Spices Board

Spices Board is the flagship organisation for the development and world wide promotion of Indian Spices. It is an autonomous body under the Ministry of Commerce & Industry Govt. of India

Quality Evaluation Laboratory, Kochi-25
The Board was established in 1986 under the Spices Board Act with the merger of the erstwhile Cardamom Board and Spices Export Promotion Council.

Spices Board, as an apex body, spearheading the activities for excellence of Indian Spices, has made quality and hygiene the cornerstones for its development and promotional strategies.
Vision of the Indian spice industry

“To become the international processing hub and premier supplier of clean, safe and value added spices and herbs to the industrial, retail, and food service segments of the global spices market by meeting the quality requirements”

Vision of the Quality Lab

The laboratory is in the process of becoming an International Centre of Excellence in the analysis of spices and spice products. As a regulatory body, Spices Board aims at analysing all the export consignments of spices & spice products as per the international regulations. To achieve this goal, the Laboratory is in the process of incorporating additional parameters and aims at equipping for handling more volume of samples.
Major Activities

The multifaceted activities of the Board include the promotion of export of Spices, monitoring the quality of the exports, development and implementation of better production methods through scientific, technological and economic research, guidance to farmers on getting higher and better quality yields through scientific agricultural practices etc.

QUALITY EVALUATION LABORATORY

The Quality Evaluation Laboratory of Spices Board was established in Kochi in 1989. It provides analytical services to the Indian spice industry, monitors the quality of spices produced and processed in the country and analyses all the samples collected by the Board under the Mandatory Inspection Scheme.

The Laboratory established its first Regional Quality Evaluation Laboratory at Mumbai in June 2008. The second Regional Quality Evaluation Laboratory was established at Guntur, Andhra Pradesh during 2010. The third Regional Quality Evaluation Laboratory was established at Gummidipoondi, Chennai in 2011 and fourth in Narela, New Delhi in 2012 and the fifth one at Tuticorin in 2013. Laboratories at Kandla and Kolkata was established during 2016 and 2021 respectively.
The Laboratory at Kochi is certified by British Standards Institution, the U.K. for the ISO 9001 Quality Management System since 1997, ISO 14001 Environmental Management System since 1999 and Accredited under the National Accreditation Board for Testing & Calibration Laboratories (NABL) (under the ISO/IEC: 17025) in 2004. The Laboratory activities are fully computerized and linked with network since 1999. The Laboratory is also in the process of providing the web enabled result delivery in the immediate future. The Laboratory is divided into three divisions Viz. Chemistry Lab, Residue Lab and Microbiology Lab for the speedy and efficient handling of the analysis done on various parameters.

QUALITY POLICIES

ISO 9001 SYSTEM
To ensure that spices exported from India conform to the specifications laid down by the appropriate international organisations, or to the food regulations of the buying countries especially with respect to the hygiene, commercial and chemical standards.
To achieve total customer satisfaction and continual improvement in quality of the services provided, the QEL of Spices Board adopts the latest version of ISO 9001, as the minimum requirement.

ISO 14001 SYSTEM
To minimize the release of chemical, microbiological or other wastes to the environment.
To reduce the consumption of electricity and water wherever possible.
To set objectives and targets for continual improvement and to prevent pollution wherever practical and cost effective.
To comply with the relevant environmental legislations and regulations

ISO/IEC17025 SYSTEM
It is our objective to develop the laboratory into an international centre of excellence in the analysis of spices by modernizing testing facilities and updating the methodology of testing, suitably upgrading the testing skills of staff by training in national and international institutions.

Accreditation status of Regional Laboratories.

ISO/IEC 17025 (NABL) for the Technical Competency

<table>
<thead>
<tr>
<th>Regional Lab</th>
<th>Accredited in</th>
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<tbody>
<tr>
<td>Mumbai</td>
<td>2011</td>
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<tr>
<td>Guntur</td>
<td>2013</td>
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<tr>
<td>Chennai</td>
<td>2014</td>
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<tr>
<td>Delhi (Narela)</td>
<td>2016</td>
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<tr>
<td>Tuticorin</td>
<td>2020</td>
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Major objectives of the Quality Evaluation Laboratories.

