

MAHAMURNI PLANTATIONS SDN BHD

(Company No 38290-V)

UTCL LABORATORY

Lot 2135, Batu 23 ½ Jalan Johor Bahru-Kota Tinggi

81900 Kota Tinggi, Johor.

Tel: 07-8821145 / Fax: 07-8822209 / Email: utcl@kulim.com.my

**SERVICE TEST: EFFLUENT**

Materials/ Products Tested	Ref No.	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring Palm Oil Mill and Rubber Factory Effluent	1a	Biochemical Oxygen	DOE Method, 4 th Edition 2019, REF
	1b	Demand (BOD ₃)	DOE Method, 4 th Edition 2019, ALT
	2	Chemical Oxygen Demand (COD)	DOE Method, 4 th Edition 2019, ALT
	3	Ammoniacal Nitrogen (AN)	In-house Method TP-EFF-03 Based on DOE Method, 4 th Edition 2019, REF
	4	Total Kjeldahl Nitrogen (TKN)	DOE Method, 4 th Edition 2019, ALT
	5	Suspended Solids (SS)	DOE Method, 4 th Edition 2019, REF
	6	Total Solids	APHA 2540 B, 19 th Edition 1995
	7	pH	APHA Method 4500-H ⁺ B 22 nd Edition 2012
	8	Oil & Grease (O & G)	DOE Method, 4 th Edition 2019, REF
	9	*Volatile Acid	APHA Method 5560 C 22 nd Edition 2012 – Organic And Volatile Acids
	10	*Alkalinity	APHA 2320 B 22 nd Edition 2012 – Titration Method
	11	*Volatile Suspended Solids	APHA 2540 E 22 nd Edition 2012 - Fixed and Volatile Solids Ignited at 550°C
12	*Dissolved Oxygen	APHA 4500-O G 22 nd Edition 2012 – Membrane Electrode Method	

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**SERVICE TEST: WATER**

Materials/ Products Tested	Ref No.	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring Sewage Water Water Processed Water Surface Water	13	*Total Coliform	APHA Method 9221 B 22 nd Edition 2012
	14	*E-Coli	APHA Method 9221 F 22 nd Edition 2012
	15	pH at 25°C	APHA Method 4500-H+B 22 nd Edition 2012
	16	Biochemical Oxygen Demand (BOD ₅)	In-house Method, TP-WAT-03, Based on APHA Method 5210 B 22 nd Edition 2012
	17	Dissolved Oxygen	APHA Method 4500 O 22 nd Edition 2012
	18	Chemical Oxygen Demand	In-house Method, TP-WAT-05, Based on APHA Method 5220 B 22 nd Edition 2012
	19	Ammoniacal Nitrogen	APHA Method 4500-NH ₃ C 22 nd Edition 2012
	20	Nitrate Nitrogen	APHA Method 4500-NO ₃ ⁻ B 22 nd Edition 2012
	21	Chloride	APHA Method 4500-Cl-B 22 nd Edition 2012
	22	Phosphorous	APHA Method 4500-P C 22 nd Edition 2012
	23	Total Solids	APHA Method 2540 B 22 nd Edition 2012
	24	Total Suspended Solids	APHA Method 2540 D 22 nd Edition 2012
	25	Total Dissolved Solids	In-house Method, TP-WAT-12, Based on APHA Method 2540 C 22 nd Edition 2012
	26	Conductivity	APHA Method 2510 B 22 nd Edition 2012
27	Hardness	APHA 2340 B 22 nd Edition 2012	

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**SERVICE TEST: WATER**

Materials/ Products Tested	Ref No.	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques	
<u>Environmental Monitoring</u>				
Sewage Water	28	Potassium	APHA 3030E, 3120B 22 nd Edition 2012 Method: ICP	
<u>Water</u>				
Processed Water				
Surface Water				
		29		Magnesium
		30		Calcium
		31		Zinc
		32		Manganese
		33		Iron
		34		Copper
		35		Aluminium
		36		Sodium
		37		*Cadmium
		38		*Plumbum
	39	*Chromium		
	40	*Selenium		
	41	*Silver		
	42	*Sulphate	APHA 4500-SO ₄ ²⁻ 22 nd Edition 2012	
	43	*Turbidity	APHA 2130 22 nd Edition 2012	

