

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 measure- ment	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 18th Edition (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 measure ment	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
	Calorific Value / Energy Value	1 % -99 %	0.2%	0.5 %	(By Calculation) MacCance & Widdowson's. The composition of Foods by Paul & Southgate 4 th 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 18 th Edition 2005
Raw/ Processed Foods	Vitamin C	3 mg/100g - 10 mg/100g	1 mg/ 100 g	2 mg/100 g	Titrimetric Method Association of Official Analytical Chemists (AOAC) 18 th 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 9 th 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., 18 th Ed. 2005

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Materials/ Products tested	Types of test/ Properties measured	Range of measure ment	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	Not applicable	LOD 1µg/kg	1.368 ppb 1.055 ppb 0.487 ppb 0.445 ppb 0.838 ppb	1.Thin-layer chromatographic method 2. Liquid- Liquid Partition Chromatography 18 th 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	Not applicable	Aflatoxin M ₁ /conc. In ug/kg (ppb)/ 1. LOD in fluid milk ≈0.05 µg/L, 2.LOD Dried milk ≈ 0.1 µg/kg, 3. LOD in cheese ≈ 0.1 µg/kg	0.0988 ppb	1.Thin-layer chromatographic method 2. Column Chromatography 18 th 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'	Not applicable	LOD 1µg/kg	0.852 ppb	1.Thin-layer chromatographic method 2. Column Chromatography Adapted Method of IARC (1982) AOAC 18 th Edition (2005) Chapter 49 AOAC Official Method (Adapted)

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Microbiology

Materials/ Products Tested	Types of test/ Properties Measured	Range of measure ment	Minimum detection limit	Uncertainty of Measurement (where applicable) MU (±)	Standard specification/ Techniques/ equipment used
Food	Aerobic Plate Count	250-10 ⁸ cfu/g	10 cfu/g	0.64 cfu/g	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)
	Faecal 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)
	Mould & Yeast Count	10 cfu/g – 10 ⁵ cfu/g	10 cfu/g	0.34 cfu/g	Bacteriological Analytical Manual, Online USFDA, Chapter # 18 (April. 2003), (Spread plate / pour plate method)
	<i>Salmonella</i> Detection	Absent/ present	Not applicable	Not applicable	Bacteriological Analytical Manual, Online USFDA, Chapter # 05 (Jan. 2001), (Selective enrichment method)
	<i>Staphylococcus aureus</i> 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)
	<i>E.coli</i> 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)

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Materials/ Products Tested	Types of test/ Properties Measured	Range of measureme nt	Minimum detection limit	Uncertainty of Measuremen t (where applicable) MU (+)	Standard specification/ Techniques/ equipment used
Water	Heterotrophic Plate Count	30 cfu/ml – 10 ⁵ cfu/ml	01 cfu/dL	0.37 cfu/ ml	Standard Method for the examination of water & wastewater, 20 th Edition 1998, (Pour plate method)
	Total Coliforms Count	1 cru/ml – 10 ⁴ cfu/ml	01 cfu/dL	0.14 cfu/ ml	ISO- 9308- 1 Part 1 Membrane filtration Method 2 nd Edition, 2000, (Membrane filtration /MPN Multiple tube method) ISO- 9308- 2 Part 2 Multiple Tube Method 1 st Edition, 1990, Membrane filtration Method/ (MPN Multiple tube method)
	Faecal Coliforms Count	1-10 ⁴ cfu/dL	01 cfu/dL	0.005 cfu/ ml	ISO- 9308- 1 Part 1 Membrane filtration Method 2 nd Edition, 2000, (Membrane filtration Method/MPN Multiple tube method) ISO-9308- 2 Part 2 Multiple Tube Method 1 st Edition, 1990, (MPN Multiple tube method)
	<i>E. Coli</i> in Water	1-10 ⁴ cfu/dL	01 cfu/dL	0.005 cfu/ ml	ISO- 9308- 1 Part 1 Membrane filtration Method 2 nd Edition, 2000, (Membrane filtration Method/MPN Multiple tube method) ISO-9308- 2 Part 2 Multiple Tube Method 1 st Edition, 1990, (MPN Multiple tube method)

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CHEMICAL PHARMACIUTICAL

Materials/ Products Tested	Types of test/ Properties Measured	Range of measure ment	Minimum detection limit	Uncertainty of Measurement (where applicable) MU (±)	Standard specification/ Techniques/ equipment used
Edible Oil and Products Containing Edible Oil	Erucic Acid	0.5 % - 5.0 %	0.5 %	0.02 %	Validated self developed method KL/PRC/Erucic Acid/03 Gas Chromatograph
Food / Pharmaceut ical	Vitamin E	5 µ g – 20 mg	5 µ g	0.013 µg / 100g	HPLC
Pharmaceut ical	Vitamin C	> 2 mg	2mg	0.0081 mg	BP 2008 page # 186-187 Techniques used: Titrimetric method
Spices & Food containing Spices	(Sudan I- IV) Absorbance	20 ppm – 100 ppm	10 ppm	Not applicable	AOAC, 920.208B (2005) UV Visible Spectrophotometer TLC
Pickles	Water Activity Equilibrium water	0.1-1	0.08	0.0016	AOAC 978.18 (2005)
Margarine/ Milk Powder, Pharmaceut ical	Vitamin A	7 µ g – 0.5mg	5 µ g	0.011 µg	HPLC
Food / Pharmaceut ical	Vitamin D	0.5 µg/g – 12 µg/g	0.5 µg	0.06 µg	AOAC, 2002.2.05 HPLC
Chilli	Para red	2 ppm – 100ppm	1 ppm	± 0.18ppm	Validated self developed method KL/PRC/Para red/08
Spices & Food containing Spices	Sudan I, II, III and IV Absorbance	> 0.2ppm	0.1 ppm	Sudan: I ± 0.025ppm II ± 0.08ppm III ± 0.01ppm VI ± 0.01ppm	LC-MS/MS

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CENTRE FOR ENVIRONMENTAL STUDIES.