- Provide Analytical Services
- Mandatory Quality check on export consignments
- Conduct Validation/Check Sample Programme on various parameters.
- Training technical personnel from Spice Industry
- Support for establishing Lab in spice export units

- Participation in ISO/IPC (International Pepper Community) /BIS(Bureau of Indian Standards)/ASTA(American Spice Trade Association) /FAPAS(Food Analysis Proficiency Assessment Scheme/FEPAS(Food Examination Proficiency Assessment Scheme) Harmonization/Establishment of various standards with Codex, ISO, IPC, ASTA, FSSAI(Food Safety & Standards Authority of India) etc.
- Compilation/validation of Specification/Analytical Methods.
- Setting-up of Regional Labs

Major Equipments/Facilities

<table>
<thead>
<tr>
<th>Major Equipments/Parameters</th>
<th>Parameters</th>
<th>LOQ*</th>
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<tbody>
<tr>
<td>LC-MS/MS</td>
<td>Illegal Dyes, Pesticides residues</td>
<td>10 µg/kg</td>
</tr>
<tr>
<td>GC-MS/MS</td>
<td>Pesticides residues</td>
<td>10 µg/kg</td>
</tr>
<tr>
<td>AAS with graphite furnace</td>
<td>Heavy Metals</td>
<td>0.1 mg/kg</td>
</tr>
<tr>
<td>HPLC-FD</td>
<td>Aflatoxins /Ochratoxin A</td>
<td>0.5 µg/kg</td>
</tr>
<tr>
<td>HPLC-UV/DAD</td>
<td>Capsaicin, vanillin etc.</td>
<td>NA</td>
</tr>
<tr>
<td>UV-Vis spectrophotometer</td>
<td>Curcumin, piperine, color value</td>
<td>NA</td>
</tr>
<tr>
<td>VIDAS</td>
<td>Salmonella</td>
<td>NA</td>
</tr>
</tbody>
</table>

* Limit of quantification
A brief on Instruments / methods used for various Analysis.

Sudan I-IV and Other Illegal dyes.

Liquid Chromatograph with Mass Spectrometer (LC-MS/MS) is used for the analysis of Sudan I-IV and other Illegal dyes.

Mycotoxins [Aflatoxins and Ochratoxin A]
High Performance Liquid Chromatograph (HPLC) with Fluorescent Detector and post column derivatisation is used for the analysis. Clean-up of samples are done using immuno affinity column.
Pesticide Residues. Different classes of pesticide residues (viz. Organo Chlorine, Oranophosphorous, Pyrethroid, Dithiocarbamates etc.) are analysed using GC-MS/MS and LC-MS/MS.

**Capsaicin, Vanillin, Gingerol and Shogaols.**
(Analysed by HPLC with UV-Vis Detector / Diode Array Detector)

**Curcumin in Turmeric, Piperine in Pepper and Color value of chillies**
(Analysed by UV-Visible Spectrophotometer)

Volatile oil (by hydro distillation method using Clevenger Apparatus)

Moisture  (Toluene/Hexane distillation method using Dean and Stark apparatus)

Total Ash (gravimetric method) oleoresin(Soxhlet method) etc.
Total Plate Count, Yeast & Mould, Pathogens viz. *Salmonella, E.coli, B.cereus, S.aureus, C.perfringens etc.*
(Analysed as per the methods specified in Bacteriological Analytical Manual, (BAM) and AOAC etc.)
**A brief description on Major Parameters.**

**Mycotoxins**
a) Aflatoxins:G2,G1,B2 & B1 are analysed. These are secondary metabolites of the fungi *Aspergillus flavus & Aspergillus parasiticus*. Aflatoxins are carcinogenic and hence stringent limits are fixed by importing countries.

b) Ochratoxin'A': Toxic secondary metabolites of the fungus *Aspergillus ochraceus*. Toxic and hence limits are fixed by importing countries.

