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## **Accreditation No: LAB 128**

**Awarded to**

### **Provincial Reference Fertilizer Testing Laboratory Raiwind, Lahore, Pakistan.**

The scope of accreditation is in accordance with the standard specifications outlined in the following page(s) of this document. The accredited scope shall be visible and legible in areas such as customer service, sample-receiving section etc and shall not mislead its users.

The accreditation was first time granted on **18-12-2017** by Pakistan National Accreditation Council.

The laboratory complies with the requirements of **ISO/IEC 17025:2017**.

The accreditation requires regular surveillance, and is valid until 17-03-2021.

The decision of accreditation made by Pakistan National Accreditation Council implies that the organization has been found to fulfill the requirements for accreditation within the scope.

The organization however, itself is responsible for the results of performed measurements/tests.

**PAKISTAN NATIONAL ACCREDITATION COUNCIL**

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Director General

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## Testing Laboratory.

### Accreditation Scope of Provincial Reference Fertilizer Testing Laboratory at Raiwind, Lahore, Pakistan.

Permanent laboratory premises

Materials/Products tested	Testing field (e.g. environmental testing or mechanical testing)	Types of test/ Properties measured	Reference to standardized method (e.g. ISO 14577-1:2003)/ Internal method reference
Nitrogen Fertilizer	Chemical testing	Ammonical Nitrogen (Single/ Mixture/ Solid / Liquid)	i. Tandon HLS (Ed.) 2009. Methods of Analysis of Soils, Plants, Waters, Fertilizer and Organic Manures Fertilizer Development Organization, New Delhi Pp 161-162 ii. Official methods of Analysis of AOAC International, 20 <sup>th</sup> Edition, 2016, . Method No.2.4.10 (AOAC Official Method 892.01), Fertilizer Chapter 2 Page 15/ SOPs Macronutrients (PRFTL/SOP-MACRO/L3/002) 6.1 to 6.5
Nitrogen Fertilizer	Chemical testing	Nitrate Nitrogen (Single/ Mixture/ Solid / Liquid)	i. Tandon HLS (Ed.) 2009. Methods of Analysis of Soils, Plants, Waters, Fertilizer and Organic Manures Fertilizer Development Organization, New Delhi Pp 161-162 ii. Official methods of Analysis of AOAC International, 20 <sup>th</sup> Edition, 2016, . Method No.2.4.10 (AOAC Official Method 892.01), Fertilizer Chapter 2 Page 15/ SOPs Macronutrients (PRFTL/SOP-MACRO/L3/002) 7.1 to 7.5

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Nitrogen Fertilizer	Chemical testing	Total Nitrogen (Single/ Mixture/ Solid / Liquid)	<p><b>i.</b> Tandon HLS (Ed.) 2009. Methods of Analysis of Soils, Plants, Waters, Fertilizer and Organic Manures Fertilizer Development Organization, New Delhi Pp 161-162</p> <p><b>ii.</b> Official methods of Analysis of AOAC International, 20<sup>th</sup> Edition, 2016, . Method No.2.4.10 (AOAC Official Method 892.01), Fertilizer Chapter 2 Page 15/ SOPs Macronutrients (PRFTL/SOP-MACRO/L3/002) 6.1 to 8.5</p>
Nitrogen Fertilizer	Chemical testing	Ureic Nitrogen (Single/ Mixture/ Solid / Liquid)	<p><b>i.</b> Tandon HLS (Ed.) 2009. Methods of Analysis of Soils, Plants, Waters, Fertilizer and Organic Manures Fertilizer Development Organization, New Delhi Pp 161-162</p> <p><b>ii.</b> Official methods of Analysis of AOAC International, 20<sup>th</sup> Edition, 2016, . Method No.2.4.10 (AOAC Official Method 892.01), Fertilizer Chapter 2 Page 15/ SOPs Macronutrients (PRFTL/SOP-MACRO/L3/002) 8.1 to 8.5</p>
Phosphate Fertilizer	Chemical testing	Citrate Soluble Phosphorus Estimation (Single/ Mixture/ Solid / Liquid)	<p>Pakistan standard for Single Super phosphate (2<sup>nd</sup>edition) PS: 67-1996.</p> <p>PSQCA. Karachi/ SOPs Macronutrients (PRFTL/SOP-MACRO/L3/002) 9.1 to 9.8</p>

