

# FOOD QUALITY TESTING LABORATORY

## N. M. COLLEGE OF AGRICULTURE

### NAVSARI AGRICULTURAL UNIVERSITY

#### NAVSARI – 396450 (GUJARAT)

#### ACTIVITIES/ACHIEVEMENT

The **Food Quality Testing Laboratory (FQTL)** is one of the few non-profit government laboratories in the South Gujarat indulged in sorting out the problems of farmers, food industry people, consumers, researchers, students and academicians *etc* pertaining to food quality. The FQTL has four sections *viz.*, **Pesticide residues, Heavy Metal, Biochemistry and Microbiology** which are capable of analyzing the pesticide residues, biochemical, elemental and nutritional components, microbial analysis *etc* from finished as well as raw agricultural commodities. Each section has its own well-furnished laboratory equipped with highly sensitive state of art world class instruments/equipments like **HPLC, GC, GC-MS, LC-MS/MS, ICP-MS, Near Infrared Spectroscopy, UV-Vis Spectrophotometer, VIDAS, Fluorescent Microscope, PCR and qRT-PCR** *etc*. The FQTL is. Additionally, FQTL offers a full array of analytical options for environmental pollutants from soil, water, sediment *etc*. Further, FQTL provides courses to UG and PG students along with need based relevant training to industry people and academicians, researchers about food testing. The FQTL is committed to excel in Research & Innovation, Knowledge dissemination, Technology Transfer and Human Resource Development in the areas of Food quality attributes, to be practiced and implemented at all levels. The infrastructure facilities and manpower available in the Department are given below with accomplishments of academic, research and extension activities.

#### **Objectives**

1. To ensure the compliance with National/International Food standards.
2. To assist industries in the food sector to develop and implement quality management systems
3. To provide information to farmers on their produces
4. To generate scientific data on quality of fresh as well as processed products of the region and to provide remedial measures for their improvement.
5. To strengthen research on food quality analysis in order to make our products more competitive in global market
6. To impart training in the areas related to quality improvement through own expertise.
7. To impart P.G. course on food quality

The scope of testing activity of the FQTL encompasses the quality and safety attributes of agricultural and food products, including cereal grains and their products; fruits, vegetables and their products, dairy products, oilseeds and oils, spices and condiments; animal products; plantation products and flavors; functional foods, processed foods and beverage. The FQTL has experienced competent scientists to monitor all the activities in analytical testing by keeping a constant track of methods for obtaining the results with high degree of accuracy. A sound scientific knowledge-based supported with state-of-the-art instrumentation, use of standard & accredited methods, Certified Reference Materials, excellent performance in proficiency testing programmes and inter laboratory comparisons are our assets.

### ***Research***

The FQTL is involved in analytical method development, validation and other good laboratory practices recommended for food testing. The FQTL has developed new technologies on sound scientific basis and provided to farmers and scientific community in the form of recommendations to enhance the scope of food safety and security.

### ***On-going projects:***

<b>Plan Project</b>		
<b>Budget Head</b>	<b>Title</b>	<b>Commencement Year</b>
12024	Strengthening of Food Quality Testing Laboratory	2012-13
12055	Status of Pesticide residues in Agricultural produce in South Gujarat	2016-17
<b>ICAR/World Bank Funded</b>		
NAHEP (CAAST) 332/02108	Establishment of Secondary Agricultural Unit for Skill development of Student and Farmer at NAU Navsari	2018-19
95-10-N-55	Revolving Fund	

Food Quality Testing Laboratory, N. M. College of Agriculture has been accredited with ISO/IEC 17025:2005 in field for the Testing of Pesticide Residue Analysis from fruits and vegetables from National Accreditation Board for Testing and Calibration Laboratories (NABL), an autonomous body of Government of India and is authorized as the sole accreditation body for Testing and Calibration laboratories. Accreditation provides formal recognition to competent laboratories, thus providing a ready means for users to find reliable testing services in order to meet their requirements. Certificate of Analysis issued by accredited laboratories is globally acceptable. The scope of the laboratory is as under.

