Testing Laboratory.

Accreditation Scope of Pakistan Council of Scientific & Industrial Research Laboratories Complex, Karachi, Pakistan.

Permanent laboratory premises [X]

FOOD CHEMISTRY

Materials/ Products tested	Types of test/ Properties measured	Range of measurement	Minimum detection limit	Uncertainty of Measurement (where applicable) MU(±)	Standard specification/ Techniques/ equipment used
Cereal Foods	Moisture	1 % - 99 %	0.5 %	0.28 %	Air Oven Method AOAC 18th Edition (2005) AOAC Official Methods 32.1.03, 925.10
	Protein	1 % - 99 %	0.2 %	0.28 %	Kjeldahl Method AOAC 18th Edition (2005) AOAC Official Methods 32.1.22, 920.87 Total Protein in flour
	Fat	1 % - 99 %	0.5 %	0.71 %	Soxhlet Method AOAC 18thEdition (2005) Crude fat or Ether extract 32.2.01, F (4.5.01) 920.39C
	Ash	1 % - 99 %	0.1 %	0.35 %	Direct Method AOAC 18th Edition (2005) Official Methods AOAC 32.1.05, 923.03
	Crude Fiber	0.5 % - 99 %	0.1 %	0.52 %	Weende Method AOAC 18th Edition 2005, Fiber Tech M6 (1020/1021) FOSS AOAC Official Method 920.86,(32.1.15) AOAC Official Method 950.37,(32.3.16) AOAC Official Method 930.24,(32.4.02) AOAC Official Method 935.39,(32.5.06)

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Materials/ Products tested	Types of test/ Properties measured	Range of measurement	Minimum detection limit	Uncertainty of Measurement (where applicable) MU(±)	Standard specification/ Techniques/ equipment used
Cereal Foods	Carbohydrate (by difference) / Nitrogen Free Extract	1 %-99 %	0.2 %	0.5 %	By Calculation Modern Food Analysis by Hart & Fisher 1971 by Difference/Nitrogen Free Extract
Cereal Foods	Calorific Value / Energy Value	1 % -99 %	0.2%	0.5 %	(By Calculation) MacCance & Widdowson's. The composition of Foods by Paul & Southgate 4th Ed. 1988
	Fat	1 % - 99 %	0.2 %	0.11 %	Acid Hydrolysis Method AOAC Official Method 922.06, Chapter 32.1.14, Official Method of Analysis AOAC International 18th Edition 2005
Raw/Processed Foods	Vitamin C	3 mg/100g - 10 mg/100g	1 mg/ 100 g	2 mg/100 g	Titremetric Method Association of Official Analytical Chemists (AOAC) 18th Edition (2005) 45.1.14, Method: 967.21
	Vitamin A	90 IU/g - 150 IU/g	80 IU/g	50.7 µg/100 g	UV-Spectrophotometer Pearson's Composition & Analysis of Food 9th Edition Page 641
	Vitamin-C	2 mg/100g -10 mg/100g	1 mg/100 g	2 mg/ 100 g	Titrimetric method AOAC Official Method 985.33, Chapter 50.1.09, Official Methods of Analysis of AOAC Int., 18th Ed. 2005

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Materials/ Products tested	Types of test/ Properties measured	Range of measurement	Minimum detection limit	Uncertainty of Measurement (where applicable) MU(±)	Standard specification/ Techniques/ equipment used
Red Chili, Rice, Food, Feed & Agriculture Commodities	Aflatoxins B_1, B_2, G_1, G_2 & Total Aflatoxin in Food & Feed	LOD 1 ug/kg LOR 3 ug/kg	Not applicable	3.48 ppb 6.48 ppb 24.3 ppb 11.4 ppb 3.17 ppb	1.Thin-layer chromatographic method 2. Liquid- Liquid Partition Chromatography 18th Edition (2005) Chapter 49 AOAC OFFICIAL METHOD (Adapted) 975.36 (49.2.08), 968.22 (49.2.08), 970.43 (49.1.01), 971.22 (49.2.03), 970.44 (49.2.07), 968.22 (49.2.02)
Milk & Milk Products	Aflatoxin M_1 in Milk & Milk Products	Aflatoxin M1/conc. In ug/kg (ppb)/1. *LOD in fluid milk ~ 0.05 µg/L, 2.LOD Dried milk ~ 0.5 µg/kg, 3. LOD in cheese ~ 0.3 µg/kg	Not applicable	10.24 ppb	1.Thin-layer chromatographic method 2. Column Chromatography 18th Edition (2005) Chapter 49 AOAC OFFICIAL METHOD (Adapted) 980.21 (49.3.02), 974.17 (49.3.01), 970.43 (49.1.01), 978.15 (49.2.21), 970.44 (49.2.07), 968.22 (49.2.08) Aflatoxin M_1 in Milk and cheese
Red Resin, Wheat & Feed	Ochratoxin 'A'/concentration in µg/kg (ppb)/ ~ 10 ng/g	Ochratoxin 'A'/concentration in µg/kg (ppb)/ ~ 10 ng/g	Not applicable	8.577 ppb	1.Thin-layer chromatographic method 2. Column Chromatography Adapted Method of IARC (1982) AOAC 18th Edition (2005) Chapter 49 AOAC Official Method (Adapted)
Microbiology					
Food	Aerobic Plate Count	250-10^8 cfu/g	10 cfu/g	Not applicable	Bacteriological Analytical Manual, Online USFDA, Chapter # 03 (Jan. 2001), (By Pour Plate method)
	Total Coliforms	3 cfu/g - 1100 cfu/g	3 cfu/g	Not applicable	Bacteriological Analytical Manual, Online USFDA, Chapter # 04 (Sept. 2002), (By MPN Multiple tube method)

