



एपारुतेस बोर्ड
भारत

*Spices Board,
India*

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.



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 corner
stones for its development and
promotional strategies.



Spices Board,
India

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 includes 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 analyse all the samples collected by the Board under the Compulsory Inspection Scheme.

The Laboratory established its first Regional Quality Evaluation Laboratory at Mumbai during June 2008. The second Regional Quality Evaluation Laboratory is established at Guntur, Andhra Pradesh during 2010. The third Regional Quality Evaluation Laboratory is established at Gummidipoondi, Chennai in 2011 and fourth in Narela, New Delhi in 2012 and the fifth one at Tuticorin in 2013. The establishment of laboratories in Kolkata and Kandla is in progress.





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The Laboratory at Kochi is certified by British Standards Institution, 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 9001:2008 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 14001:2004 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/IEC 17025:2005 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 17025:2005 (NABL) for the Technical Competency)

Regional Lab	Accredited in
Mumbai	2011
Guntur	2013
Chennai	2014

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 Method.
- ◆ Setting-up of Regional Labs

Major Equipments/Facilities

Major Equipments/Parameters			
Equipments	Parameters	Test Methods	LOQ
LC-MS/MS Q trap	Illegal Dyes	EU News notification/ASTA	10 µg/kg
LC-MS/MS	Sudan I-IV	EU News notification/ASTA	10 µg/kg
GC-MS ion trap	Pesticides confirmation	PAM/AOAC	10 µg/kg
GC-ECD/FPD, "Q" Trap	Pesticide residues	PAM/AOAC	10 µg/kg
AAS with graphite furnace.	Heavy Metals	AOAC	0.1 mg/kg
HPLC-FD	Aflatoxins /Ochratoxin A	ASTA/AOAC	0.5 µg/kg /5.0 µg/kg
HPLC-UV/FD/DAD	Capsaicin, vanillin etc.	ASTA/AOAC	NA
UV-Vis spectro photometer	Curcumin, piperine, color value	ASTA/AOAC	NA
VIDAS	Salmonella	BAM	NA





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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.



LC-MS/MS with Q Trap

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 by using immuno affinity column.



HPLC with fluorescent detector



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Pesticide Residues. [organochlorines, organophosphorous & pyrethroids]. Organochlorines(BHC,DDT,Endosulfan etc) and Pyrethroids (Cypermethrin and fenvalerate) are analysed by Gas Chromatograph with Electron Capture Detector.

Organophosphorous compounds such as Ethion, Chlorpyrifos, Quinalphos,



GC with ECD
Disulfoton etc are analysed by Gas Chromatograph with FPD.(Flame Photometric Detector)



GC with FPD

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 distillation method using Dean and Stark apparatus)

Total Ash (gravimetric method) oleoresin(Soxhlet method) etc.



Automated soxhlet extraction system

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).



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Bio-safety Cabinet



Immuno Diagnostic Assay System



A brief description on Major Parameters.

Mycotoxins

a) Aflatoxins:G2,G1,B2 & B1 are analysed. These are secondary metabolites of the fungus-*Aspergillus flavus* & *Aspergillus parasiticus*. Aflatoxins are carcinogenic and hence stringent Maximum Residual Limits (MRLs) are fixed by importing countries.

b) Ochratoxin'A': Toxic secondary metabolites of the fungus *Aspergillus ochraceus*. Toxic and hence (MRLs) 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 $\mu\text{g}/\text{kg}$ 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 man 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 microorganisms and foods; eliminate microorganisms from food or at least adjust conditions of storage to prevent their growth. When the microorganism 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.



Microscopic Examination



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 get 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 should be analysed for Sudan I to IV. Turmeric, ginger & Nutmeg 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, ginger & ginger products (except oils and oleoresins) exported to Japan should be tested for Ethion, Iprobenphos, Triazophos and Profenfos.

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.



Spices Board,
India



Annual Training Programme conducted at QEL, Kochi.

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

All the training programmes are practical oriented and hands on training will be provided for the participants.

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. An 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.
4. HPLC analysis of Aflatoxins and analysis of illegal dyes (Sudan, Rhodamine, Parared, Sudan orange G etc.). The training emphasises on sample homogenisation techniques, extraction methods and instrumentation.



Cleanup by Immuno Affinity Column



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