

## A Step Closer to 'Safe to Eat Food'

### 2. Category – Agriculture

### 3. Challenge

Fruit and vegetable production of the state of Kerala is not sufficient to meet the demand of its population. Hence a major chunk of the fruit and vegetable requirement is met from the cross-border import of fruits and vegetables from neighbouring states like Tamilnadu and Karnataka. The 'Endosulfan' story from the northern district of Kerala, Kasaragode, has created a panic in the mind of citizens of Kerala regarding pesticide residues in the food commodities. Government of Kerala has banned the use of a few highly toxic pesticides, so as to minimize the problem of pesticide residues. But these toxic pesticides are still being used in neighbouring states and these residue laden food commodities reaches the food platter of Keralites. Hence it is imperative to test the food commodities reaching the markets of Kerala and also those produced by Kerala farmers to provide a guidance to consumers regarding Safe to Eat food commodities. This will also enable extension of officials of the state to properly guide the farmers in the production of Safe to Eat Food commodities.

### 4. Initiative

The pesticide residue testing lab at College of Agriculture, Vellayani was the only facility in the state to monitor pesticide residues in fruits and vegetables. A single laboratory was unable to monitor pesticide residues in food commodities from all over the state in a regular manner. Hence, Kerala Agricultural University decided to establish a pesticide residue testing laboratory at College of Horticulture, Vellanikkara in Thrissur district. A residue testing facility in Thrissur district will help to routinely monitor pesticide residues in food commodities in the central districts of Ernakulam, Palakkad, Thrissur and Malappuram. **Hence, a proposal worth 293.00 lakhs was submitted to Rashtriya Krishi Vikas Yojana (RKVY) in the year 2013-14.** The funding sanctioned under RKVY was utilized to construct a laboratory building with a cost of Rs. 60.00 lakhs. Rest of the funding was utilized to procure equipments and certified reference materials needed for the project. The establishment of the lab has taken place with the guidance of the pesticide residue laboratory at College of Agriculture, Vellayani. From the design of the building to procurement of instruments, the scientists from Vellayani guided the team at Vellanikkara. State of the art analytical equipments like gas chromatograph with triple quadrupole detector (GC-MS/MS), high performance liquid chromatograph (HPLC) with photo diode array and UV-Vis detector and gas chromatograph (GC) with electron capture detector were imported. Though GC and HPLC helps to detect pesticide residues in food commodities, exact identification (confirmation) of the pesticide requires GC-MS/MS. The equipments will enable us to detect residues up to ppt level. QuEChERS method is the method routinely followed for the extraction of residues from food commodities. The extraction process requires equipments like weighing balance, homogenizer, refrigerated centrifuge and nitrogen evaporator. All these equipments were procured and installed at the laboratory. Method

development and validation of protocols for GC-MS/MS is currently going on in the laboratory. Once method development and validation is completed samples will be procured from markets as well as farmgates for residue analysis. The results from the analysis will help the consumers to make informed choices in the purchase of food commodities. The farming community could make use of the residue analysis data to modify their pest management practices to make their produce more safe.

## **5. Key result**

Monitoring of pesticide residues in the whole state of Kerala where earlier carried out by the pesticide residue lab of Kerala Agricultural University at College of Agriculture, Vellayani. Hence regular monitoring of pesticide residues could not be taken up. The establishment of the laboratory will enable Kerala Agricultural University to conduct regular monitoring of the residues in food commodities in the central districts of Kerala, viz., Palakkad, Thrissur, Ernakulam and Malappuram. All these districts are major producers of vegetables in Kerala, especially for vegetables like yard long bean and bitter gourd. The monitoring of residues in food commodities will help us to determine the level of pesticide residues, if any, in the farmers produce. If the levels of residues are below the MRL prescribed we could brand those vegetables as 'Safe to Eat' and the farmers could fetch a higher price for their produce. If higher levels of residues are detected in the farmers produce, specific interventions could be taken up in association with Department of Agriculture to modify their pest management practices so that the use of persistent pesticides could be avoided by the farmers. The monitoring of residues from the market samples will enable us to provide guidance to the consumers regarding the fruits and vegetables which more contaminated with residues and the consumers can choose a more safe to eat commodity for their household use.

## **6. Impact**

Once the lab is fully functional the reports from the lab will provide a guidance to the farmers, consumers and policy makers. Farmers could fetch a higher price for their produce if their product is certified as safe to eat. Consumers will benefit from the information on residues in various commodities so that they can select their food basket more wisely. Policy makers can utilize the data to identify the farming tracts where the usage of pesticides are higher and specific extension programmes could be organized to reduce the pesticide usage in these tracts.

## **7. Lessons learned**

The laboratory was established with GC-MS/MS as the major equipment for residue detection. GC-MS/MS is used for the detection of non-polar, thermostable pesticides like organophosphates, carbamates and synthetic pyrethroids. New generation pesticides like neonicotinoids, spinosyns, diamides, and fungicides could not be analysed by GC-MS/MS. For the analysis of these new generation pesticides liquid chromatography coupled to a triple quadrupole detector (LC-MS/MS) is essential. As LC-MS/MS was not included in the present

project, the scope of residue analysis does not include new generation pesticides. In order to overcome this lacuna a new project is submitted to RKVY to procure an LC-MS/MS so that the scope of analysis could include new generation pesticides.

### 8. Supporting quotes and images



**Building of pesticide residue lab**





**Extraction facilities at the residue lab**



**Instrumentation room**



**GC-MS/MS**



**Gas Chromatograph**



**HPLC**





Hon. Minister of Agriculture inaugurating the pesticide residue lab



Hon. Minister of Agriculture unveiling the plaque of pesticide residue lab



**Hon. Minister of Agriculture observing the functioning of GC-MS/MS**

### **9. Additional information**

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