| | | | |
|---|---|---|---|
| **Laboratory** | **Asthagiri Herbal Research Foundation, 162 A, II Floor, Perungudi Industrial Estate, Perungudi, Chennai, Tamil Nadu** | | |
| **Accreditation Standard** | **ISO/IEC 17025: 2005** | | |
| **Certificate Number** | **TC-7345** | **Page 1 of 14** | |
| **Validity** | **06.06.2018 to 05.06.2020** | **Last Amended on --** | |

| Sl. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|

**CHEMICAL TESTING**

| | | | | |
|---|---|---|---|---|
| **I.** | **AYUSH PRODUCTS** | | | |
| **1.** | **General Tests for Herbs, Herbal Extract, Herbal Products** | Foreign Matter | The Ayurvedic Pharmacopeia of India, (Part 1),Volume 5, Pg–213. | 0.01% w/w to 20% w/w |
| | | Loss on Drying | The Ayurvedic Pharmacopeia of India, (Part 1),Volume 5, Pg–213 | 1 % w/w to 20% w/w |
| | | Determination of Water soluble ash | The Ayurvedic Pharmacopeia of India, (Part 1),Volume 5, Pg–213. | 0.1% w/w to 50% w/w |
| | | Total Ash Content | The Ayurvedic Pharmacopeia of India, (Part 1),Volume 5, Pg–213 | 0.1 % w/w to 50% w/w |
| | | Acid insoluble ash | The Ayurvedic Pharmacopeia of India, (Part 1),Volume 5, Pg–213. | 0.1% w/w to 10% w/w |
| | | Alcohol extractives | The Ayurvedic Pharmacopeia of India, (Part 1),Volume 5, Pg–213. | 0.5% w/w to 80% w/w |
| | | Water extractive value | The Ayurvedic Pharmacopeia of India, (Part 1),Volume 5, Pg– | 0.1% w/w to 80% w/w |

| Sl. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | | | 213. | |
| | | Volatile oil content | The Ayurvedic Pharmacopeia of India, (Part 1),Volume 5, Pg–213. | 0.5% w/w to 10% v/w |
| | | Crude Fiber | The Ayurvedic Pharmacopeia of India, (Part 1),Volume 5, Pg–213. | 0.5% w/w to 15% w/w |
| | | pH | The Ayurvedic Pharmacopoeia of India, (Part II), Volume II, 1st edition, pg 221-224 | 1 to 12 |
| | | Specific gravity | The Ayurvedic Pharmacopoeia of India, (Part II), Volume II, 1st edition, pg 221 | 0.70 to 1.50 |
| | | Iodine value | The Ayurvedic Pharmacopoeia of India, (Part II), Volume II, 1st edition, pg 221 | 1 to 300 |
| | | Saponification value | The Ayurvedic Pharmacopoeia of India, (Part II), Volume II, 1st edition, pg 221 | 1 to 300 |
| | | Unsaponification matter | The Ayurvedic Pharmacopoeia of India, (Part II), Volume II, 1st edition, pg 221 | 0.3% w/w to 20% w/w |
| | | Refractive index | The Ayurvedic Pharmacopoeia of India, (Part II), Volume II, 1st edition, pg 221 | 1.33 to 1.52 |

| Sl. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | | Free fatty acid | The Ayurvedic Pharmacopoeia of India, (Part II), Volume II, 1st edition, pg 221 | 0.5 % w/w to 25% w/w |
| | | Acid value | The Ayurvedic Pharmacopoeia of India, (Part II), Volume II, 1st edition, pg 221 | 0.2 to 50 |
| 2. | **Functional Group Analysis By UV-Vis Method for Herbs, Herbal Extract, Herbal Products** | Alkaloids | AHRF/WI/UV/01, Issue 2, 15-03-18 Sreevidya & Mehrotra: journal of AOAC International Vol. 86, no. 6, 2003 | 0.1% w/w to 40% w/w |
| | | Carbohydrates | AHRF/WI/UV/02, Issue 2, 15-03-18 (Hedge J.E and Hofreiter B.T, 1962, Carbohydrate chemistry, 17, Academic press, New York.) | 0.1 % w/w to 40% w/w |
| | | Flavonoid | AHRF/WI/UV/03, Issue 2, 15-03-18 (Woisky, R. and Salatino, A.1998. Analysis of propolis: some parameters and procedures for chemical quality control. J. Apic. Res. 37: 99-105.) | 0.1% w/w to 15% w/w |