<b>Discipline / Group</b>	<b>Fruits and vegetables</b>	<b>Pesticide residue</b>
<b>CHEMICAL/ RESIDUES IN FOOD PRODUCTS</b>	Apple	$\alpha$ -HCH, $\beta$ -HCH, $\gamma$ -HCH, $\delta$ -HCH, Heptachlor, Aldrin, <i>p</i> , <i>p'</i> -DDE, <i>p</i> , <i>p'</i> -DDD, <i>p</i> , <i>p'</i> -DDT, Bifenthrin, $\lambda$ -cyhalothrin, Alpha-Cypermethrin, Deltmethrin
	Sapota	$\alpha$ -HCH, $\beta$ -HCH, $\gamma$ -HCH, $\delta$ -HCH, Heptachlor, Aldrin, <i>p</i> , <i>p'</i> -DDE, <i>p</i> , <i>p'</i> -DDD, <i>p</i> , <i>p'</i> -DDT, Bifenthrin, $\lambda$ -cyhalothrin, Alpha-Cypermethrin, Deltmethrin
	Banana	$\alpha$ -HCH, $\beta$ -HCH, $\gamma$ -HCH, $\delta$ -HCH, Heptachlor, Aldrin, <i>p</i> , <i>p'</i> -DDE, <i>p</i> , <i>p'</i> -DDD, <i>p</i> , <i>p'</i> -DDT, Bifenthrin, $\lambda$ -cyhalothrin, Alpha-Cypermethrin, Deltmethrin
	Cauliflower	$\alpha$ -HCH, $\beta$ -HCH, $\gamma$ -HCH, $\delta$ -HCH, Heptachlor, Aldrin, <i>p</i> , <i>p'</i> -DDE, <i>p</i> , <i>p'</i> -DDD, <i>p</i> , <i>p'</i> -DDT, Bifenthrin, $\lambda$ -cyhalothrin, Alpha-Cypermethrin, Deltmethrin
	Tomato	$\alpha$ -HCH, $\beta$ -HCH, $\gamma$ -HCH, $\delta$ -HCH, Heptachlor, Aldrin, <i>p</i> , <i>p'</i> -DDE, <i>p</i> , <i>p'</i> -DDD, <i>p</i> , <i>p'</i> -DDT, Bifenthrin, $\lambda$ -cyhalothrin, Alpha-Cypermethrin, Deltmethrin
	Brinjal,	$\alpha$ -HCH, $\beta$ -HCH, $\gamma$ -HCH, $\delta$ -HCH, Heptachlor, Aldrin, <i>p</i> , <i>p'</i> -DDE, <i>p</i> , <i>p'</i> -DDD, <i>p</i> , <i>p'</i> -DDT, Bifenthrin, $\lambda$ -cyhalothrin, Alpha-Cypermethrin, Deltmethrin
	Okra	$\alpha$ -HCH, $\beta$ -HCH, $\gamma$ -HCH, $\delta$ -HCH, Heptachlor, Aldrin, <i>p</i> , <i>p'</i> -DDE, <i>p</i> , <i>p'</i> -DDD, <i>p</i> , <i>p'</i> -DDT, Bifenthrin, $\lambda$ -cyhalothrin, Alpha-Cypermethrin, Deltmethrin



**National Accreditation Board for  
Testing and Calibration Laboratories**

(A Constituent Board of Quality Council of India)



**CERTIFICATE OF ACCREDITATION**

**FOOD QUALITY TESTING LABORATORY, NAVSARI  
AGRICULTURAL UNIVERSITY**

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

N.M. COLLEGE OF AGRICULTURE, NAVSARI AGRICULTURAL UNIVERSITY, NAVSARI, GUJARAT,  
INDIA

in the field of

**TESTING**

Certificate Number: TC-8199

Issue Date: 14/12/2018

Valid Until: 13/12/2020

In view of the transition deadline for ISO/IEC 17025:2017, the validity of this accreditation certificate will cease on 30.11.2020.

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.

(To see the scope of accreditation of this laboratory, you may also visit NABL website [www.nabl-india.org](http://www.nabl-india.org))

Signed for and on behalf of NABL



Anil Relia  
Chief Executive Officer

## A. Recommendations

SN	Recommendation	Combined Joint Agresco No. and Year
1.	<p><b>Title: Isolation and identification of lactic acid bacteria and their various biochemical activity</b> Fourteen microorganisms were isolated from <i>khira</i> of <i>dhokla</i> and <i>khaman</i> samples and preliminary study reveals that, among them ten isolates belongs to <i>Lactobacilli</i> and remaining were yeast.</p>	9 <sup>th</sup> Agresco, 6-8 may, 2013 at SK Nagar
2.	<p><b>Title: Residues and Dissipation of imidacloprid 17.8SL in Mango</b> Spraying of imidacloprid 17.8 SL@0.53 g a.i./tree upto marble stage of mango do not pose residue problem after 5 days. Considering the MRL of imidacloprid(0.2 µg/g) for mango, interval one day after spraying is recommended for the harvest of mango under south Gujarat condition.</p>	10 <sup>th</sup> Agreco, 9-11 April, 2014 at Junagadh
3.	<p><b>Title: Residue and dissipation pattern of indoxacarb, bifenthrin, fipronil and novaluron in brinjal</b> Considering the respective Codex MRLs of Indoxacarb 15.8 EC, bifenthrin 10 EC and novaluron 10 EC applied @ 0.22, 0.125 and 0.5 kg a.i./ha respectively, do not pose residue problem in brinjal when harvetsted 1 day after spray. Therefore, pre-harvest interval of 1 day recommendation in brinjal under south Gujarat condition.</p>	
4.	<p><b>Title: Residue and dissipation pattern of indoxacarb, bifenthrin, fipronil and novaluron in okra</b> Considering the respective Codex MRLs of Indoxacarb 15.8 EC, bifenthrin 10 EC and novaluron 10 EC when applied @0.22, 0.125 and 0.5 kg a.i./ha respectively, do not pose residue problem in okra when harvested 1 day after spray. Therefore, pre-harvest interval of 1 day recommended in okra under south Gujarat conditions.</p>	
5.	<p><b>Title: Residue and dissipation pattern of fipronil in okra and brinjal</b> Application of fipronil 5 SC @ 0.05 kg a.i./ha,do not pose residue problem in okra and brinjal when harvested 5 day and 7 days, respectively after spray.</p>	
6.	<p><b>Title: Status of insecticide residue in farm gate samples of okra, brinjal and chilli</b> Farm gate samples of brinjal collected from Navsari (AES-III) found free from 41 pesticides but some of okra and chilli samples found positive with organophosphate insecticide such as monocrotophos, ethion and triazophos.</p>	
7.	<p><b>Title: Monitoring of pesticide residue in market samples of okra and brinjal</b> Market samples of brinjal obtained from different talukas of Navsari, Surat and Tapi district were free from pesticide while that of okra samples were positive with organophosphate insecticides among them, monocrotophos was frequently detected.</p>	
8.	<p><b>Title: Evaluation of the drinking water of Navsari and surroundings</b> Potable water samples collected from the Navsari and its surroundings were free from 41 pesticides while other chemical properties were under the acceptable limit <i>Escherichia coli</i> (bacteria) were detected across the seasons but found higher in winter followed by monsoon and summer seasons.</p>	
9.	<p><b>Title: Analysis of the microbial contaminant and adulteration in milk</b> The pasteurized milk samples procured from Navsari and its surrounding places found excellent to good while some of the raw milk samples were poor from the microbial quality point of view, across the seasons. Some of the raw milk samples were found positive with <i>Escherichia coli</i> (bacteria) out of which maximum positive samples were in winter followed by monsoon and summer. None of the pasteurized milk sample found positive with <i>E. coli</i> and none of the milk samples were found positive to chemical adulterant.</p>	
10.	<p><b>Title: Qualitative analysis of mango varieties Kesar and Alfanso</b> The nutritional quality of mango varied with variety, crop management practices under south Gujarat condition. The findings is mentioned below:</p> <ul style="list-style-type: none"> <li>Nutritional quality of alphanso and kesar was more or less same but Fe, Mn, Zn, P, K, Ca, Mg, and Na contents were higher in alphanso.</li> </ul>	

