

Punjab Horticultural Postharvest Technology Centre Punjab Agricultural University, Ludhiana

PHPTC Newsletter

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SIGNIFICANCE OF QUALITY CONTROL LABORATORY: A PRE-REQUISITE FOR FOOD SAFETY

Quality Control Laboratory plays a significant role in providing a quality product, through valid analytical results. It is a core strength of regulatory agencies related to food safety and helps prove that practices by food producers and suppliers results in safe products for the consumers. Increased demand of agricultural produce with increasing population has lead to extensive use of pesticides / fertilizers in order to enhance the productivity of the crops. However, indiscriminate use of fertilizers and pesticide have shown drastic contamination of ground as well as irrigation water leading to adverse impact on the aquatic life, plants, animals and human health.

India retains its position as the second largest producer of Fruits and Vegetables globally. International marketing of fruits and vegetables to fulfill demand for exotic and off-season products offers a lucrative marketing opportunity for growers and traders. Considering the current level of International Food trade, food safety has become a significant global issue. Hundreds of pesticides, including herbicides, insecticides and fungicides are among the most hazardous chemical compounds extensively used to increase the food production. Reason for increasing levels of pesticide residues in food is majorly lack of awareness of farmer about Good Agricultural Practices (GAP) leading to :

1. Indiscriminate use of chemical pesticides

List of some rejected consignments exported from India.

Type of Food	Date	Notification	Notified by	Countries concerned	Reason for Rejection of Consignment (unauthorised substances present)
Fruits and vegetables	3/4/2019 18/04/2019*	Border rejection	United Kingdom	India, United Kingdom	• Methamidophos (0.03ppm) • Acephate (0.05ppm) • Carbendazim (0.48 ppm) in peppers • Ethion (0.34 ppm) in chillies
Fruits and vegetables	11/2/2019	Information for attention	Switzerland	India, Switzerland	• Monocrotophos (0.18 ppm) • Triazophos (0.04ppm) in amla
Cereals	4/6/2019	Border rejection	Finland	Finland, India, Sweden	• Tricyclazole (0.035 ppm) in basmati rice

Source: <https://webgate.ec.europa.eu/rasff-window/portal/?event=searchResultList#>

2. Non-observance of prescribed waiting periods
3. Wrong advice and supply of pesticides to the farmers by pesticide dealers
4. Effluents from pesticides manufacturing units
5. Wrong disposal of left over pesticides and cleaning of plant protection equipments

One of the potential reason for the decreasing agri exports is non-compliance with export norms that are quite stringent, especially in case of fresh fruits and vegetables. Stringent norms of International markets require compliance with a strict regulatory framework of measures designed to ensure human and plant health and to procure the produce from the registered farmers only. For this purpose the produce of the farmer needs to comply with the strict regulatory frame work according to the defined maximum residue limits (MRLs) depending upon the zone of export.

The two major regulatory frame work for export are :

European Union (EU) : For export to European countries.

Food and Drug Administration (FDA or USFDA) : For export to United States.

A recent data from European Union showed the rejected consignment list due to higher levels of pesticides detected in food crops as listed below (European Commission)

Apart from National Export, increasing human health problems in India especially Punjab region needs attention. The farmers are unaware of the consequences of the excess/ untimely usage of pesticides on their crops, thereby leading to the high residual levels of pesticides. Moreover, untreated effluent disposal by the various industries is another contribution to the pollution of ground water. The impact of polluted water is getting reflected in the increasing heavy metal content in the produce.

Under such circumstances, the need of the hour is to create awareness and provision of testing facility at nominal prices for Heavy metals and nutritional elements ; Pesticide residue ; Microbiological ; General Quality parameters including mycotoxins.

Since these testing requires highly sophisticated equipments, private laboratories are the super players in

providing these facilities with very high profitable revenues. A list of equipments required for heavy metal, pesticide and nutritional testing of food commodity is mentioned below.

In India, FSSAI has been established under the Food Safety and Standards Act, 2006 and one of the key objective of FSSAI is to facilitate food safety. FSSAI has established a number of Government laboratories to cater food safety issues. However, due to narrow distribution of these laboratories, it is required to strengthen such facilities in each state for providing services to farmer / common man at subsidized prices.

PHPTC, PAU, Ludhiana, Deptt. of Agriculture & Deptt. of Horticulture, Punjab regularly provides awareness to the farmers through various training programmes about the adverse effects of overuse of pesticides and fertilizers on human health.

List of major equipments for Quality Control Laboratory

S.No.	Name of the Equipment	Testing Parameters
1.	Inductively Coupled Plasma-Mass spectrometer (ICP-MS)/ Inductively Coupled Plasma - Optical Emission spectrometer/ Atomic Absorption Spectrometer	Heavy metals and nutritional elements in water and food
2	Microwave Digestion System	
3	Gas Chromatograph (GC)/ Gas Chromatograph - Mass spectrometer (GC-MS)/	For pesticide residues in food and water
4	High performance Liquid Chromatograph (HPLC)/ Liquid Chromatograph-Mass spectrometer (LC-MS)	For pesticide residues in food & water and Mycotoxins
5	Conductivity meter, pH, Hunter color meter, refractometer, texture analyzer, UV-visible spectrophotometer	For general quality parameters



Atomic Absorption Spectrophotometer



Colour Meter



Gas Chromatography – Mass Spectrophotometer

FSSAI has approved eight Government and five Private Food Testing Laboratories as National Reference laboratories (NRL) under Regulation 3 for Food Safety and Standard Regulations, 2018 for specific areas.