| Sl. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | | Proteins | AHRF/WI/UV/04, Issue 2, 15-03-18 (Lowry O.H, Rosebrough N.J, Farr A.L and Randall R.J. (1951). J.Biol.Chem 193:265) | 0.1 % w/w to 60% w/w |
| | | Tannins | AHRF/WI/UV/05, Issue 2, 15-03-18 (Ravi Narayan Venkatachalam. July – September 2012 RJPBCS Volume 3 Issue 3 Page No. 605) | 0.1% w/w to 40% w/w |
| | | Total Phenols | AHRF/WI/UV/06, Issue 2, 15-03-18 (Determination of Total Phenolic and Flavonoids Contents in the Methanolic and Aqueous Extract of Achillea Millefolium.Anoosh Eghdami Et al. Org. Chem. J. 2010, 2, 81-84) | 0.1 % w/w to 40% w/w |
| 3. | **Estimation Of Active Ingredients/ Markers by HPLC for Herbs, Herbal Extract, Herbal Products** | Andrographolide (Andrographis paniculata) | AHRF/WI/HPLC/01, Issue 2, 15-03-18 USP 34 <621> | 1 mg /kg to 2500 mg /kg |
| | | Azadirachtin–A | AHRF/WI/HPLC/02, Issue 2, 15-03-18 Determination of Azadirichtin and fatty acid, Methyl esters of Azadirichtin Seeds by | 1 mg /kg to 1500 mg /kg |

| Sl. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | | | HPLC and GLC. Nutan Kaushik, 2002, Anal Bioanal Chem. 374; 1199-1204. | |
| | | Azadirachtin–B | AHRF/WI/HPLC/03, Issue 2, 15-03-18 Determination of Azadirichtin and fatty acid, Methyl esters of Azadirichtin Seeds by HPLC and GLC. Nutan Kaushik, 2002, Anal Bioanal Chem. 374; 1199-1204. | 1 mg /kg to 1500 mg /kg |
| | | Curcumin (*Curcuma longa*) | AHRF/WI/HPLC/04, Issue 2, 15-03-18 A liquid chromatography Method for the simultaneous determination Of curcumin and piperine In food products using diode array detector. Krishna Veni Nagappanet.al, Asian JResearch Chem., 2(2),April---June 2009, page 115---118 | 1 mg /kg to 1500 mg /kg |
| | | Forskolin | AHRF/WI/HPLC/05, Issue 2, 15-03-18 Analysis of forskolin in Homeopathic tinctures | 1 mg /kg to 1500 mg/kg |

| Sl. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | | | by Validated HPLC method. Binit K Dwivediet.al, Int. J. Med. Arom. Plants, Vol 2, No1, pp 195-199 March 2012 | |
| | | Gallic Acid | AHRF/WI/HPLC/06, Issue 2, 15-03-18 Development of a RP-HPLC Method for Analysis of Triphala Churna and its Applicability to Test Variations in Triphala Churna Preparations, Pawar et.al, Indian Journal Of Pharmaceutical Sciences.2009 Jul-Aug; 71(4):382–386 | 0.1 mg /kg to 2500 mg /kg |
| | | Hypophyllanthin | AHRF/WI/HPLC/07, Issue 2, 15-03-18 Rapid RP-HPLC technique for the determination of Phyllantin as bulk and its Quantification in phyllantus Amareus extract. Amene Alvari et.al International Journal of | 1 mg /kg to 1500 mg/kg |

| Sl. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | | | Phtomedicine 3, 2011,115--119 | |
| | | Nimbin | AHRF/WI/HPLC/08, Issue 2, 15-03-18 Acid Catalysed Isomerization of Nimbin to Isonimbin, Narasimhan et.al, American JournalofOrganicChemistry: 2011;1(1):6-9 | 1 mg /kg to 1500 mg /kg |
| | | Nimbolide | AHRF/WI/HPLC/09, Issue 2, 15-03-18 Analysis of phytochemical Variability in Neem formulation, Gunasekaran et.al, Indian Journal of Natural products and Research, Sept 2010; Vol. 1(3): 291-295 | 1 mg /kg to 1500 mg /kg |
| | | Phyllanthin | AHRF/WI/HPLC/10, Issue 2, 15-03-18 Rapid RP-HPLC technique for the determination of Phyllantin as bulk and its Quantification in phyllantus | 1 mg /kg to 1500 mg /kg |