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Phosphate Fertilizer	Chemical testing	Total Phosphorus (Single/ Mixture/ Solid / Liquid)	Pakistan standard for Bio Organo phosphate fertilizer (2 <sup>nd</sup> edition) PS: 5295/2017. PSQCA. Karachi/ SOPs Macronutrients (PRFTL/SOP-MACRO/L3/002) 10.1 to 10.8
Potassium fertilizer	Chemical testing	Water Soluble Potassium (Single/ Mixture/ Solid / Liquid)	Pakistan Standard Specification for potassium Sulphate PS:1501/2011 (2 <sup>nd</sup> Revision) ICS: 65.080 PSQCA Karachi/ SOPs Macronutrients (PRFTL/SOP-MACRO/L3/002) 11.1 to 11.6
Zinc Fertilizer	Chemical testing	Water Soluble Zinc (Single/ Mixture/ Solid / Liquid)	Official Method of Analysis of AOAC International, 20 <sup>th</sup> Edition, 2016 Method No.2.6.01 (AOAC Official Method 965.09), Fertilizer Chapter 2, Subchapter 6, Page 29-30/ SOPs Micronutrients (PRFTL/SOP-MICRO/L3/003) 6.1 to 6.6
Zinc Fertilizer	Chemical testing	Acid Soluble Zinc (Single/ Mixture/ Solid / Liquid)	Official Method of Analysis of AOAC International, 20 <sup>th</sup> Edition, 2016 Method No.2.6.01 (AOAC Official Method 965.09), Fertilizer Chapter 2, Subchapter 6, Page 29-30/ SOPs Micronutrients (PRFTL/SOP-MICRO/L3/003) 7.1 to 7.6
Iron Fertilizer	Chemical testing	Water Soluble Iron (Single/ Mixture/ Solid / Liquid)	Official Method of Analysis of AOAC International, 20 <sup>th</sup> Edition, 2016 Method No.2.6.01 (AOAC Official Method 965.09), Fertilizer Chapter 2, Subchapter 6, Page 29-30/ SOPs Micronutrients (PRFTL/SOP-MICRO/L3/003)

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			10.1 to 11.6
Iron Fertilizer	Chemical testing	Acid Soluble Iron (Single/ Mixture/ Solid / Liquid)	Official Method of Analysis of AOAC International, 20 <sup>th</sup> Edition, 2016 Method No.2.6.01 (AOAC Official Method 965.09), Fertilizer Chapter 2, Subchapter 6, Page 29-30/ SOPs Micronutrients (PRFTL/SOP-MICRO/L3/003) 10.1 to 11.6
Copper Fertilizer	Chemical testing	Water Soluble Copper (Single/ Mixture/ Solid / Liquid)	Official Method of Analysis of AOAC International, 20 <sup>th</sup> Edition, 2016 Method No.2.6.01 (AOAC Official Method 965.09), Fertilizer Chapter 2, Subchapter 6, Page 29-30/ SOPs Micronutrients (PRFTL/SOP-MICRO/L3/003) 17.1 to 17.6
Copper Fertilizer	Chemical testing	Acid Soluble Copper (Single/ Mixture/ Solid / Liquid)	Official Method of Analysis of AOAC International, 20 <sup>th</sup> Edition, 2016 Method No.2.6.01 (AOAC Official Method 965.09), Fertilizer Chapter 2, Subchapter 6, Page 29-30/ SOPs Micronutrients (PRFTL/SOP-MICRO/L3/003) 18.1 to 18.6
Manganese Fertilizer	Chemical testing	Water Soluble Manganese (Single/ Mixture/ Solid / Liquid)	Official Method of Analysis of AOAC International, 20 <sup>th</sup> Edition, 2016 Method No.2.6.01 (AOAC Official Method 965.09), Fertilizer Chapter 2, Subchapter 6, Page 29-30/ SOPs Micronutrients (PRFTL/SOP-MICRO/L3/003) 19.1 to 19.6

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Manganese Fertilizer	Chemical testing	Acid Soluble Manganese (Single/ Mixture/ Solid / Liquid)	Official Method of Analysis of AOAC International, 20 <sup>th</sup> Edition, 2016 Method No.2.6.01 (AOAC Official Method 965.09), Fertilizer Chapter 2, Subchapter 6, Page 29-30/ SOPs Micronutrients (PRFTL/SOP-MICRO/L3/003) 20.1 to 20.6
Magnesium Fertilizer	Chemical testing	Water Soluble Magnesium (Single/ Mixture/ Solid / Liquid)	Official Method of Analysis of AOAC International, 20 <sup>th</sup> Edition, 2016 Method No.2.6.21 (AOAC Official Method 937.02), Fertilizer Chapter 2, Subchapter 6, Page -37 Method No.2.6.01 (AOAC Official Method 965.09), Fertilizer Chapter 2, Subchapter 6, Page 29-30/ SOPs Micronutrients (PRFTL/SOP-MICRO/L3/003) 21.1 to 21.6
Magnesium Fertilizer	Chemical testing	Acid Soluble Magnesium (Single/ Mixture/ Solid / Liquid)	Official Method of Analysis of AOAC International, 20 <sup>th</sup> Edition, 2016 Method No.2.6.01 (AOAC Official Method 965.09), Fertilizer Chapter 2, Subchapter 6, Page 29-30/ SOPs Micronutrients (PRFTL/SOP-MICRO/L3/003) 22.1 to 22.6
Boron Fertilizer	Chemical testing	Water Soluble Boron (Single/ Mixture/ Solid / Liquid)	Official Methods of Analysis of AOAC International, 20 <sup>th</sup> Edition, 2016, Method No 2.6.04 (AOAC Official method 982.01), Fertilizer Chapter 2, Subchapter 6, Page 31/ SOPs Micronutrients (PRFTL/SOP-MICRO/L3/003) 23.1 to 23.6