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**SERVICE TEST: PALM OIL PRODUCTS**

Materials/ Products Tested	Ref No.	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
<u>Foods</u>	45	Moisture & Volatile Matter	MPOB Test Method p2.1 Part1:2004
Palm Oil & Palm Oil Products	46	Insoluble Impurities	MPOB Test Method p2.2:2004
	47	Acidity	MPOB Test Method p2.5:2004
	48	Iodine Value	MPOB Test Method p3.2:2004
	49	Peroxide Value	PORIM Test Method p2.3:2004
	50	DOBI	MPOB Test Method p2.9:2004
	51	*Copper	MPOB Test Method p2.10:2004
	52	*Ferum	MPOB Test Method p2.10:2004
	53	*Phosphorous	MPOB Test Method p2.10:2004
	54	*Discriminant Function	MPOB Test Method p2.14:2004
	55	*Specific Extinction	MPOB Test Method p2.14:2004
	56	*Carotene	MPOB Test Method p2.6:2004
	57	*Physical Analysis	Palm Oil Factory Process Handbook, Laboratory And Milling Control

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**SERVICE TEST: FOLIAR / COMPOST**

Materials/ Products Tested	Ref No.	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
<u>Agriculture Products and Materials</u> Foliar, Leaf and Rachis	58	Nitrogen	In-house Method, TP-FOL-06, Based on LECO TruMac CN Nitrogen in Soil and Plant Tissue Application Notes 203-821-394:2010
	59a 59b	Phosphorus	In-house Method, TP-FOL-02, Based on MS 677:Pt.I, II & IV:1980 Method A: UV Method B: ICPOES
	60a 60b	Potassium	In-house Method, TP-FOL-03, Based on MS 677:Pt.I, II & IV:1980 Method A: AAS Method B: ICPOES
	61a 61b	Magnesium	In-house Method, TP-FOL-03, Based on MS 677: Pt.I, II & VII:1980 Method A: AAS Method B: ICPOES
	62a 62b	Calcium	In-house Method, TP-FOL-03, Based on MS 677:Pt.I, II & IV:1980 Method A: AAS Method B: ICPOES
	63a 63b	Boron	In-house Method, TP-FOL-05, Based on MS 677:Pt.I & II:1980 and Method 9.3 Official Journal of the E.U, 2003 Method A: UV Method B: ICPOES
	64a 64b	Zinc	In-house Method, TP-FOL-04, Based on MS 677:Pt.I & II:1980 Method A: AAS Method B: ICPOES
	65a 65b	Ferum	
	66a 66b	Copper	
	67a 67b	Manganese	
	68	*Ash	Method: Muffle Furnace at 550°C

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**SERVICE TEST: COMPOST**

Materials/ Products Tested	Ref No.	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques	
<u>Agriculture Products and Materials</u> Compost	69	Total Nitrogen	In-house Method TP-FOL-06, Based on LECO TruMac CN Nitrogen in Soil and Plant Tissue Application Notes 203-831-394:2010	
	70	Total Phosphorus (as P ₂ O ₅)	In-house Method TP-FOL-02, Based on MS677:PT. I & II:1980 / ICP-OES	
	71	Total Potassium (as K ₂ O)	In-house Method TP-FOL-03, Based on MS677:PT. I & II:1980 / ICP-OES	
	72	Total Magnesium (as MgO)	In-house Method TP-FOL-03, Based on MS677:PT. I & II:1980 / ICP-OES	
	73	Total Calcium (as CaO)	In-house Method TP-FOL-03, Based on MS677:PT. I & II:1980 / ICP-OES	
	74	*Total Boron (as B ₂ O ₃)	In-house Method TP-FOL-05, Based on MS677:PT. I & II:1980 / ICP-OES	
	75a 75b	Total Carbon	a. In-house Method, TP-FER-08, Based on LECO TruMac CN	b. *Furnace
	76a 76b	Organic Carbon	Nitrogen in Soil and Plant Tissue	
	77a 77b	Organic Matter	Application Notes 203-821-394:2010	
	78a 78b	CN ratio		
	79	Moisture	In-House Method, TP-FER-02, Based on MS417:Part2:1994	

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**SERVICE TEST: FERTILIZER**