**Azo Dyes**
Azo -Dyes such as Sudan I to IV, Rhodamine, Parared, Sudan Orange G, Sudan Red 7 B etc. are analysed at µg/kg levels since these are adulterants which are not permitted in edible items. These dyes are toxic, and are potential carcinogens. Importing countries have laid down stringent measures to control these adulterants.

**Pesticide Residues**
Farmers use pesticides to protect crops, e.g. fruits and vegetables, from insects, pests, weeds and fungal diseases during the course of cultivation and to protect harvested crops from rats, mice, flies and other insects during storage. But the residues of the pesticides may remain in the crop which is harmful to human and other animals. The levels of these residues in foods are often stipulated by regulatory bodies in many countries.

**Microbial contamination**
Components of the food act as substrate for the growth of microbes in the presence of optimal moisture paving way to contamination and spoilage. To prevent contamination we should minimize the contact between micro-organisms and foods; eliminate micro-organisms from food or at least adjust conditions of storage to prevent their growth. When the micro-organism involved are pathogenic, their association with our food supply is critical from a public point of view, since they have the potential to cause large outbreaks.
Analytical Services of QEL.

Customer Samples

Customers can send the samples directly to the sample receipt desk of Quality Lab, Spices Board and the same can be got tested. For details pl. refer website: www.indianspices.com.

The details of analytical service are given in Form No:75 in the website www.indianspices.com.

Mandatory Inspection Scheme

All chilly and chilly products exported from India should be analysed for Sudan I to IV and Aflatoxins. Chilly whole is exempted from Sudan analysis.

Turmeric powder exported to EU, USA, North America, Japan, Australia & New Zealand should be analysed for Sudan I to IV. Turmeric, ginger & nutmeg, nutmeg products and mace to EU should be tested for Aflatoxin

Dried curry leaf exported to EU should be tested for endosulfan, triazophos and profenfos.

Spices such as chilly & chilly products, cumin & cumin products (except oils and oleoresins) exported to Japan should be tested for Ethion, Iprobenphos, Triazophos and Profenphos.

Sugar coated fennel exported to all destinations should be analysed for Sunset yellow FCF.

Cumin seed whole exported to any destinations should be tested for “Extraneous Matter” and “other seed contents”. Extraneous matter content can be minimised by suitable cleaning methodologies.

Small Cardamom exported to Saudi Arabia should be tested for the pesticide residues λ Cyhalothrin, Aectamiprid, Cypermethrin, Profenofos, Triazophos and Dithiocarbamates.
Annual Training Programme conducted at QEL, Kochi.

Following training programmes are conducted regularly during November-December every year. The details will be published in the website www.indianspices.com.

All the training programmes are practical oriented and hands on training.

1. Physical and Chemical Analysis of spices and spice products. Determination of intrinsic qualities of spices such as capsaicin (in chillies), Piperine (in pepper), Curcumin (in Turmeric) etc are covered. Analysis of Macro contaminants (extraneous matter, physical mould, insect defiled, Excreta mammalian etc.) are included in the training programmes.

2. GC analysis of pesticide residues (Organochlorines, Organophosphorous & Pyrethroids). The training includes sample preparation techniques, extraction methods, clean-up techniques and instrumentation part.

3. Microbial parameters such as E. coli, Salmonella, Coliforms, Total Plate Count, Yeast & Mould etc. Training includes analysis using conventional and customized method

4. HPLC analysis of Aflatoxins and analysis of illegal dyes (Sudan, Rhodamine, Para red, Sudan orange G etc.). The training emphasises on sample homogenisation techniques, extraction methods and instrumentation.
Contact details of Quality Evaluation Laboratories

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   Quality Evaluation Laboratory,
   Spices Board, Sugandha Bhavan,
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