EMMERICH RESEARCH CENTER

Data Report

Liquid Frass

(Phytohormone Analysis)

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Sample	SPE Methode	Concentration (µg/mL)					Eff. Factor (X)
		SA	IPA	ICA	IAA	IAA*	
1	1	8.1	1.6	0.24	0.1	0.00036	278
	1	7.5	1.5	0.23	0.1		
	2	5.2	1.2	0.19	0.1		
	2	5.4	1.2	0.19	0.1		
2	1	8.2	1.6	0.21	0.12		
	1	8.2	1.6	0.2	0.12		
	2	5.1	1.3	0.2	0.11		
	2	5.2	1.3	0.2	0.1		
3	1	8.3	1.6	0.24	0.1		
	1	8.2	1.6	0.21	0.1		
	2	5.6	1.4	0.21	0.09		
	2	5.3	1.4	0.2	0.09		
4	1	7.6	1.5	0.23	0.09		
	1	8.4	1.6	0.22	0.1		
	2	5.6	1.4	0.21	0.09		
	2	5.6	1.4	0.18	0.08		
5	1	8.2	1.9	0.26	2.45		
	1	8.6	2	0.23	2.51		
	2	5.6	1.7	0.21	2.52		
	2	5.6	1.6	0.22	2.43		
6	1	8.7	1.9	0.27	2.68		
	1	8.2	1.9	0.28	2.66		
	2	5.6	1.5	0.18	2.75	0.00036	7639
	2	5.6	1.5	0.22	2.75		

1.	Company	:	Hermetia Bio Science
2.	Project No.	:	18013
3.	Document No.	:	*SPEC 18013-P3-G-0000-DS-FZUFL001A_D*
4.	Laboratory	:	*Fraunhofer Institute for Molecular Biology and Applied Ecology IME*
5.	Reference No.	:	*Report Phytohormon Analytics-2*
6.	Sample Number	:	FZUF
7.	Sample Name	:	Fertilizer
			Liquid Frass
8.	Date Received	:	*08 April 2024 & 24 June 2024*
9.	Date of Analysis	:	*24 June 2024 - 07 August 2024*
10.	Type of Analysis	:	See Above

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Liquid Frass

(Phytohormone Analysis)

Source: REPORT ON PHYTOHORMONE ANALYTICS IN LIQUID INSECT FRASS FROM HERMETIA ILLUCENS

(Report received: Aug 24)

**0.36 ng/mL [Ref: Green (2023); https://doi.org/10.1371/journal.pone.0288913.t001]*

In this study frass was separated free of contaminating waste feedstock, insect exuviae and particulate matter. It was then examined with regard to: (i) its N:P_2O_5:K_2O percent dry matter average which if significant could be serving as a source of nutrient fertilizer; (ii) its phytohormone content, particularly its indole acetic acid and/or gibberellin content, which if present in

Legend:

SPE	: Variation of Analysis Method
Sample	
1	: 08042024 Fresh Liquid Frass (Larvae reared with Pond 9)
2	: 08042024 Fresh Liquid Frass (Larvae reared with Pond 9)
3	: 08042024 Fresh Liquid Frass (Larvae reared with Pond 9), Heat treated
4	: 08042024 Fresh Liquid Frass (Larvae reared with Pond 9), Heat treated
5	: 24062024 Fresh Liquid Frass (Larvae reared with HBS Phyco Algae)
6	: 24062024 Fresh Liquid Frass (Larvae reared with HBS Phyco Algae)
Phytohormones	
SA	: Salicylic acid
IPA	: indole-3-propionic acid (derivative of ICA)
ICA	: Indole-3-carboxylic acid (part of auxin)
IAA	: Indole-3-acidic acid (part of auxin)

Comments:

Rev No.	Date	Revision Description	Prepared by	Lab.	ERC	OBU	HBS
A	3-Feb-22	Issued for Information	DM	NPK	ES	DM	EA
B	18-Dec-23	Revised and Added More Parameters	PS	NPK	ES	DM	EA
C	18-Mar-24	Updated Data Based on PPKS Test Result	PS	PPKS	ES	DM	EA
D	*7-Aug-24*	*Added Phytohormone Report*	*YY*	*Fraunhofer*	*ES*	*DM*	*EA*

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Data Sheet

Liquid Frass

(Fertilizer Analysis)

No.	Parameter	Result	Unit	Method
1	Moisture content	98.10	%	IKK-02 Oven (103±2°C)
2	Nitrogen (N)	0.27	%	IK.01.P.16 (Volumetri)
3	Phosphorus (P)	1.82	%	IK.01.P.16 (Spektrofotometri)
4	Potassium (K)	0.51	%	IK.01.P16 (AAS)
5	Magnesium (Mg)	0.02	%	SM 23rd Ed. 3111 2017
6	Boron (B)	0.33	ppm	Spektrofotometri
7	Calcium (Ca)	0.01	%	SM 23rd Ed. 3111 2017
8	Copper (Cu)	661.35	ppm	IK.01.P16 (AAS)
9	Zink (Zn)	6.88	ppm	IK.01.P16 (AAS)
10	Mangan (Mn)	0.85	ppm	AAS
11	Iron (Fe)	0.00	%	IK.01.P16 (AAS)
12	C-Organic	0.77	%	IK.01.P.12 (Gravimetri)
13	Organic Compound	59.97	%	IKK-03 Titrimetry
14	Nitrogen Organic	0.05	%	Destilasi
15	Arsenic (As)	<0.001	ppm	AAS
16	Mercury (Hg)	<0.62	ppm	AAS
17	Lead (Pb)	<0.001	ppm	IK.01.P.15 (AAS)
18	Cadmium (Cd)	8.09	ppm	IK.01.P.15 (AAS)
17	Chromium (Cr)	<0.069	ppm	AAS
18	Nickel (Ni)	0.41	ppm	IK.01.P.15 (AAS)
17	Molibdenum (Mo)	<0.005	ppm	AAS
18	E.coli	<3.0	MPN/g	MU 7.2/ML/05 (MPN)
17	Salmonella sp	<3.0	MPN/g	MU 7.2/ML/05 (MPN)
18	pH	5.72		IK.01.P.14 (Potensiometri)

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Data Sheet

Liquid Frass

(Fertilizer Analysis)

1.	Company	:	Hermetia Bio Science
2.	Project No.	:	18013
3.	Document No.	:	*SPEC 18013-P3-G-0000-DS-FZUFL001A_D* D
4.	Laboratory	:	Pusat Penelitian Kelapa Sawit (PPKS)
5.	Reference No.	:	502/0.1/Sert/III/2024
6.	Sample Number	:	FZUF
7.	Sample Name	:	Fertilizer
			Liquid Frass
8.	Date Received	:	25 January 2024
9.	Date of Analysis	:	25 January 2024 - 18 March 2024
10.	Type of Analysis	:	See Above

Comments:

1 The Liquid Frass is treated with heat 70 deg C for 60 minutes

Rev No.	Date	Revision Description	Prepared by	Lab.	ERC	OBU	HBS
A	3-Feb-22	Issued for Information	DM	NPK	ES	DM	EA
B	18-Dec-23	Revised and Added More Parameters	PS	NPK	ES	DM	EA
C	18-Mar-24	Updated Data Based on PPKS Test Result	PS	PPKS	ES	DM	EA
D	*7-Aug-24*	*Added Phytohormone Report*	*YY*	*Fraunhofer*	*ES*	*DM*	*EA*