects." Pesticide residues in Food-2005. Agriculture and Consumer Protection.

Analysed and Reported on Behalf of Health Research Institute by



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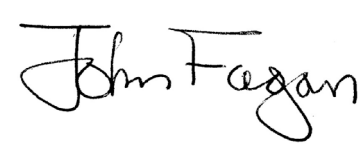
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Accreditation # 92657
CA STATE ID: 800766





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Accreditation #92657

Form No.: FM-024	Issue Date: 09/29/2023	LF-Rev: 09/29/2025
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	Pesticide residues Conc. in Test samples (ng/g) or (µg/kg)
Pesticide residue name	S11979
(Monceren) Pencycuron	ND
3-Hydroxycarbofuran	ND
Acephate	ND
Acetamiprid	ND
Acibenzolar-S-methyl	ND
Alanycarb	ND
Aldicarb sulfone	ND
Aldicarb sulfoxide	ND
Aldicarb	ND
Ametryn	ND
Aminocarb	ND
Amitraz	ND
Avermectin B1a	ND
Avermectin B1b	ND
Azoxystrobin	ND
Benalaxyl	ND
Bendiocarb	ND
Benfuracarb	ND
Benzoximate	ND
Bifenazate	ND
Bitertanol	ND
Boscalid	ND
Bromucanazole Isomer	ND
Bupirimate	ND
Buprofezin	ND
Butafenacil	ND
Butocarboxim	ND
Butoxycarboxim	ND
Carbaryl	ND
Carbendazim	ND
Carbetamide	ND
Carbofuran	ND
Carboxin	ND

Carfentrazone-ethyl	ND
Chlorantraniliprole	ND
Chlorfluazuron	ND
Chlorotoluron	ND
Chloroxuron	ND
Clethodim Isomer	ND
Clofentezine	ND
Clothianidin	ND
Cyazofamid	ND
Cycluron	ND
Cymoxanil	ND
Cyproconazole Isomer	ND
Cyprodinil	ND
Cyromazine	ND
Desmedipham	ND
Diclobutrazol	ND
Diclotophos	ND
Diethofencarb	ND
Difenoconazole Isomer	ND
Diiflubenzuron	ND
Dimethoate	ND
Dimethomorph Isomer	ND
Dimoxystrobin	ND
Diniconazole	ND
Dinotefuran	ND
Dioxacarb	ND
Diuron	ND
Doramectin	ND
Emamectin-benzoate b1a	ND
Emamectin-benzoate b1b	ND
Epoxiconazole	ND
Eprinomectin	ND
Etaconazole Isomer	ND
Ethiofencarb	ND
Ethiprole	ND
Ethirimol	ND
Ethofumesate	ND
Etoxazole	ND
Famoxadone	ND
Fenamidone	ND
Fenarimol	ND
Fenazaquin	ND
Fenbuconazole	ND
Fenhexamid	ND
Fenobucarb	ND
Fenoxycarb	ND
Fenpropimorph	ND

Fenpyroximate	ND
Fenuron	ND
Fipronil	ND
Flonicamid	ND
Flubendiamide	ND
Fludioxinil	ND
Flufenacet	ND
Flufenoxuron	ND
Fluometuron	ND
Fluoxastrobin	ND
Fluquinconazole	ND
Flusilazole	ND
Flutolanil	ND
Flutriafol	ND
Forchlorfenuron	ND
Formetanate HCl	ND
Fuberidazole	ND
Furalaxyl	ND
Furathiocarb	ND
Halofenozide	ND
Hexaconazole	ND
Hexaflumuron	ND
Hexythiazox	ND
Hydramethylnon	ND
Imazalil	ND
Imidacloprid	ND
Indoxacarb	ND
Ipconazole Isomer	ND
Iprovalicarb Isomer	ND
Isocarbophos	ND
Isoproc carb	ND
Isoproturon	ND
Ivermectin	ND
Kresoxim-methyl	ND
Linuron	ND
Lufenuron	ND
Mandipropamid	ND
Mefenacet	ND
Mepanipyrim	ND
Mepronil	ND
Mesotrione	ND
Metaflumizone	ND
Metalaxyl	ND
Metconazole	ND
Methabenzthiazuron	ND
Methamidophos	ND
Methiocarb	ND

