Government of Telangana

Professor Jayashankar Telangana State Agricultural University, Rajendranagar, Hyderabad-30.

RKVY SUCCESS STORY

RKVY Project Title: Strengthening of Quality Control Lab for Pesticideresidues, Sanitary and Phyto Sanitary Analysis

Year of Initiation: 2010-11

Place: MFPI - QUALITY CONTROL LABORATORY, RAJENDRANAGAR, HYDERABAD

1. **Success Story title:**

"Ensuring Nutritional Security and Food Safety through Establishing and Strengthening of State-Of The-Art Food Testing Facility".

2. **Category:**

"Agriculture"; Success Story- Food Testing Services as a tool towards achieving Food Safety and Quality.

3. **Challenge:**

Indian agricultural sector has transitioned from food security to nutritional security over the past few decades making it a quality conscious society and nation with marketable surplus in food commodities. Human food is obtained from sources and species characterized by great variety, which is subjected to various treatments before consumption. On the other hand, the food industry has proceeded to tackle nutrition and health-associated challenges in various complementary ways by removing or replacing unhealthy ingredients with health-promoting and bioactive compounds into new products. The nutrient / anti-nutrient composition of food is an important and complex issue to receive attention. Consumers are very careful about food quality, not only in terms of hygiene standards, but also from the nutritional point of view. The contents of health-promoting compounds in foods depend quantitatively and qualitatively on their makeup which can be known only by analyzing the components present in food.

Estimation of nutrient content is of primary interest, which can be achieved by analyzing / identification, quantification and tracing of selected nutritional component, execution of physical-chemical and qualitative analysis to ensure that food contains a specific nutrient, demonstration that the nutrient could determine a disease state or may be toxic over an established threshold level. Providing consumer with safe / nutritious food is a continuous challenge in the vicious cycle of "Food & Nutritional Security" concept. To ensure food safety and nutritional quality throughout the entire food supply chain, establishment of a facility capable of analyzing these safety and quality benefits is a constant necessity.

4. Initiative:

The MFPI-Quality Control Laboratory of the Professor Jayashankar Telangana State Agricultural University was established in the year 2007-08 with the financial support of the GOI. This facility was intended to provide food analytical services at affordable rates to the agricultural fraternity for raw and processed food commodities. However, the need to upgrade the competence of the Lab was felt in order to make it more relevant to emerging issues in the Food sector particularly with the advent of "Food Safety and Standards Act". Apart from profiling nutritional components, generation of information on anti nutritional compounds present in various edible forms became essential to address issues like malnutrition, tracing hazardous compounds in foods besides, detection of microbial contamination.

In view this it was decided to upgrade the existing infrastructural facilities in the Laboratory to benefit various stakeholders involved in Food Value Chain. The financial support from the RashtriyaKrishiVigyanYojna (RKVY) enabled us to realize this targeted activity through an allocation of Rs. 1.16 Crore, which was initiated in 2010-11.

During the process of finalization of high end analytical equipment to be procured, a cross section of players were contacted which included Food producers, processors, traders, consumers, Scientific community involved in the business of Food Chain at various levels of the society through personal interviews and other means of communication. After the consultation process, it was learnt that, micronutrient malnutrition particularly of Iron and Zinc, Vitamin deficiency in daily intake and food contamination with trans fats and microbial contamination were some of the areas which needed intervention through science based diagnostics.

Accordingly, latest versions of high end machines like Inductively Coupled Plasma-Optical Emission Spectroscope for estimation of essential micronutrients/ Heavy metals, High Pressure Liquid Chromatography to profile amino acids and to detect aflatoxins, Gas Chromatograph to profile fatty and trans fatty acids and a certified Microbiology Clean Room facility to detect and quantify microbial contamination were procured by 2012-13 through approved tender process.