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	<ul style="list-style-type: none"> <li>Organically grown mango was superior in protein, total antioxidant capacity, vitamin-C, folic acid, P, K, Mg, Fe, Mn, Zn and Cu content than inorganically grown mangoes.</li> <li>Total antioxidant capacity, vitamin-C, folic acid, Ca and Cu content in non-irrigated mango was higher than irrigated mango.</li> </ul>																										
11.	<p><b>Title: Residues and dissipation of deltamethrin 2.8 EC in okra</b>  The okra growers of South Gujarat Heavy Rainfall Agro climatic Zone (AES III) are recommended to observe minimum one day pre harvest interval after the last spray of deltamethrin 2.8 EC when applied @ 0.028% (10 ml in 10 litre water).  <b>As per CIBRC Format</b></p> <table border="1" data-bbox="170 500 1843 649"> <thead> <tr> <th rowspan="2">Year</th> <th rowspan="2">Crop</th> <th rowspan="2">Pest /Diseases</th> <th rowspan="2">Pesticide with formulation</th> <th colspan="3">Doses</th> <th rowspan="2">Waiting Period (days)</th> </tr> <tr> <th>Quantity of formulation</th> <th>Conc.(% )</th> <th>Dilution in water</th> </tr> </thead> <tbody> <tr> <td>2015</td> <td>Okra</td> <td>fruit borer, shoot borer and jassids.</td> <td>Deltamethrin 2.8 EC</td> <td>11.2 g a.i./ha</td> <td>0.028 %</td> <td>400 L</td> <td>1.0</td> </tr> </tbody> </table>							Year	Crop	Pest /Diseases	Pesticide with formulation	Doses			Waiting Period (days)	Quantity of formulation	Conc.(% )	Dilution in water	2015	Okra	fruit borer, shoot borer and jassids.	Deltamethrin 2.8 EC	11.2 g a.i./ha	0.028 %	400 L	1.0	
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12.	<p><b>Title: Evaluation of different extractants and methods for the determination of P and K from soils</b>  The soil analysts are suggested to use AB-DTPA as multi-nutrient extractants and ICP-MS as quantifying instrument to get accurate, precise, rapid and predictable results for P and K analysis in soil.</p>																										
13.	<p><b>Title: Non Destructive Analysis of Protein, Fibre and Oil in Rice, Pigeon Pea and Soybean by NIR Analyzer</b>  Considering the cost and time of analysis and safety, the laboratory analysts are suggested to use Near Infra-Red analyzer for the accurate and rapid estimation of protein, oil and fibre content from rice, soybean and pigeon pea over routine methods <i>i.e.</i> Folin-Lowry method, Soxhlet method and Gravimetric method, when the samples are homogenous in nature.</p>																										
14.	<p><b>Title: Residue and dissipation pattern of bifenthrin, fipronil, chlorpyrifos and imidacloprid in clayey and sandy loam soils and their downward movement and leaching potential</b></p> <ul style="list-style-type: none"> <li>Considering the leaching potential and depthwise distribution and chances of contamination of water, bifenthrin 10 EC, chlorpyrifos 20 EC and fipronil 5 SC should be preferred over imidacloprid 17.8 SL for the control of soil pest in sandy loam and clay soils.</li> <li>Bifenthrin, chlorpyrifos, fipronil and imidacloprid can be used to control soil pest in sandy loam and clay soils due their moderate persistency and strong adsorption in the soil.</li> </ul>							11 <sup>th</sup> Agresco, 7-9 April, 2015 at Anand																			
15.	<p><b>Title: Residues of Some Insecticides in/On Indian Bean Pod</b>  Indian bean growers of South Gujarat (AES-III) are advised to keep waiting period of seven days after spray of thiamethoxam 25 WG (35 g a.i. /ha), novaluron 10 EC (33.5 g a.i. /ha), indoxacarb 14.5 SC (60 g a.i. /ha), spinosad 45 SC (75 g a.i. /ha), acetamiprid 20 SP (20 g a.i. /ha) and flubendiamide 39.35 SC (50 g a.i. /ha) and ten days for imidacloprid 17.8 SL (25 g a.i. /ha).</p>																										
16.	<p><b>Title: Status of residues of insecticides in/on Indian bean after Ubadia Preparation</b>  The residues of imidacloprid 17.8 SL (25 g a.i. /ha), thiamethoxam 25 WG (35 g a.i. /ha), novaluron 10 EC (33.5 g a.i. /ha), indoxacarb 14.5 SC (60 g a.i. /ha), spinosad 45 SC (75 g a.i. /ha), acetamiprid 20 SP (20 g a.i. /ha) and flubendiamide 39.35 SC (50 g a.i. /ha) observed below detectable level in Indian bean after <i>Ubadia</i> preparation.</p>																										
17.	<p><b>Title: <i>In vitro</i> efficacy of isolated probiotic organism</b>  <i>Enterococcus faecium</i> strain LAB1, <i>Leuconostoc mesenteroides</i> and <i>Leuconostoc pseudomesenteroides</i> shows the antimicrobial properties as well as produce good quality curd. Thus, these strains can be used for probiotic curd preparation.</p>																										