Methomyl	ND
Methoprotryne	ND
Methoxyfenozone	ND
Metobromuron	ND
Metribuzin	ND
Mevinphos Isomer	ND
Mexacarbate	ND
Monocrotophos	ND
Monolinuron	ND
Moxidectin	ND
Myclobutanil	ND
Neburon	ND
Nitenpyram	ND
Novaluron	ND
Nuarimol	ND
Omethoate	ND
Oxadixyl	ND
Oxamyl	ND
Paclobutrazol	ND
Penconazole	ND
Phenmedipham	ND
Picoxystrobin	ND
Piperonyl butoxide	ND
Pirimicarb	ND
Prochloraz	ND
Promecarb	ND
Prometon	ND
Prometryne	ND
Propamocarb	ND
Propargite	ND
Propham	ND
Propiconazole Isomer	ND
Propoxur	ND
Prothioconazole	ND
Pymetrozine	ND
Pyracarbolid	ND
Pyraclostrobin	ND
Pyridaben	ND
Pyrimethanil	ND
Pyriproxyfen	ND
Quinoxifen	ND
Rotenone	ND
Secbumeton	ND
Siduron	ND
Simetryn	ND
Spinetoram	ND
Spinosad (Spinosyn A)	ND

Spinosad (Spinosyn D)	ND
Spirodiclofen	ND
Spiromesifen	ND
Spirotetramat	ND
Spiroxamine Isomer	ND
Sulfentrazone	ND
Tebuconazole	ND
Tebufenozide	ND
Tebufenpyrad	ND
Tebuthiuron	ND
Teflubenzuron	ND
Temephos	ND
Terbumeton	ND
Terbutryn	ND
Tetraconazole	ND
Thiabendazole	ND
Thiacloprid	ND
Thiamethoxam	ND
Thidiazuron	ND
Thiobencarb	ND
Thiofanox	ND
Thiophanate-methyl	ND
Triadimefon	ND
Triadimenol	ND
Trichlorfon	ND
Tricyclazole	ND
Trifloxystrobin	ND
Triflumizole	ND
Triflumuron	ND
Triticonazole	ND
Vamidothion	ND
Zoxamide	ND
Atrazine	ND
Alachlor	ND
Acetochlor	ND
Metolachlor	ND
Simazine	ND
Pendimethalin	ND
Bifenthrin	ND
Fenpropathrin	ND
Propanil	ND
Trifluralin	ND
Coumaphos	ND
Pirimiphos methyl	ND
Trans-Permethrin	ND
Iprodione	ND
Deltamethrin	ND

Cis-Permethrin	ND
Azinphos methyl	ND
Vinclozolin	ND
Folpet	ND
Phosalone	ND
Thiram	ND
Chlorpyrifos	ND
Dichlofluamid	ND
Diazinon	ND
Fenthion	ND
Dichlorvos	ND
Bensulide	ND
Sethoxydim	ND
Fluopyram	ND
Penflufen	ND
Dicamba	ND
2,4-D	ND
Ethephon	ND
Captan	ND
Chlorothalonil	ND

Form No.: FM-024	Issue Date: 09/29/2023	LF-Rev: 09/29/2025
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Notes:
See Limits of Quantification (LOQs) for each analyte on following page.
ND = Not Detected
Trace: Conc.< 1.10 ng/g
ng/g = nanogram per gram and may also be expressed as parts per billion (ppb)