Materials/ Products tested	Types of test/ Properties measured	Range of measurement	Minimum detection limit	Uncertainty of Measurement (where applicable) MU(±)	Standard specification/ Techniques/ equipment used
	Faecal Coliforms	3 cfu/g - 1100 cfu/g	3 cfu/g	Not applicable	Bacteriological Analytical Manual, Online USFDA, Chapter # 04 (Sept. 2002), (MPN Multiple tube method)
Food	Mould & Yeast Count	10 cfu/g - 10^5 cfu/g	10 cfu/g	Not applicable	Bacteriological Analytical Manual, Online USFDA, Chapter # 18 (April 2003), (Spread plate/pour plate method)
	Salmonella Detection	Absent/ present	Not applicable	Not applicable	Bacteriological Analytical Manual, Online USFDA, Chapter # 05 (Jan. 2001), (Selective enrichment method)
	Staphylococcus aureus Enumeration	35 cfu/g – 10^5 cfu/g	35 cfu/g	Not applicable	Bacteriological Analytical Manual, Online USFDA (Chapter 12), Jan 2001, (Spread plate method)
	E.coli in food	3 cfu/g - 1100 cfu/g	3 cfu/g	Not applicable	Bacteriological Analytical Manual, Online USFDA, Chapter # 04 (Sept. 2002), (MPN Multiple tube method)
Water	Heterotrophic Plate Count	30 cfu/ml - 10^5 cfu/ml	01 cfu/dL	Not applicable	Standard Method for the examination of water & wastewater, 20th Edition 1998, (Pour plate method)
	Total Coliforms Count	1 cfu/ml – 10^4 cfu/ml	01 cfu/dL	Not applicable	ISO- 9308- 1 Part 1 Membrane filtration Method 2nd Edition, 2000, (Membrane filtration /MPN Multiple tube method) ISO- 9308- 2 Part 2 Multiple Tube Method 1st Edition, 1990, Membrane filtration Method/ (MPN Multiple tube method)
	Faecal	1 – 10^4			ISO- 9308- 1 Part 1

Materials/ Products tested	Types of test/ Properties measured	Range of measurement	Minimum detection limit	Uncertainty of Measurement (where applicable) MU(±)	Standard specification/ Techniques/ equipment used
	Coliforms Count	cfu/dL	01 cfu/dL	Not applicable	Membrane filtration Method 2nd Edition, 2000, (Membrane filtration Method/MPN Multiple tube method) ISO- 9308- 2 Part 2 Multiple Tube Method 1st Edition, 1990, (MPN Multiple tube method)
	E. coli in Water	$1 – 10^4$ cfu/dl	01 cfu/dL	Not applicable	ISO- 9308- 1 Part 1 Membrane filtration Method 2nd Edition, 2000, (Membrane filtration/MPN Multiple tube method) ISO- 9308- 2 Part 2 Multiple Tube Method 1st Edition, 1990, (MPN Multiple tube method)
CHEMICAL PHARMACIUTICAL					
Edible Oil and Products Containing Edible Oil	Erucic Acid	0.5 %– 5.0 %	0.5 %	0.04 %	Validated self developed method KL/PRC/Erucic Acid/03 Gas Chromatograph
Food / Pharmaceutical	Vitamin E	5 µg – 20 mg	5 µg / 100 g	0.013 µg / 100 g	HPLC
Pharmaceutical	Vitamin C	> 2 mg	2 mg	0.0081 mg	BP 2003 Page #. 155-56 Techniques used: Titrimetric method
Spices & Food containing Spices	(Sudan I-1V) Absorbance	10 ppm – 100 ppm	8 ppm	(Sudan1-1V) 0.05 ppm	AOAC, 920.208B (2005) UV Visible Spectrophotometer TLC
Pickles	Water Activity Equilibrium water	0.1 – 1	0.08	0.0016	AOAC 978.18 (2005)