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18.	<p><b>Title: Residue and dissipation pattern of fenazaquin in/on chilli under South Gujarat conditions</b>            To avoid fenazaquin residue in chilli in South Gujarat AES-III, farmers are recommended to observe 12 days waiting period when fenazaquin 10 EC is applied twice @ 0.01% (10 ml /10 l water) at 15 days interval starting from 50% flowering stage.</p> <table border="1" data-bbox="184 440 1843 558"> <thead> <tr> <th rowspan="2">Year</th> <th rowspan="2">Crop</th> <th rowspan="2">Pest/ Diseases</th> <th rowspan="2">Pesticide with formulation</th> <th colspan="3">Doses</th> <th rowspan="2">Waiting Period (days)</th> </tr> <tr> <th>Quantity of formulation</th> <th>Conc. (%)</th> <th>Dilution in water</th> </tr> </thead> <tbody> <tr> <td>2016</td> <td>Chilli</td> <td>Mites</td> <td>Fenazaquin10EC</td> <td>1250 ml or 125g a.i/ha</td> <td>0.01 %</td> <td>500 L</td> <td>12.0</td> </tr> </tbody> </table>							Year	Crop	Pest/ Diseases	Pesticide with formulation	Doses			Waiting Period (days)	Quantity of formulation	Conc. (%)	Dilution in water	2016	Chilli	Mites	Fenazaquin10EC	1250 ml or 125g a.i/ha	0.01 %	500 L	12.0																														
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19.	<p><b>Title: Residue and dissipation pattern of fenazaquin in/on chilli under South Gujarat conditions</b>            The application of fenazaquin 10 EC applied twice @ 0.01% (10 ml /10 l water) at 15 days interval starting from 50% flowering stage in green chilli resulted in built-up of fenazaquin residues in dried chilli powder by 5.22 to 5.79 times. Therefore, it is recommended to consider a processing factor of 5.64 (i.e. 6.0) for fenazaquin in dried chilli powder.</p> <table border="1" data-bbox="170 768 1831 1118"> <thead> <tr> <th>DAA</th> <th>Control (Water spray)</th> <th>Mean Residues (<math>\mu\text{g g}^{-1}</math>) applied at the rate of 125 g a.i./ha</th> <th>Residues(<math>\mu\text{g g}^{-1}</math>) in green chillies*</th> <th>Processing Factor</th> </tr> </thead> <tbody> <tr> <td>0 (2 hrs )</td> <td>-</td> <td>13.19</td> <td>2.53</td> <td>5.22</td> </tr> <tr> <td>5 day</td> <td>-</td> <td>8.27</td> <td>1.40</td> <td>5.92</td> </tr> <tr> <td>10 day</td> <td>-</td> <td>2.94</td> <td>0.53</td> <td>5.61</td> </tr> <tr> <td>30 day</td> <td>-</td> <td>0.35</td> <td>0.06</td> <td>5.79</td> </tr> <tr> <td></td> <td></td> <td></td> <td><b>Mean</b></td> <td><b>5.64</b></td> </tr> <tr> <td rowspan="2">LOD (<math>\mu\text{g/g}</math>)</td> <td>Fruit</td> <td>0.01</td> <td></td> <td></td> </tr> <tr> <td>Powder</td> <td>0.02</td> <td></td> <td></td> </tr> <tr> <td rowspan="2">LOQ (<math>\mu\text{g/g}</math>)</td> <td>Fruit</td> <td>0.04</td> <td></td> <td></td> </tr> <tr> <td>Powder</td> <td>0.06</td> <td></td> <td></td> </tr> </tbody> </table> <p style="text-align: center;"> <math display="block">\text{Processing factor} = \frac{\text{Residue in chilli powder}}{\text{Residue in green chilli}}</math> </p>							DAA	Control (Water spray)	Mean Residues ( $\mu\text{g g}^{-1}$ ) applied at the rate of 125 g a.i./ha	Residues( $\mu\text{g g}^{-1}$ ) in green chillies*	Processing Factor	0 (2 hrs )	-	13.19	2.53	5.22	5 day	-	8.27	1.40	5.92	10 day	-	2.94	0.53	5.61	30 day	-	0.35	0.06	5.79				<b>Mean</b>	<b>5.64</b>	LOD ( $\mu\text{g/g}$ )	Fruit	0.01			Powder	0.02			LOQ ( $\mu\text{g/g}$ )	Fruit	0.04			Powder	0.06			<p>12<sup>th</sup>  <b>Agreco,</b>  <b>11-13</b>  <b>April,</b>  <b>2016 at</b>  <b>Navsari</b></p>
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20.	<p><b>Title: Status of pesticide residues in major seasonal fruits</b>            Residue analysis of fruit samples collected from different market places of South Gujarat revealed that 31.67 % out of 120 samples were positives for pesticides among these 9.17 % were above MRL. Maximum positive samples were detected from Surat market. Carbendazim was the most frequently detected pesticide followed by chlorpyrifos and tebuconazole. Most positive samples were detected in apple and least in sapota. However, banana had most positive samples which were above MRL. Total 52 pesticides detected in different fruits out of which 29 (55 %) pesticides violated label claim fixed by the CIBRC.</p>																																																							