| Sl. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | | | Amareus extract. Amene Alvari et.al International Journal of Phtomedicine 3, 2011,115-119 | |
| | | Piperine (*Pipernigrum*) | AHRF/WI/HPLC/11, Issue 2, 15-03-18 Quantitative analysis of Piperine from Ayurvedic Polyherbal formulations Using Reverse phase High Performance Liquid Chromatography; Sunita et al, International Journal of Pharma and BioSciences VI(1) 2010 | 1 mg /kg to 1500 mg /kg |
| | | Salanin | AHRF/WI/HPLC/12, Issue 2, 15-03-18 Acid Catalysed Isomerization of Nimbin to Isonimbin, Narasimhan et.al, American JournalofOrganicChemistry: 2011;1(1):6---9 | 1 mg /kg to 1500 mg /kg |
| | | Epoxyazadiridione | AHRF/WI/HPLC/13, Issue 2, 15-03-18 Acid Catalysed Isomerization of Nimbin to Isonimbin, | 1 mg /kg to 1500 mg /kg |

| Sl. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | | | Narasimhan et.al, American Journal of Organic Chemistry: 2011;1(1):6--9 | |
| **Residues In Herbal Extract/ Products** | | | | |
| **1.** | **Heavy metals by AAS for Herbs, Herbal Extract, Herbal Products** | Mercury – Hg | The Ayurvedic Pharmacopoeia of India, (Part II), Volume I, 1st edition, pg 158 | 0.1 mg /kg to 350mg/kg |
| | | Arsenic – As | The Ayurvedic Pharmacopoeia of India, (Part II), Volume I, 1st edition, pg 158 | 0.1 mg /kg to 100mg/kg |
| | | Lead – Pb | The Ayurvedic Pharmacopoeia of India, (Part II), Volume I, 1st edition, pg 158 | 0.1 mg /kg to 25mg/kg |
| | | Cadmium - Cd | The Ayurvedic Pharmacopoeia of India, (Part II), Volume I, 1st edition, pg 158 | 0.1 mg /kg to 30mg/kg |
| **II.** | **FOOD AND AGRICULTURAL PRODUCTS (GENERAL TESTS)** | | | |
| **1.** | **Cereals, pulses and by products Coffee, cocoa and by products Tea and tea products Honey and** | Foreign Matter | FSSAI manual of methods of analysis of foods- Cereals and cereal products | 0.01% w/w to 20% w/w |
| | | Loss on Drying | FSSAI manual of methods of analysis of foods- Cereals and | 1% w/w to 20% w/w |

| Sl. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | **honey products Spices and condiments Edible oils, Neem oil** | | cereal product | |
| | | Determination of Water soluble ash | FSSAI manual of methods of analysis of foods- Cereals and cereal products | 0.1% w/w to 50% w/w |
| | | Total Ash Content | FSSAI manual of methods of analysis of foods- Cereals and cereal products | 0.1% w/w to 50% w/w |
| | | Acid insoluble ash | FSSAI manual of methods of analysis of foods- Cereals and cereal products | 0.1% w/w to 10% w/w |
| | | Alcohol extractives | FSSAI manual of methods of analysis of foods- Spices and condiments | 0.5% w/w to 80% w/w |
| | | Water extractive value | FSSAI manual of methods of analysis of foods- Spices and condiments | 0.1% w/w to 80% w/w |
| | | Volatile oil content | F.A.O Manual of food quality control(1986)14/8 page 239. A.O.A.C 17th edn, 2000 Official method 962.17 | 0.5% w/w to 10% v/w |
| | | Crude Fiber | FSSAI manual of methods of analysis of foods- Cereals and cereal products | 0.5% w/w to 15% w/w |
| | | pH | IS 548 (Part 1) 1964, RA 2010 | 1 to 12 |

| Sl. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | | Specific gravity | IS 548 (Part 1) 1964, RA 2010 | 0.70 to 1.50 |
| | | Iodine value | IS 548 (Part 1) 1964 ,RA 2010 | 1 to 300 |
| | | Saponification value | IS 548 (Part 1) 1964, RA 2010 | 1 to 300 |
| | | Unsaponification matter | IS 548 (Part 1) 1964, RA 2010 | 0.3% w/w to 20% w/w |
| | | Refractive index | IS 548 (Part 1) 1964, RA 2010 | 1.33 to 1.52 |
| | | Free fatty acid | IS 548 (Part 1) 1964, RA 2010 | 0.5 % w/w to 25% w/w |
| | | Acid value | IS 548 (Part 1) 1964, RA 2010 | 0.2 to 50 |
| **2.** | **Cereals, pulses and by products Coffee, cocoa and by products Tea and tea products Honey and honey products Spices and condiments** | Functional Group Analysis by UV-Vis Method for **Alkaloids** Carbazole(Curry leaves) Piperidine( Pepper) Purine derivatives(Caffeine) Pyrrolizidine(Tea, Honey) *Using piperine as standard | AHRF/WI/UV/01, Issue 2, 15-03-18 (Sreevidya & Mehrotra: journal of AOAC International Vol. 86, no. 6, 2003) A.O.A.C. 17$^{TH}$edn, 2000 Official method Piperine in pepper preparations 987.07 spectrophotometric method | 0.1 % w/w to 40% w/w |
| | | Functional Group Analysis by UV-Vis Method for **Carbohydrates Glucose**(Cereals, | AHRF/WI/FAUV/01, Issue 2, July 2015 (Hedge J.E and Hofreiter B.T, 1962, Carbohydrate chemistry, 17, Academic | 0.1% w/w to 40% w/w |