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Chelated Zinc	Chemical testing	Chelated Zinc (Single/ Mixture/ Solid / Liquid)	i.Vogel’s Textbook of Quantitative Chemical Analysis, 6 <sup>th</sup> Edition, J Mendham, R c Denney, J D Barnes, M J K Thomas ii.Official Methods of Analysis of AOAC International, 20 <sup>th</sup> Edition, 2016, Method No 2.6.01 (AOAC Official method 965.09), Fertilizer Chapter 2, Subchapter 6, Page 29-30/ SOPs Micronutrients (PRFTL/SOP-MICRO/L3/003) 24.1 to 24.6
Chelated Iron	Chemical testing	Chelated Iron (Single/ Mixture/ Solid / Liquid)	Official Methods of Analysis of AOAC International, 20 <sup>th</sup> Edition, 2016, Method No 2.6.16 (AOAC Official method 983.03), Fertilizer Chapter 2, Subchapter 6, Page 35/ SOPs Micronutrients (PRFTL/SOP-MICRO/L3/003) 25.1 to 25.6
Organic Matter	Chemical testing	Organic Matter (Single/ Mixture/ Solid )	i. AOAC International, 20 <sup>th</sup> Edition, 2016, Method No 2.7.08 (AOAC Official method 967.05), Fertilizer Chapter 2, Subchapter 7, Page 54 ii. Tandon HLS (Ed.) 2009. Methods of Analysis of Soils, Plants, Waters, Fertilizer and Organic Manures Fertilizer Development Organization, New Delhi Pp 161-162/ SOPs Macronutrients (PRFTL/SOP-MACRO/L3/002) 14.1 to 14.6

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Amino Acid	Chemical testing	Total Amino Acid (Protein Base) (Solid / Liquid)	<p><b>i.</b> Official Methods of Analysis of AOAC International, 20<sup>th</sup> Edition, 2016, Method No 2.4.10 (AOAC Official method 892.01), Fertilizer Chapter 2, Page 15</p> <p><b>ii</b> FAO nutritional studies no 24 (1970)</p> <p><b>iii</b> Pellet, L P and Young (1980).</p> <p><b>iv</b> Theymoli Balasubramanian sadasivam (1987)</p> <p><b>v</b> <a href="http://www.eplantsceinece.com/">www.eplantsceinece.com/</a> SOPs Macronutrients (PRFTL/SOP-MACRO/L3/002) 13.1 to 13.8</p>
Humic Acid	Chemical testing	Humic Acid (Solid / Liquid)	<p>ISO 19822:2018  <a href="https://www.iso.org/standard/66271.html/">https://www.iso.org/standard/66271.html/</a>            SOPs Macronutrients (PRFTL/SOP-MACRO/L3/002) 12.1 to 12.6</p>
Organic Matter	Chemical testing	Cation exchange capacity (Single/ Mixture/ Solid )	<p>Official Methods of Analysis of AOAC International, 20<sup>th</sup> Edition, 2016, Method No. 2.7.13 (AOAC Official Method 973.09), Fertilizers Chapter 2, Subchapter 7 Page 56/            SOPs Macronutrients (PRFTL/SOP-MACRO/L3/002) 15.1 to 15.6</p>