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21.	<p><b>Title: Dissipation and Persistence of combi-product of Profenofos 40 % + Cypermethrin 4 % in Sapota and its distribution in edible parts of fruits</b>  A] Observation of 14 days waiting period provides residue free unripe sapota fruits when pre-mix formulation of profenofos 40% and cypermethrin 4 % EC applied twice at 15 days interval on sapota bearing trees at the rate of 0.044 % (1ml/l) to control the sapota bud borer.</p>	<p style="text-align: center;">13<sup>th</sup>  <b>Agresco,  5-7 April  at SK  Nagar</b></p>																			
22.	<p><b>Title: Dissipation and Persistence of combi-product of Profenofos 40 % + Cypermethrin 4 % in Sapota and its distribution in edible parts of fruits</b>  B] The residues of profenos and cypermethrin were arrested in peel of unripe sapota fruits while trans-peel movement of these residues to pulp was observed in ripe sapota fruit when pre-mix formulation of profenofos 40 % and cypermethrin 4% EC sprayed twice at 15 days interval at the rate of 0.044 % (1ml/l) to control the 80 sapota bud borer on sapota bearing trees.</p>																				
23.	<p><b>Title: Dissipation and persistence of combi-product of chlorpyrifos 50 % + cypermethrin 5 % in sapota and its distribution in edible parts of fruit</b>  A] Observation of 4 days waiting period provides residue free unripe sapota fruits when pre-mix formulation of chlorpyrifos 50% and cypermethrin 5% EC sprayed twice at the rate of 0.055% (1ml/l) sprayed twice at 15 days interval on sapota fruit bearing trees to control the sapota bud borer.</p>																				
24.	<p><b>Title: Dissipation and persistence of combi-product of chlorpyrifos 50 % + cypermethrin 5 % in sapota and its distribution in edible parts of fruit</b>  B] The residues of chlorpyrifos and cypermethrin arrested d in peel of unripe sapota fruits when pre-mix formulation of chlorpyrifos 50 % and cypermethrin 5% EC sprayed twice at 15 days interval at the rate of 0.055 % (1ml/l) to control the sapota bud borer on sapota bearing trees.</p>																				
25.	<p><b>Title: Exploring microbes for their siderophore production and their biocontrol potential</b>  It is informed to scientific community that siderophore producing <i>Enterobacter ludwigii</i> TLAB1 and <i>Pseudomonas aeruginosa</i> TPA1 can be used in vitro to inhibit the growth of <i>Colletotrichum</i> sp.</p>																				
26.	<p><b>Title: Exploring microbes for exopolysaccharides (EPS) production.</b>  It is informed to scientific community that exopolysaccharide produced by bacterial isolate <i>Klebsiella vericolla</i> showed non-Newtonian behaviour, therefore, can be used as thickening agent and also possesses antioxidant activity.</p>																				
27.	<p><b>Title: Dissipation and persistence of combi-product of chlorantraniliprole 9.26% + λ cyhalothrin 4.63% in/on pigeon pea</b>  Pigeon pea growers of South Gujarat are recommended pre-mix formulation of λ cyhalothrin 4.63% + chlorantraniliprole 9.26% ZC twice at 15 days interval starting from 50 per cent flowering stage @ 30 g.a.i./ha (4.0 ml/10.0 litre water) for control pod borer. Pre harvest interval of nine days should be observed to avoid residue problem.  <b>As per CIBRC Format</b></p> <table border="1" data-bbox="172 1224 1843 1377"> <thead> <tr> <th rowspan="2">Year</th> <th rowspan="2">Crop</th> <th rowspan="2">Pest /Diseases</th> <th rowspan="2">Pesticide formulation with</th> <th colspan="3">Doses</th> <th rowspan="2">Waiting Period (days)</th> </tr> <tr> <th>Quantity of formulation</th> <th>Conc. (%)</th> <th>Dilution in water</th> </tr> </thead> <tbody> <tr> <td>2018</td> <td>Pigeon pea</td> <td>Pod borer</td> <td>chlorantraniliprole 9.26%+ λ-cyhalothrin</td> <td>220 ml/ 30 g.a.i./ha</td> <td>0.006</td> <td>550 L</td> <td>9.0</td> </tr> </tbody> </table> <p><b>Approved in 14<sup>th</sup> Combined Joint AGRESCO of PPSC Meeting held at Junagadh during April 3-5, 2018.</b></p>	Year	Crop	Pest /Diseases	Pesticide formulation with	Doses			Waiting Period (days)	Quantity of formulation	Conc. (%)	Dilution in water	2018	Pigeon pea	Pod borer	chlorantraniliprole 9.26%+ λ-cyhalothrin	220 ml/ 30 g.a.i./ha	0.006	550 L	9.0	<p style="text-align: center;">14<sup>th</sup>  <b>Agresco,  3-5 April  at  Junagadh</b></p>
Year	Crop					Pest /Diseases	Pesticide formulation with	Doses			Waiting Period (days)										
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2018	Pigeon pea	Pod borer	chlorantraniliprole 9.26%+ λ-cyhalothrin	220 ml/ 30 g.a.i./ha	0.006	550 L	9.0														
28.	<p><b>Title: Dissipation and persistence of spiromesifen (22.9% SC) in brinjal under south Gujarat condition</b>  Brinjal growers of South Gujarat Heavy Rainfall Agro-climatic Zone are recommended to apply spiromesifen 22.9 SC, twice @ 96 g.a.i./ha (8.4 ml/10.0 litre water) at 15 days interval starting from fruit setting stage for control of red mite. Preharvest interval of one day should be observed to avoid residue problem.  <b>As per CIBRC Format</b></p>																				