Materials/ Products tested	Types of test/ Properties measured	Range of measurement	Minimum detection limit	Uncertainty of Measurement (where applicable) MU(±)	Standard specification/ Techniques/ equipment used
Margarine/ Milk Powder, Pharmaceutical	Vitamin A	7 µg – 0.5 mg	5 µg	0.011 µg	HPLC
Food / Pharmaceutical	Vitamin D	0.5 µg/ g – 12 µg/ g	0.4 µg	0.06 µg	AOAC, 2002.2.05 HPLC
Chilli	Para red	2 ppm– 10 ppm	1 ppm	0.01 ppm	Validated self developed method KL/PRC/Para red/08
Spices & Food containing Spices	Sudan I, II, III and IV Absorbance	> 0.2 ppm	0.1 ppm	0.1 ppm	LC-MS/MS
CENTRE FOR ENVIRONMENTAL STUDIES					
Food (All Commodities)	Lead	≥ 0.100 ppm	3.000 ppb	0.155 ppb	AOAC 18th Ed (2005) AOAC Official Method 999.10 (9.1.08)
	Cadmium	≥ 0.010 ppm	0.200 ppb	0.034 ppb	AOAC 18th Ed (2005) AOAC Official Method 999.10 (9.1.08)
	Zinc	≥ 0.5 ppm	0.010 ppm	0.039 ppm	AOAC 18th Ed (2005) AOAC Official Method 999.10 (9.1.08)
	Copper	≥ 0.5 00 ppm	0.010 ppm	0.016 ppm	AOAC 18th Ed (2005) AOAC Official Method 999.10 (9.1.08)
	Iron	≥ 2 ppm	0.04 ppm	5.000 ppm	AOAC 18th Ed (2005) AOAC Official Method 999.10 (9.1.08)
	Arsenic	≥ 0.100 ppm	1.000 ppb	0.025 ppm	AOAC 18th Ed (2005) AOAC Official (Method 986.15 (Sec 9.1.01)

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Materials/ Products tested	Types of test/ Properties measured	Range of measurement	Minimum detection limit	Uncertainty of Measurement (where applicable) MU(±)	Standard specification/ Techniques/ equipment used
	Selenium	≥ 0.20 ppm	3.0 ppb	0.021 ppm	AOAC 18th Ed (2005) AOAC Official (Method 986.15 (Sec 9.1.01)
	Mercury	≥ 0.100 ppm	0.2 ppb	6.23 ppm	AOAC 18th Ed (2005) AOAC Official (Method 971.21 (Sec 9.2.22)
Food (All Commodities)	Pesticides	0.010 - 005 ppm	0.001 ppm	0.002 ppm	AOAC 2005 GC
Water	Pesticides	0.010 - 005 ppm	0.001 ppm	0.002 ppm	AOAC 2005 GC
TEXTILE					
Fabric	Colour Fastness to Washing and Laundering	Grey Scale (1-5)	1 (Grey Scale Rating)	Change in color 1/2	ISO-105 CO1 (1989) (Change in Colour & Staining)
≈	Colour Fastness to Washing and Laundering	Grey Scale (1-5)	1 (Grey Scale Rating)	Change in color 1/2	ISO-105 CO2 (1989) (Change in Colour & Staining)
≈	Colour Fastness to Washing and Laundering	Grey Scale (1-5)	1 (Grey Scale Rating)	Change in color 1/2	ISO-105 CO3 (1989) (Change in Colour & Staining)
≈	Colour Fastness to Rubbing	Grey Scale (1-5)	1 (Grey Scale Rating)	Change in color 1/2	AATCC-08 (2005) (Change in Colour & Staining)
≈	Colour Fastness to Perspiration	Grey Scale (1-5)	1 (Grey Scale Rating)	Change in color Acid: 1/2 Alkaline: 1/2	ISO-105 EO4 (1994) (Change in Colour & Staining)
≈	Colour Fastness to Water.	Grey Scale (1-5)	1 (Grey Scale Rating)	Change in color 1/2	ISO-105 EO1 (1994) (Change in Colour & Staining)
≈	Colour Fastness to Sea Water.	Grey Scale (1-5)	1 (Grey Scale Rating)	Change in color 1/2	ISO-105 EO2 (1994) (Change in Colour & Staining)