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Organic Matter Solid	Chemical testing	C:N ratio (Single/ Mixture/ Solid )	<p>i. Tandon HLS (Ed.) 2009. Methods of Analysis of Soils, Plants, Waters, Fertilizer and Organic Manures Fertilizer Development Organization, New Delhi Pp 161-162</p> <p>ii. Official methods of Analysis of AOAC International, 20<sup>th</sup> Edition, 2016, . Method No.2.4.10 (AOAC Official Method 892.01), Fertilizer Chapter 2 Page 15/ SOPs Macronutrients (PRFTL/SOP-MACRO/L3/002) 15.1 to 15.6</p>
Chelated Copper	Chemical testing	Chelated Copper (Single/ Mixture/ Solid / Liquid)	<p>i. Vogel's Textbook of Quantitative Chemical Analysis, 6<sup>th</sup> Edition, J Mendham, R c Denney, J D Barnes, M J K Thomas</p> <p>ii. Official Method of Analysis of AOAC International, 20<sup>th</sup> Edition, 2016 Method No.2.6.01 (AOAC Official Method 965.09), Fertilizer Chapter 2, Subchapter 6, Page 29-30 / SOPs Micronutrients (PRFTL/SOP-MICRO/L3/003) 26.1 to 26.6</p>
Chelated Manganese	Chemical testing	Chelated Manganese (Single/ Mixture/ Solid / Liquid)	<p>i. Vogel's Textbook of Quantitative Chemical Analysis, 6<sup>th</sup> Edition, J Mendham, R c Denney, J D Barnes, M J K Thomas</p> <p>ii. Official Method of Analysis of AOAC International, 20<sup>th</sup> Edition, 2016 Method No.2.6.01 (AOAC Official Method 965.09), Fertilizer Chapter 2, Subchapter 6, Page 29-30 / SOPs Micronutrients</p>

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Materials/Products tested	Testing field (e.g. environmental testing or mechanical testing)	Types of test/ Properties measured	Reference to standardized method (e.g. ISO 14577-1:2003)/ Internal method reference
			(PRFTL/SOP-MICRO/L3/003) 27.1 to 27.6
Sulphur	Chemical testing	Sulphur (Single/ Mixture/ Solid / Liquid)	i.Diagnosis and Improvement of Saline and Alkali Soils, USDA, Handbook Book No. 60 pp 146 ii.Official Method of Analysis of AOAC International, 20 <sup>th</sup> Edition, 2016 AOAC Official Method 980.02 Method No. 2.6.28 Page 39 iii.Pakistan Standard Specification for SOP Fertilizer Grade PS:1501-2011 © ICS:65.080 Pakistan Standards and Quality Control Authority, Karachi / <b>SOPs Micronutrients</b> (PRFTL/SOP-MICRO/L3/003) 28.1 to 28.6
Chloride	Chemical testing	Total Chlorides (Single/ Mixture/ Solid / Liquid)	i.Diagnosis and Improvement of Saline and Alkali Soils, USDA, Handbook Book No. 60 pp 146 ii.Official Method of Analysis of AOAC International, 20 <sup>th</sup> Edition, 2016 AOAC Official Method 928.02 Method No. 2.6.09 page 33 iii.Pakistan Standard Specification for SOP Fertilizer Grade PS:1501-2011 © ICS:65.080 Pakistan Standards and Quality Control Authority, Karachi / <b>SOPs Micronutrients</b> (PRFTL/SOP-MICRO/L3/003) 29.1 to 29.6
Paclobutrazole	Chemical testing	Paclobutrazole (Single/ Mixture/ Solid / Liquid)	Sigma Aldrich Germany, HPLC method for Paclobutrazole/ <b>SOPs PGPR</b> (PRFTL/SOP-PGPR/L3/004) 7.1 to 7.7

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			Instrument required : HPLC
Naphthyl acetic acid	Chemical testing	Naphthyl acetic acid (Single/ Mixture/ Solid / Liquid)	Sigma Aldrich Germany, HPLC method for Naphthyl acetic acid/ SOPs PGPR (PRFTL/SOP-PGPR/L3/004) 9.1 to 9.7 Instrument required : HPLC
Mepiquat Chloride	Chemical testing	Mepiquat Chloride (Single/ Mixture/ Solid / Liquid)	Bayer Crop Sciences, HPLC method for Mepiquat Chloride/ SOPs PGPR (PRFTL/SOP-PGPR/L3/004) 6.1 to 6.8 Instrument required : HPLC
Gibberallic acid	Chemical testing	Gibberallic acid (Single/ Mixture/ Solid / Liquid)	SOPs PGPR (PRFTL/SOP-PGPR/L3/004) 11.1 to 11.6 In house validated, HPLC method for Gibberallic acid Instrument required : HPLC
Cyclanilide	Chemical testing	Cyclanilide (Single/ Mixture/ Solid / Liquid)	i. Bayer Crop Sciences, HPLC method for Cyclanilide ii. Sigma Aldrich Germany, HPLC method for Cyclanilide/ SOPs PGPR (PRFTL/SOP-PGPR/L3/004) 12.1 to 12.6 Instrument required : HPLC

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