SN	Recommendation							Combined Joint Agresco No. and Year																					
	Year	Crop	Pest /Diseases	Pesticide formulation with	Doses			Waiting Period (days)																					
					Quantity of formulation	Conc. (%)	Dilution in water																						
	2018	Brinjal	Red spider mite	Spiromesifen 22.9 SC	420 ml/ 96 g.a.i/ha	0.02	550 L	1.0																					
29.	<b>Title: Isolation, identification and exploitation of microbes from composting site for xylanase production for agro waste management</b> It is informed to Scientific community that Xylanase producing <i>Bacillus licheniformis</i> X6 and <i>Aspergillus terreus</i> XF9 degrade 15.5% rice straw at ambient temperature after 40 days of incubation.							14 <sup>th</sup> Agresco, 3-5 April at Junagadh																					
30.	<b>Title: Microbial pigment as food additive to replace chemically synthesized colour</b> Yellow and orange pigments produced by bacteria <i>Micrococcus luteus</i> and <i>Kokuria rosea</i> , respectively having antioxidant activity can be used as natural colorants.																												
31.	<b>Title: Isolation and identification of cyanobacteria as a source of single cell protein</b> It is informed to scientific community that <i>Anabaena</i> isolate 2 having high protein content (38.12 µg/mg) and antioxidant activity (28%) has the potential to be used as single cell protein.																												
32.	<b>Title: Determination of nutritional composition of minor fruits</b> Minor fruits (mentioned below) of South Gujarat are found rich in following parameters as compared to banana and sapota. <table border="1" data-bbox="172 831 1850 1453"> <thead> <tr> <th data-bbox="172 831 390 863">Fruits</th> <th data-bbox="390 831 1850 863">Composition better than banana and sapota</th> </tr> </thead> <tbody> <tr> <td data-bbox="172 863 390 896">Palmyra palm</td> <td data-bbox="390 863 1850 896">K (3902ppm), Ca(739ppm), P (268ppm) and Zn (2.79ppm)</td> </tr> <tr> <td data-bbox="172 896 390 928">Jamun</td> <td data-bbox="390 896 1850 928">Total phenol (241.6 mg/100g), Antioxidant activity (126.5 mg/100g), Ca (324ppm) and Mg (241ppm)</td> </tr> <tr> <td data-bbox="172 928 390 993">White wax apple</td> <td data-bbox="390 928 1850 993">Antioxidant activity (16.4 mg/100g)</td> </tr> <tr> <td data-bbox="172 993 390 1058">Carambola</td> <td data-bbox="390 993 1850 1058">Vitamin-C (16.1 mg/100g), Total phenol (20.8 mg/100g), Antioxidant activity (28.4 mg/100g), K (4099ppm), Ca (657ppm), Mn (3.01ppm) and Cu (2.75ppm)</td> </tr> <tr> <td data-bbox="172 1058 390 1140">Tamarind</td> <td data-bbox="390 1058 1850 1140">Carbohydrates (62.8%), Protein (2.81%), Vitamin-C (18.9 mg/100g), Total phenol (25.6 mg/100g), Antioxidant activity (30.4 mg/100g), K (12433ppm), Ca (2759ppm), Mg (1286ppm), P (1099ppm), Fe (154.3ppm), Mn (6.47ppm), Zn (7.11ppm) and Cu (6.13ppm)</td> </tr> <tr> <td data-bbox="172 1140 390 1205">Jackfruit</td> <td data-bbox="390 1140 1850 1205">Total phenol (31.8 mg/100g), Antioxidant activity (62.9 mg/100g), K (5135ppm), Ca (405ppm), Mg (533ppm) and Mn (5.12ppm)</td> </tr> <tr> <td data-bbox="172 1205 390 1269">Star gooseberry</td> <td data-bbox="390 1205 1850 1269">Protein (4.31%), β carotene (100.7 µg/100g), Vitamin-C (17.1), Total phenol (105.0 mg/100g), Antioxidant activity (83.7 mg/100g), K (4411ppm), Ca (4933ppm), Mg (1518ppm), P (545ppm), Fe (17.2ppm) and Zn (3.94ppm)</td> </tr> <tr> <td data-bbox="172 1269 390 1334">Lasoda</td> <td data-bbox="390 1269 1850 1334">β carotene (62.7 µg/100g), Total phenol (41.8 mg/100g), Antioxidant activity (55.7 mg/100g), K (4644ppm), Ca (656ppm), P (431ppm), Mn (3.51ppm) and Zn (2.06ppm)</td> </tr> <tr> <td data-bbox="172 1334 390 1399">Kair</td> <td data-bbox="390 1334 1850 1399">Protein (2.24%), Total phenol (61.5 mg/100g), Antioxidant activity (77.7 mg/100g), K (7313ppm), Ca (1011ppm), Mg (723ppm), P (999ppm) and Zn (4.71ppm)</td> </tr> <tr> <td data-bbox="172 1399 390 1453">Rayan</td> <td data-bbox="390 1399 1850 1453">β carotene (87.63 µg/100g), total phenol (157.4 mg/100g), Antioxidant activity (92.6 mg/100g), Ca (284ppm) and P (321ppm)</td> </tr> </tbody> </table>								Fruits	Composition better than banana and sapota	Palmyra palm	K (3902ppm), Ca(739ppm), P (268ppm) and Zn (2.79ppm)	Jamun	Total phenol (241.6 mg/100g), Antioxidant activity (126.5 mg/100g), Ca (324ppm) and Mg (241ppm)	White wax apple	Antioxidant activity (16.4 mg/100g)	Carambola	Vitamin-C (16.1 mg/100g), Total phenol (20.8 mg/100g), Antioxidant activity (28.4 mg/100g), K (4099ppm), Ca (657ppm), Mn (3.01ppm) and Cu (2.75ppm)	Tamarind	Carbohydrates (62.8%), Protein (2.81%), Vitamin-C (18.9 mg/100g), Total phenol (25.6 mg/100g), Antioxidant activity (30.4 mg/100g), K (12433ppm), Ca (2759ppm), Mg (1286ppm), P (1099ppm), Fe (154.3ppm), Mn (6.47ppm), Zn (7.11ppm) and Cu (6.13ppm)	Jackfruit	Total phenol (31.8 mg/100g), Antioxidant activity (62.9 mg/100g), K (5135ppm), Ca (405ppm), Mg (533ppm) and Mn (5.12ppm)	Star gooseberry	Protein (4.31%), β carotene (100.7 µg/100g), Vitamin-C (17.1), Total phenol (105.0 mg/100g), Antioxidant activity (83.7 mg/100g), K (4411ppm), Ca (4933ppm), Mg (1518ppm), P (545ppm), Fe (17.2ppm) and Zn (3.94ppm)	Lasoda	β carotene (62.7 µg/100g), Total phenol (41.8 mg/100g), Antioxidant activity (55.7 mg/100g), K (4644ppm), Ca (656ppm), P (431ppm), Mn (3.51ppm) and Zn (2.06ppm)	Kair	Protein (2.24%), Total phenol (61.5 mg/100g), Antioxidant activity (77.7 mg/100g), K (7313ppm), Ca (1011ppm), Mg (723ppm), P (999ppm) and Zn (4.71ppm)	Rayan
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SN	Recommendation	Combined Joint Agresco No. and Year
33.	<b>Characterization of bacteriocin produced by isolated lactic acid bacteria</b> Isolated bacteria ( <i>Enterococcus faecium</i> ) produce bacteriocin, which can be used <i>in vitro</i> to inhibit the growth of <i>Staphylococcus aureus</i> , <i>Enterococcus faecalis</i> , <i>Serratia marcescens</i> , <i>Micrococcus luteus</i> and <i>Listeria monocytogenes</i>	15 <sup>th</sup> Agresco, 29-01, April at Anand
34.	<b>Delaying the browning of sugarcane juice by various treatments</b> To retain the natural taste and Colour of sugarcane juice up to three hours should add 0.5 g/L of Citric acid immediately after extraction.	