| Sl. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | | Pulses, Juices)<br>Polysaccharides (Turmeric)<br>Glycosides( Papaya)<br>*Using dextrose as standard | press, New York.)<br>I.S.I Handbook of food analysis (Part II-1984 Pg 36 | |
| | | Functional Group Analysis by UV-Vis Method for **Flavonoid**<br>Catechins, Epicatechins, Epigallocatechins ( Tea, Cocoa, Grapes)<br>Proanthocyanidins ( Cocoa, tea, Grapes, Cinnamon)<br>Quercetin( Tea)<br>*Using Quercetin as standard | AHRF/WI/FAUV/02, Issue 2, July 2015 (Woisky, R. and Salatino, A. 1998. Analysis of propolis: some parameters and procedures for chemical quality control. J. Apic. Res. 37: 99-105.) | 0.1% w/w to 15% w/w |
| | | Functional Group Analysis by UV-Vis Method for **Proteins** (Cereal, Pulses, Moringa oleifera)<br>*Using BSA as standard | AHRF/WI/FAUV/03, Issue 2, July 2015 (Lowry O.H, Rosebrough N.J, Farr A.L and Randall R.J. (1951). J.Biol.Chem 193:265)<br>IS:6287(RA 2010)Method of sampling and analysis of sugar confectionery | 0.1 % w/w to 60% w/w |
| | | Functional Group | AHRF/WI/FAUV/04, | 0.1 % w/w to 40% w/w |

| Sl. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | | Analysis by UV-Vis Method for **Tannins**<br>Condensed tannins (Tea, Cocoa, Grapes, Mint)<br>Hydrolyzable tannins ( Pomegranate, Clove, Barley, Rice, Oat)<br>*Using Gallic acid as standard | Issue 2, July 2015<br>Ravi Narayan Venkatachalam.<br>July – September 2012<br>RJPBCS Volume 3 Issue 3 Page No. 605 | |
| | | Functional Group Analysis by UV-Vis Method for **Total Phenols**<br>Protocatechuic acid<br>Gallic acid<br>Caffeic acid<br>Coumaric acid<br>Ferulic acid<br>*Using Gallic acid as standard | AHRF/WI/FAUV/05, Issue 2, July 2015<br>Determination of Total Phenolic and Flavonoids Contents in the Methanolic and Aqueous Extract of AchilleaMillefolium.<br>Anoosh Eghdami Et al. Org. Chem. J. 2010, 2, 81-84 | 0.1% w/w to 40% w/w |
| **III.** | **RESIDUES IN FOOD PRODUCTS** | | | |
| **1.** | **Heavy metals by AAS Food and agricultural products Cereals, pulses and by products Coffee, cocoa and by products** | Mercury-Hg | FSSAI Manual of methods of analysis of foods– Metals, pg 10 | 0.1 mg/kg to 350 mg/kg |
| | | Arsenic-As | FSSAI Manual of methods of analysis of foods– Metals, pg 10 | 0.1 mg/kg to 100 mg/kg |
| | | Lead-Pb | FSSAI Manual of methods of analysis of foods– Metals, pg 10 | 0.1 mg/kg to 25 mg/kg |

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|---|---|
| **Laboratory** | **Asthagiri Herbal Research Foundation, 162 A, II Floor, Perungudi Industrial Estate, Perungudi, Chennai, Tamil Nadu** |
| **Accreditation Standard** | **ISO/IEC 17025: 2005** |
| **Certificate Number** | **TC-7345** **Page 14 of 14** |
| **Validity** | **06.06.2018 to 05.06.2020** **Last Amended on --** |

| Sl. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | **Tea and tea products<br>Honey and honey products<br>Spices and condiments** | Cadmium-Cd | FSSAI Manual of methods of analysis of foods– Metals, pg 10 | 0.1 mg/kg to 30 mg/kg |

**Bhumi Rajyaguru**
**Convenor**

**Alok Jain**
**Program Manager**