Materials/ Products Tested	Ref No.	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Agriculture Products and Materials Fertilizers	80a 80b	Moisture	MS 417:Part2:1994 Method A: Desiccators Method B: Oven
	81	Total Nitrogen	In-house Method, TP-FER-03, Based on MS417:Part3:2020 (Second Revision)
	82a 82b	Total Phosphorus (as P ₂ O ₅)	In-house Method, TP-FER-04, Based on 417:Part4:2020 (Second Revision) Method A: UV Method B: ICPOES
	83a 83b	Total Potassium (as K ₂ O)	In-house Method, TP-FER-05, Based on 417:Part5:2020 (Second Revision) Method A: AAS Method B: ICPOES
	84a 84b	Total Magnesium (as MgO)	In-house Method, TP-FER-06, Based on 417:Part6:2020 (Second Revision) Method A: AAS Method B: ICPOES
	85a 85b	Total Calcium (as CaO)	In-house Method, TP-FER-07, Based on 417:Part6:2020 (Second Revision) Method A: AAS Method B: ICPOES
	86a 86b	Total Boron (as B ₂ O ₃)	In-house Method, TP-FER-09, Based on 417:Part7:2020 (Third Revision) Method A: UV Method B: ICPOES
	86c	*Water Soluble Boron (as B ₂ O ₃)	In-house Method, TP-FER-09, Based on 417:Part7:2020 (Third Revision) / Titration
	87	Citric Acid Soluble Phosphorus (as P ₂ O ₅)	In-house Method, TP-FER-16, Based on MS 417:Part4:2020 (Second Revision) / UV
	88a 88b	Water Soluble Magnesium (as MgO)	In-house Method, TP-FER-17, Based on MS 417:Part6:2020 (Second Revision) Method A: AAS Method B: ICPOES
	89a 89b	*Water Soluble Phosphorus (as P ₂ O ₅)	In-house Method, TP-FER-04, Based on 417:Part4:2020 (Second Revision) Method A: UV Method B: ICPOES

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**SAMM 307**

Materials/ Products Tested	Ref No.	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques	
	90	*Sulphur	In-house Method, TP-FER-03, Based on MS417:Part3:2020 (Second Revision)	
	91	*pH	APHA Method 4500-H*B 22 nd Edition 2012	
	92a 92b	*Ferum	In-house Method, Based on 417:Part5:2020 (Second Revision) Method A: AAS Method B: ICPOES	
	93a 93b	*Manganese		
	94a 94b	*Copper		
	95b 95b	*Zinc		
	96a 96b	*Total Carbon		
	97a 97b	*Organic Matter		
	98a 98a	*Organic Carbon		
	99a 99b	*C/N Ratio		

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**SERVICE TEST: SOILS**

Materials/ Products Tested	Ref No.	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Agriculture Products and Materials Soils	100	pH	MS 2457:2012
	101	Conductivity	MS 2458:2012
	102	Total Nitrogen	MS ISO 13878:2014
	103	Organic Carbon	In-House Method, TP-SOIL-05, Based on MS10694:2016 and Soil Sampling, Preparation, and Analysis 1996 pg. 225
	104	*Total Carbon	MS10694:2016
	105	*Organic Matter	
	106a 106b	Available Phosphorus	In-House Method, TP-SOIL-06, Based on Buku Panduan Analisis Tanah & Tumb, Jab Sains Tanah UPM 1988 pg. 23, Method A: UV *Method B: ICPOES
	107	Total Phosphorus	MS 678:Part VII:1980 Method: UV
	108	Exchangeable Cation Potassium	MS 678:Part IV:1980 Method: ICPOES
	109	Exchangeable Cation Magnesium	
	110	Exchangeable Cation Calcium	
	111	*Exchangeable Cation Sodium	
	112	Cation Exchangeable Capacity	MS 678:Part V:1980
	113	*Exchangeable Al	Soil Analysis Handbook of Reference Methods.
	114	*Exchangeable H	
115	*Acid Extractable		

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**SERVICE TEST: LATEX**

Materials/ Products Tested	Ref No.	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
<u>Rubber</u>	116	Dry Rubber Content	MS 466:1987
Field Latex	117	*TSC	MS 466:1987
	118	*Ammonia	In-house Method
	119	*VFA	
	120	*KOH	
	121	*Coagulant	
	122	*Magnesium	
	123	*Zinc	
	124	*Specific Gravity	

Remarks :

* Not SAMM accredited