Full List of Analytes and Limits of Quantitation

Pesticide residue Name	Limit of Quantitation (ng/g)
(Monceren) Pencycuron	1,10
3-Hydroxycarbofuran	1,10
Acephate	1,10
Acetamiprid	1,10
Acibenzolar-S-methyl	1,10
Alanycarb	NA
Aldicarb sulfone	1,10
Aldicarb sulfoxide	1,10
Aldicarb	1,10
Ametryn	1,10
Aminocarb	1,10
Amitraz	1,10
Avermectin B1a	1,10
Avermectin B1b	NA
Azoxystrobin	1,10
Benalaxyl	1,10
Bendiocarb	1,10
Benfuracarb	NA
Benzoximate	1,10
Bifenazate	1,10
Bitertanol	1,10
Boscalid	1,10
Bromucanazole Isomer	1,10
Bupirimate	1,10
Buprofezin	1,10
Butafenacil	1,10
Butocarboxim	NA
Butoxycarboxim	1,10
Carbaryl	1,10
Carbendazim	1,10
Carbetamide	1,10
Carbofuran	NA
Carboxin	1,10
Carfentrazone-ethyl	1,10
Chlorantraniliprole	1,10
Chlorfluazuron	1,10

Chlorotoluron	1,10
Chloroxuron	1,10
Clethodim Isomer	1,10
Clofentezine	1,10
Clothianidin	1,10
Cyazofamid	1,10
Cycluron	1,10
Cymoxanil	1,10
Cyproconazole Isomer	1,10
Cyprodinil	1,10
Cyromazine	1,10
Desmedipham	1,10
Diclobutrazol	1,10
Dicrotophos	1,10
Diethofencarb	1,10
Difenoconazole Isomer	1,10
Diiflubenzuron	1,10
Dimethoate	1,10
Dimethomorph Isomer	1,10
Dimoxystrobin	1,10
Diniconazole	1,10
Dinotefuran	1,10
Dioxacarb	1,10
Diuron	1,10
Doramectin	1,10
Emamectin-benzoate b1a	1,10
Emamectin-benzoate b1b	1,10
Epoxiconazole	1,10
Eprinomectin	1,10
Etaconazole Isomer	1,10
Ethiofencarb	1,10
Ethiprole	1,10
Ethirimol	1,10
Ethofumesate	NA
Etoxazole	1,10
Famoxadone	NA
Fenamidone	1,10
Fenarimol	1,10
Fenazaquin	1,10
Fenbuconazole	1,10
Fenhexamid	1,10
Fenobucarb	1,10
Fenoxycarb	1,10
Fenpropimorph	1,10
Fenpyroximate	1,10

Fenuron	1,10
Fipronil	1,10
Flonicamid	1,10
Flubendiamide	1,10
Fludioxinil	NA
Flufenacet	1,10
Flufenoxuron	1,10
Fluometuron	1,10
Fluoxastrobin	1,10
Fluquinconazole	1,10
Flusilazole	1,10
Flutolanil	1,10
Flutriafol	1,10
Forchlorfenuron	1,10
Formetanate HCl	1,10
Fuberidazole	1,10
Furalaxyl	1,10
Furathiocarb	1,10
Halofenozide	1,10
Hexaconazole	1,10
Hexaflumuron	1,10
Hexythiazox	1,10
Hydramethylnon	1,10
Imazalil	1,10
Imidacloprid	1,10
Indoxacarb	1,10
Ipconazole Isomer	1,10
Iprovalicarb Isomer	1,10
Isocarbophos	1,10
Isoprocarb	1,10
Isoproturon	1,10
Ivermectin	1,10
Kresoxim-methyl	1,10
Linuron	1,10
Lufenuron	1,10
Mandipropamid	1,10
Mefenacet	1,10
Mepanipyrim	1,10
Mepronil	1,10
Mesotrione	1,10
Metaflumizone	1,10
Metalaxyl	1,10
Metconazole	1,10
Methabenzthiazuron	1,10
Methamidophos	1,10