**B. The faculty of FQTL is also involved UG and PG teaching in the different disciplines**

SN	UG and PG courses in different disciplines	
	Title	Credits
1.	Industrial Microbiology	2+1
2.	Environmental biotechnology	2+1
3.	Industrial Microbiology	2+1
4.	Principles of Microbiology	2+1
5.	Horticulture Plant Bacteriology	2+1
6.	Plant Bacteriology	2+1
7.	Regulation of Microbial biosynthesis	2+0
8.	Advances in fertilizer technology	2+1
9.	System approaches in soil and crop studies	2+1
10.	Food and Dairy Microbiology	2+1
11.	Basic Concept in Laboratory Techniques	0+1
12.	Soil and Water Management in Agroforestry	2+1
13.	Fertilizer Technology and Management	2+0
14.	Soil Degradation and Restoration	1+0
15.	Advances in soil physics	2+0
16.	Soil physical chemistry	2+0

**C. Extension activities:**

The Faculty of FQTL is involved in activities such as imparting training to the agriculture input dealers, farmers, students and faculty members and participating in extension activities like Krushi mela etc.

Event Organized by Food Quality Testing Laboratory under National Agricultural Higher Education Project (NAHEP) - Centre for Advanced Agricultural Science and Technology (CAAST)

1. National Workshop on “Pesticide Residue: Management and Techniques for Food Safety and Security” during 25-26 February 2019.
2. Skill development course on secondary agriculture during March 23 – to April 3, 2019.