Materials/ Products tested	Types of test/ Properties measured	Range of measurement	Minimum detection limit	Uncertainty of Measurement (where applicable) MU(±)	Standard specification/ Techniques/ equipment used
≈	Colour Fastness to Rubbing (Organic Solvent)	Grey Scale (1-5)	1 (Grey Scale Rating)	Change in color Warp: 1/2 Weft: 1/2 Staining Warp: 1/2 Weft: 1/2	ISO-105 DO2 (1993) (Change in Colour & Staining)
≈	Wrinkle Recovery of Woven Fabrics	20°-180°	20° (Angle)	1°	AATCC-66 (2003) Angle of Recovery
≈	Tensile Strength of Fabric (Strip Method)	1N-5 KN	1N (Force)	Warp: 9.15% of the observed value Weft: 9.65% of the observed value	ISO-13934-1 (1999) Force at Break
≈	Tear Strength	1N -5 KN	1N (Force)	Across Warp: 8.49% Of the observed Value Across Weft: 10.65% Of the observed Value	ISO-13937-2 (2000) Force at Tear
≈	Fibre Composition / Blend Ratio	% of Cotton % of Polyester	0.1%	% Polyester: 0.09% % Cotton: 0.09%	ISO 1833, Section 10. (Mixture of Cellulose & Polyester) (1977) Fibre Solubility
≈	Ends and Picks	Numeric Values	1 Thread	Warp: 2 thread Warp: 1 thread	ISO-7211-2 (1984) No of Threads / Area
≈	Color Fastness to Light	Blue Scale (1-8)	1 (Blue Wool Scale Rating)	1/2	AATCC-16E (Option-03) (2004) (Change in Colour)
≈	Weight of Fabric	gm/m^2	N.A	1.13 g/m^2	ISO-3801 (1977-E) Weight of Fabric
≈	Pilling (Martindale)	Numeric Value (1-5)	1 (Rating)	15% of observed reading	ASTM D-4970 (2002) Fabric Deformation
≈	Abrasion (Martindale)	Numeric Value (1-5)	1 (Rating)	33% of observed reading	ISO-12947 (1998) Fabric Deformation

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Materials/ Products tested	Types of test/ Properties measured	Range of measurement	Minimum detection limit	Uncertainty of Measurement (where applicable) MU(±)	Standard specification/ Techniques/ equipment used
≈	Spray Rating Tester	0-100	0 (AATCC Rating)	1.0	AATCC-22 (2005) Water penetration
≈	pH of Water Extract	4-10	2	0.5	AATCC-81 (2001) pH of fabric
Yarn	Count of Yarn	English (Ne)/ Denier/Tex	Not applicable	15% of observed reading	ISO-7211-5 (1984)

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Calibration Laboratory.

Field of measurement			
Measured quantity	**Range**	**Best Measurement Capability expressed as an uncertainty (±)**	**Brief description of measurement and equipment used**
Calibration of Balance	2 mg - 200 g	0.2 mg	R-76-1 & 2 (OIML) Masses: ASTM Class-1 (1 mg to 100g) Class E2 (1 mg to 50 g)
Calibration of Volumetric Apparatus	1 ml - 2 L	0.03 ml	ASTM E-542- 94 (99) Top Loading Balance (i) Ohaus Model AR 3130 and (ii) AND Model GX 6100 (iii) Analytical Balance ME 414 Capacity 410 g
Calibration of: (I) Liquid-in-Glass Thermometer & Dial gauge Thermometer (ii) Temperature Controller (Oven & Furnace)	0 °C - 400 °C Ambient - 1000 °C	0.3 °C 1.0 °C	• Dry Block Make ISO Tech Model 650B • Multi Function Process Calibrator Model 725 Make Fluke • Thermocouples S, R T and K type
Calibration of: (i) Micrometer (ii) Vernier Caliper	1mm - 25 mm 1mm - 100 mm	For Micrometer 6.0 µm For Vernier Caliper 30 µm	Use of gauge blocks Gauge Blocks Inspection Grade 0
Calibration of DC Voltage measuring Device/ equipment.	1 mV - 1000 V	0.01 mV	**(a)** Manual of Wavetek Model 9100 Universal Calibration System, Volume 1& 2, Issue 8 (Jun 1998, No. 850300
Calibration of AC Voltage measuring Device/ equipment.	1 mV - 700 V	0.5 mV	

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Calibration of Decade Resistance Box, Substitution Type Resistor and Resistance Measuring Device/Equipment	1 Ω - 300 MΩ	0.2 Ω	

*Capabilities are to be expressed as uncertainties (±) for a confidence probability of not less than 95%

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