Material s/ Products Tested	Types of test/ Properties Measured	Range of measurement	Minimum detection limit	Uncertainty of Measurement (where applicable) MU (±)	Standard specification/ Techniques/ equipment used
Food (All Commoditi es)	Lead	≥ 0.100 ppm	3.000 ppb	0.155 ppb	AOAC 18 th Ed (2005) AOAC Official Method 999.10 (9.1.08)
	Cadmium	≥ 0.010 ppm	0.200 ppb	0.034 ppb	
	Zinc	≥ 0.5 ppm	0.010 ppm	0.039 ppm	
	Copper	≥ 0.5 00 ppm	0.010 ppm	0.016 ppm	
	Iron	≥ 0.2 ppm	0.04 ppm	5.000 ppm	
	Arsenic	≥ 0.100 ppm	1.000 ppb	0.025 ppm	AOAC 18 th Ed (2005) AOAC Official (Method 986.15 (Sec 9.1.01)
	Selenium	≥ 0.20 ppm	3.0 ppb	0.021 ppm	
	Mercury	≥ 0.100 ppm	0.2 ppb	6.23 ppm	AOAC 18 th Ed (2005) AOAC Official (Method 971.21 (Sec 9.2.22)
	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

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Materials/ Products Tested	Types of test/ Properties Measured	Range of measure ment	Minimum detection limit	Uncertainty of Measurement (where applicable) MU (±)	Standard specification/ Techniques/ equipment used
Fabric	Colour Fastness to Rubbing	Grey Scale (1-5)	1 (Grey Scale Rating)	Change in color 1/2	AATCC-08 (2005) (Change in Color & 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)
	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° (Angel)	2°	AATCC-66 (2003) Angle of Recovery
	Tensile Strength of Fabric (Strip Method)	1N-5 KN	1N (Force)	Warp: 9.0 % of the observed value Weft: 14.9% of the observed value	ISO-13934-1 (1999) Force at Break
	Tear Strength	1N- 5KN	1N (Force)	Across Warp: 15.7% of the observed value Across Weft: 13.40% of the observed value	ISO-13937-2 (2000) Force at Tear

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Fabric	Fibre Composition / Blend Ratio	% of Cotton % of Polyester	0.1%	% of Cotton: 0.09% % of Polyester: 0.09%	ISO 1833, Section 10. (Mixture of Cellulose & Polyester) (1977) Fibre Solubility
	Ends and Picks	Numeric Values	1 Thread	Warp: 5.4 thread Warp: 3.9 thread	ISO-7211-2 No of threads / Area
	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
	Spray Rating Tester	0-100	0 (AATCC Rating)	1.0	AATCC-22 (2005) Water penetration
	pH of water Extract	4-10	2	± 0.084	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	Calibration & Measurement Capability (CMC) expressed as an uncertainty (+)	Brief description of measurement and equipment used
Weighing	2.0 mg to 20.0 kg	0.2 mg to 0.5 g	R-76-1 & 2 (OIML) Masses 1. ASTM Class 1 Masses 2. Working class
Mass/Weights	10 mg to 20 Kg	0.01 mg to 0.5 g	Technique: Direct Comparison 1. Set of masses 2. Analytical Balance Mettler Toledo AX 205 3. Mass Comparator Mettler Toledo XP 5003S 4. Mass Comparator Mettler Toledo KA 30-3/P 5. Top Loading Balance, AND GP-40K
Volume	1 ml to 2 L	0.03 ml to 0.5 ml	ASTM E-542- 01 Top Loading Balance (i) Ohaus Model AR 3130 and (ii) AND Model GX 6100 (iii) Analytical Balance ME 414 Capacity 410 g
Length	1mm to 1000 mm	0.01 mm to 1mm	Direct Comparison Use of gauge blocks Grade 0, Length Comparator

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Field of measurement:			
Measured quantity	Range	Calibration & Measurement Capability (CMC) expressed as an uncertainty (±)	Brief description of measurement and equipment used
Temperature	-20 °C to 1000 °C	0.03 °C to 0.8 °C	ASTM E-77/84 Low Temperature Hydra Liquid Bath, 7380 Fluke Dry Block Calibrator Jupiter Make ISO Tech Model 650B Dry Block Calibrator Tecal, 650S Dry Block Calibrator Pegas, ISO Tech Three Zone Furnace ISO Tech 465 Saturn Thermocouple Calibrator 27152-6 Huminator Germany Multi Function Process Calibrator Model 725 Make Fluke Thermocouples S, R T and K type
DC Voltage	1 mV to 1000 V	0.001 mV to 1.0 V	Direct comparison Universal Calibration System, Keithley Model 2002 DMM Agilent 344401
AC Voltage	1 mV to 700 V	0.004 mV to 1.0 V	
Resistance	1 Ω to 300 MΩ	0.2mΩ to 0.0003 MΩ	

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