Methiocarb	1,10
Methomyl	1,10
Methoprotryne	1,10
Methoxyfenozide	1,10
Metobromuron	1,10
Metribuzin	1,10
Mevinphos Isomer	1,10
Mexacarbate	1,10
Monocrotophos	1,10
Monolinuron	1,10
Moxidectin	1,10
Myclobutanil	1,10
Neburon	1,10
Nitenpyram	1,10
Novaluron	1,10
Nuarimol	1,10
Omethoate	1,10
Oxadixyl	1,10
Oxamyl	1,10
Paclobutrazol	1,10
Penconazole	1,10
Phenmedipham	1,10
Picoxystrobin	1,10
Piperonyl butoxide	1,10
Pirimicarb	1,10
Prochloraz	1,10
Promecarb	1,10
Prometon	1,10
Prometryne	1,10
Propamocarb	1,10
Propargite	1,10
Propham	1,10
Propiconazole Isomer	1,10
Propoxur	1,10
Prothioconazole	1,10
Pymetrozine	1,10
Pyracarbolid	1,10
Pyraclostrobin	1,10
Pyridaben	1,10
Pyrimethanil	1,10
Pyriproxyfen	1,10
Quinoxyfen	1,10
Rotenone	1,10
Secbumeton	1,10
Siduron	1,10

Simetryn	1,10
Spinetoram	1,10
Spinosad (Spinosyn A)	1,10
Spinosad (Spinosyn D)	1,10
Spirodiclofen	1,10
Spiromesifen	1,10
Spirotetramat	1,10
Spiroxamine Isomer	1,10
Sulfentrazone	1,10
Tebuconazole	1,10
Tebufenozide	1,10
Tebufenpyrad	1,10
Tebuthiuron	1,10
Teflubenzuron	1,10
Temephos	1,10
Terbumeton	1,10
Terbutryn	1,10
Tetraconazole	1,10
Thiabendazole	1,10
Thiacloprid	1,10
Thiamethoxam	1,10
Thidiazuron	1,10
Thiobencarb	1,10
Thiofanox	NA
Thiophanate-methyl	1,10
Triadimefon	1,10
Triadimenol	1,10
Trichlorfon	1,10
Tricyclazole	1,10
Trifloxystrobin	1,10
Triflumizole	1,10
Triflumuron	1,10
Triticonazole	1,10
Vamidothion	1,10
Zoxamide	1,10
Atrazine	1,10
Alachlor	1,10
Acetochlor	1,10
Metolachlor	1,10
Simazine	1,10
Pendimethalin	1,10
Bifenthrin	1,10
Fenpropathrin	1,10
Propanil	1,10
Trifluralin	NA

Coumaphos	1,10
Pirimiphos methyl	1,10
Trans-Permethrin	NA
Iprodione	1,10
Deltamethrin	NA
Cis-Permethrin	NA
Azinphos methyl	1,10
Vinclozolin	NA
Folpet	NA
Phosalone	1,10
Thiram	1,10
Chlorpyrifos	1,10
Dichlofluamid	NA
Diazinon	1,10
Fenthion	1,10
Dichlorvos	1,10
Bensulide	1,10
Sethoxydim	1,10
Fluopyram	1,10
Penflufen	1,10
Dicamba	1,10
2,4-D	1,10
Ethephon	NA
Captan	NA
Chlorothalonil	1,10

Note: Out of the 240 compounds analyzed, the following 27 compounds were not detectable or were detectable at reduced sensitivity, leaving a total of 213 compounds that were screened with full rigor. It is the nature of multiresidue methods that they cannot be optimal for all compounds in all matrices.

Alanycarb	Propargite	Ethephon
Avermectin B1b	Spirodiclofen	Captan
Benfuracarb	Temephos	Bifenthrin
Bifenazate	Thiofanox	Thiram
Butocarboxim	Trifluralin	Chlorpyrifos
Carbofuran	Trans-Permethrin	
Eprinomectin	Deltamethrin	
Ethofumesate	Cis-Permethrin	
Famoxadone	Vinclozolin	
Fludioxinil	Folpet	
Piperonyl butoxide	Dichlofluamid	

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Pesticide residue concentrations (ng/g) or (µg/kg) in Test samples	
Pesticide residue name	S11979
No Pesticide residues were detected	

Notes:
See Limits of Quantification (LOQs) for each analyte on following page.
ND = Not Detected
Trace: Conc.< 1.10 ng/g
ng/g = nanogram per gram and may also be expressed as parts per billion (ppb)

Reported Conc. (ng/g) =	Conc. Obtained from LC vial (ng/ml) × Volume of Acetonitrile (ml) used for Quenching
	Sample weight (g)