Later, installation and commissioning of the equipment was accomplished by providing proper environmental conditions as prescribed under the Quality Management System of ISO/IEC 17025:2005 and Good Laboratory Practices (GLP). Further,, during 2013 to 2016, Method development and Validation exercises in identified food matrices was carried out. The data on validation parameters was verified through Quality Control exercises like Inter Laboratory Comparison and Proficiency Testing and commercial analysis of samples received from stakeholders was simultaneously initiated.

Finally to achieve International validity of the Lab results, the equipment procured under the RKVY was offered for National Accreditation Board for Laboratories (NABL) accreditation and successfully included ICP-OES in the Scope of the NABL in 2017.

This endeavor has enabled to create a Centre of Excellence to forge collaborative and Science based activities among stakeholders like Progressive farmers, Small scale food industries, R&D organizations, SAU's, Research Scholars.

5. Key result/insight/interesting fact:

Strengthening of the existing facility led to the origin of first of its kind Testing Laboratory attached to a SAU in the region with wide ranging analytical capability in the area of food quality testing. This Laboratory now operates on the Quality Management System of ISO/IEC 17025:2005. During the due course the Lab has gained expertise in estimation of micro nutrients, proximate principles in foods and profiling Fatty acids and Amino acids besides microbiological examination of raw and processed food commodities.

Sample analysis on commercial scale and Revolving Fund generated since inception of the laboratory:

Sl. No	Year	No. of Samples analyzed on Commercial basis	Revolving fund generated from Commercial testing (Rs.)
1	2010 – 2011	7666	20,05,750-00
2	2011 – 2012	5450	11,71,584-00
3	2012 – 2013	3511	10,46,930-00
4	2013 – 2014	1494	3,99,614-00
5	2014 - 2015	2969	8,96,602-00
6	2015 - 2016	1518	16,10,742-00
7	2016 - 2017	3157	5,71,338-00
8	2017-2018	Till date	9,20,000-00
		GRAND TOTAL:	**Rs: 86,22,560-00**

Apart from generation of revenue and employment in the form of engaging technical staff on contractual basis, the facilities created also helped in reorienting the Research work carried out at this Laboratory by directing efforts to profile large number of Breeding lines generated in the Crop Improvement Programmes of the University and other ICAR/ Central Research Institutes as per approved Technical programme of Work. Another benefit derived from this venture which is of immense practical value is establishment of working linkages with variety of stakeholders in the food chain system as evidenced by following illustration.

Linkages Established:

NABL Accreditation Certificate and onsite assessment by the NABL Audit Team:

National Accreditation Board for Testing and Calibration Laboratories

CERTIFICATE OF ACCREDITATION

MFPI-QUALITY CONTROL LABORATORY

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2005

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

EEI Campus, Professor Jayashankar Telangana State Agricultural University Rajendra Nagar, Hyderabad, Telangana

in the field of

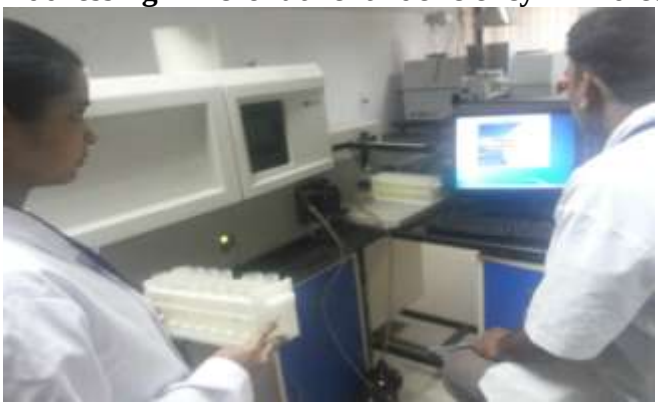
TESTING

Certificate Number

Issue Date

Valid Until

Addressing micronutrient deficiency in diet through State-of the –Art ICP-OES:



Amino acid profiling and detection of aflatoxins through advanced HPLC:

Quantification of essential fatty acids and Trans fatty acids through GC:

Clean Room Facility for Microbiological testing:

6. Impact:

i) **Creation of Internationally certified and Nationally Accredited Lab facility:** The present Project enabled us to give shape to a most modern and advanced Lab facility in the area of food quality testing. This has created a plat form for various stakeholders of agricultural fraternity to work together in frontier areas of food quality research.

ii) **Human resource development and training in the field of food analytics:**
The facility has provided an opportunity to develop skilled professionals in the advanced food testing field through proper training in handling different food matrices as per standard test protocols and ISO 17025:2005 QMS, leading to compliance with complex documentation process.

iii) Support to Scholastic Research:
The Lab has become seat for carrying out Research studies under Post Graduate and Doctoral programmes of various disciplines of not only this University but also other Universities situated in other states like Andhra Pradesh, Karnataka, Maharashtra etc,. More than 40 Scholars from various disciplines were directly or indirectly benefited from the facilities at this Lab.

iv) Revenue generation:

The analytical activities carried out in the Lab on cost basis at affordable prices has resulted in income generation as detailed in previous pages and helped in self sustenance of the facility besides earning the tag of Flag Ship facility of University thus attracting high profile visitors on a regular basis.

7. Lessons learnt:

During the process of upgrading the competence of the Lab, it was learnt that Team work plays an important role in creation and maintenance of such establishments. Further, adhering to Standards has brought immense credibility to the Test results issued by the Lab, which has attracted clientele from advanced R&D institutes to work with us in mutually gainful collaboration. The most challenging part of the entire process was development and validation of Test protocols and to sustain precision and accuracy of the data generated from time to time.

The authenticity of the data generated was ensured by following an established Quality Management System of ISO/IEC 17025:2005 and obtaining the NABL/QCI accreditation. Further, all the high end analytical equipment were maintained in state of calibration. Only Standard test methods were followed employing trained and certified Technical personnel. Further, internationally traceable documentation system was put in place to eliminate any kind of aberrations in the process flow.

Provided an opportunity to redo the project my first priority would be to start with a new building with clean power which is essential to comply with the stipulations laid down by the NABL, which ultimately gives lot of control and confidence to run the daily processes.

8. Supporting quotes and images:


Prof. Vijay Singh Tomar

Prof. Vijay Singh Tomar, Vice Chancellor, Rajmata Vijyaraje Scindia Krishi Vishwa Vidyalaya, Gwalior: "***Extremely good analytical facilities have been developed and good work is being done by young scientists. Keep it up. Your labs can be accredited at National level and many more people can get advantage of these facilities".***

Dr. V. Prakash, FRESC, Distinguished Scientist of CSIR-India Former Director of CFTRI-India Mysore, India, Vice President of International Union of Nutritional Sciences, Mysore: "***A wonderful laboratory to visit and learn the analytical methods. They are following and making an impact nutritionally. The facility is excellent and can be pushed to higher levels towards accreditation and global recognition. Best regards to faculty and staff for this unique centre".***

M.P.Vincent, Indian National Congress politician from Thrissur and Member of the Legislative Assembly of Ollur Assembly Constituency to Kerala Legislative Assembly; I.C.Balakrishnan, MLA - Indian National Congress partymember of 13th Kerala Legislative Assembly Sulthan Bathery constituency: "***Visited an excellent lab facility which improved to great extent. Congrats to the scientists for appreciable work. Thanks".***


Carolyn Reifsnyder

Carolyn Reifsnyder, Marketing Director, Agilent Technologies, LaJolla, California, United States of America: "***Excellent lab facilities, remarkable establishment. We look forward to working closely with you".***

9. Additional information:

i) Project partners: RKVY, PJTSAU(Formerly ANGRAU), Agilent Technologies, USA, Teledyne Leeman Labs, USA, Smartlab Tech, Hyderabad, Agrosaw Industries, Ludhiana, NABL/QCI.

ii) Contact person: Dr. M. Sreedhar, Principal Scientist and Head, MFPI-Quality Control Laboratory, PJTS Agrl. University, Rajendranagar, Hyderabad-500030, Telangana. E-mail: qclab_2008@rediffmail.com, mulisree1969@gmail.com

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