List of National Reference Laboratories (NRL) established by FSSAI.

Sr. No.	Name of the Laboratory / Institution / Organization	Specific area for which declared as NRL
Government Laboratories		
1.	Central Food Technological Research Institute , Mysore	Nutritional information and labeling
2.	Export Inspection Agency, Kerala	GMO testing *
3.	Punjab Biotechnology Incubator, Mohali	Sweets & Confectionary including Honey
4.	ICAR-National Research Centre for Grapes, Pune	Pesticides Residues and Mycotoxins
5.	Central Institute of Fisheries Technology, Kochi	Fish & Fish Products

6.	Centre for Analysis and Learning in Livestock and Food – National Dairy Development Board, Anand	Dairy & Dairy Products
7.	CSIR-Indian Institute of Toxicology Research, Lucknow	Toxicological evaluation / risk assessment of nutraceuticals, functional foods / food ingredients
8.	National Institute of Plant Health Management, Hyderabad	Pesticide residue analysis in fruits & vegetables, cereals and pulses, spices, PTP for the same
Private Laboratories		
9.	Trilogy Analytical Laboratory Pvt. Ltd., Hyderabad	Mycotoxins in cereals and pulses, spices and condiments and related PT activities
10.	Edward Food Research & Analysis Centre Limited, Kolkatta	Veterinary drug residues, antibiotics and hormones
11.	Vimta Labs Limited, Hyderabad	Water, alcoholic and non alcoholic beverages
12.	Fare Labs Pvt. Ltd., Gurugram	Oils & fats
13.	Neogen Food & Animal Security (India) Private Limited	Food allergens

(* Subject to implementation of GMO regulations)

PHPTC Activities

Training Programmes on Postharvest Management of Horticultural Crops : Punjab Horticultural Postharvest Technology Centre (PHPTC) organized 3 training programmes in collaboration with Directorate of Horticulture, Punjab for farmers of district Barnala, Sangrur, Bathinda, Fatehgarh Sahib, Nawanshahar, Gurdaspur, Pathankot, Patiala and Mansa in the month of February, 2019. A group of 40-50 farmers in each batch attended the training programmes. These training programmes covered wider aspects of different techniques involved in harvesting, precooling, grading, packaging, storage, marketing and food safety regulations of perishable produce.



Participation in Horticultural Officers Workshop: PHPTC Scientists participated in Horticultural Officers Workshop organized by Punjab Agricultural University on



27th and 28th May 2019. The Centre displayed various technologies such as CFB boxes for packaging of pear and kinnow, shrink and cling packaging of fresh fruits and vegetables, ethylene ripened banana and papaya fruits, dried vegetables such as bittergourd, onion and fenugreek. Dr. B.S. Dhillon, Vice Chancellor, PAU, Ludhiana and Ms. Shailender Kaur, IFS, Director of Horticulture, Punjab graced the occasion and appreciated the efforts of the Scientists.

Calibration / Repair of Grain Moisture Meters: PHPTC calibrated 2008 grain moisture meters of different market committees of Punjab Mandi Board in the Calibration Laboratory during 20-2-2019 to 5-4-2019.



Upgradation of Quality Control Laboratory : PHPTC received a grant of Rs. 90 lakh from Punjab Mandi Board for the upgradation of Quality Control Laboratory with respect to heavy metal estimation in fresh and processed food products. The funds have been used for the purchase of Inductively Coupled Plasma - Mass Spectrometer (ICP-MS) Microwave Digestion System and water purification system.

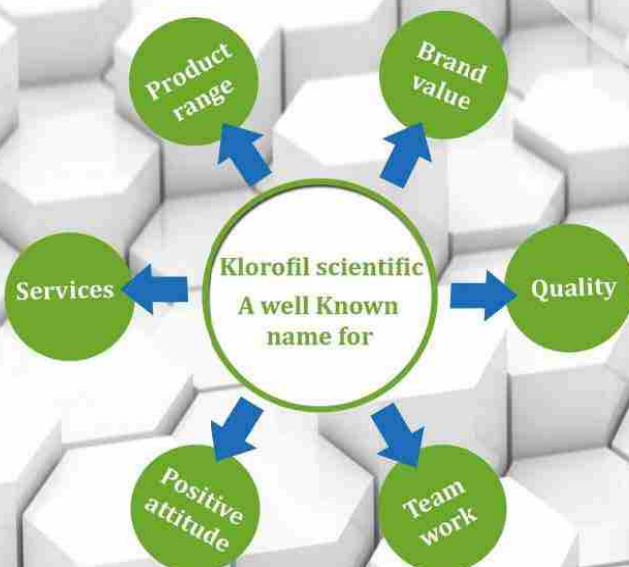


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