**D. Charges for analysis of different quality parameters of fruit, vegetables, processed food etc.**

Analysis	Parameters	Charges (Rs.)
Chromatographic	Pesticide residues (As per scope)	4000
	Pigment <i>etc.</i>	
Spectroscopic	Protein	500
	Carbohydrate	
	Sugar	
	Vitamin C	
	Nutrient	
	Pigment	
	Antioxidant activity	
	Phenol	
	Element <i>etc.</i>	
Microbiology	Total bacterial count	500
	Total fungal count	
	Total actinomycetes count	
	MPN	
	Identification of <i>E. coli</i> by biochemical test	800
	Identification of <i>Salmonella</i> by biochemical test	
	Identification of <i>Shigella</i> by biochemical test	
	Identification of <i>Vibrio</i> by biochemical test .	
Other	Crude Protein	500
	Ash	
	Fibre	
	Total fat	
	Moisture	100
	pH	
	Brix <i>etc.</i>	

**Note:**

- Charges for per sample, per parameter analysis.
- 25% discount to NAU including student samples.
- Analysis charges are based on analysis techniques used. However any parameter not covered in price list or required special technique which is costlier, then the charges will be decided by FQTL

### **E. INSTRUMENT/EQUIPMENT FACILITY**

- 1. Gas Chromatograph (ECD-FPD Detector)**
- 2. Gas Chromatograph – Mass Spectrometer (Ion trap detector)**
- 3. High Performance Liquid Chromatograph (PDA, RI and Fluorescence Detector)**
- 4. Liquid Chromatograph – Mass Spectrometer (Triple Quadruple)**
- 5. Inductive Coupled Plasma Mass Spectrometer**
- 6. Water Purification System (Millipore)**
- 7. Large volume Homogenizer**
- 8. Vacuum Rotary Evaporator**
- 9. UV-VIS Spectrophotometer**
- 10. Refrigerated Centrifuge**
- 11. Near Infrared Spectrometer**
- 12. Refractometer**
- 13. Water-Bath**
- 14. pH Meter**
- 15. EC Meter**
- 16. Bio Safety Cabinet**
- 17. Fluorescence Microscope**
- 18. Incubator**
- 19. Laminar Air-Flow**
- 20. Sonicator**
- 21. PCR**
- 22. Real Time-PCR**
- 23. Weighing Balances**

## **F. Publication and other achievements**

### **Full length Research paper published**

1. H.M. Jajada, K.G. Patel, S.R. Patel, V.H. Solanki, K.N. Patel Susheel Singh (2015). Comparative efficacy of two standard methods for determination of iron and Zinc in fruits, pulses and cereals. *Journal of Food Science and Technology*. 52(2):1096–1102
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3. Shailesh Tayade, Z. P. Patel, Susheel Singh and A.D. Phapale (2014). Effect of weather parameters on pest complex of banana under heavy rainfall zone of South Gujarat, *Journal of Agro-meteorology*. 16(2): 222- 226.
4. Smriti Sharma and Trupti K Vyas (2014). Characterization of alkaloid produced by *Aspergillus* sp strain TAS1: Its possible role as antioxidant and antibacterial agent. *Trends in Life Sciences*, 3(1): 10-14.
5. Dhara Desai and Trupti K. Vyas (2014). Alkaline protease production by thermophilic and alkalophilic halotolerant *Bacillus* sp. strain TD: A promising enzyme producer for biotechnological application. *Trends in Biotechnological Research*, 3(1): 12-17.
6. Vyas T.K. and SR Murthy (2015) Chlorobenzene degradation by *Bacillus* sp. TAS6CB: A potential candidate to remediate chlorinated hydrocarbon contaminated sites. *Journal of basic microbiology* 55 (3), 382-388
7. Patel A, Vyas T.K. (2015) Chlorobenzene degradation via ortho-cleavege pathway by newly isolated *Microbacterium* sp. strain TAS1CB from petrochemical contaminated site. *Soil and Sediment Contamination: An International Journal*.
8. Vyas T.K., Desai P, Patel A, Patel S, Jajda H, Patel KG (2016). Quality surveillance of milk for microbial and chemical adulterant sold by local vendors at Navsari, India. *Trends in Life Sciences*, 5 (3) : 17-21
9. Vyas T.K. and Dave B.P. (2016). Biosynthesis of Rhamnolipid Biosurfactant by Newly Isolated Marine Bacterium *Methylobacterium mesophilicum* MTCC 6839 from Oil Contaminated Sites at Alang Coast, Gujarat, India. *I J Biores Stress Manag*, 7(1):74-79

10. Vyas TK, Desai P, Patel A, Patel S, Jajda H, Patel KG (2016) Exploring effect of various organic manure on microbial community of soil from banana organic farm, Green Farming
11. Khushbu Kunadia, Neelam M. Nathani, Vishal Kothari, Rohit J. Kotadia, Charmy R. Kothari, Anjali Joshi, Jalpa K. Rank, Priti R. Faldu, M. Chandra Shekar, Mitkumar J. Viroja, Priyank A. Patel, Divyarajsinh Jadeja, Bhaskar Reddy, Ravindra Pal Singh, Prakash G. Koringa, Chaitanya G. Joshi, Ramesh K. Kothari (2016) Draft Genome Sequence of Commercial Textile Dye- Decolorizing and-Degrading *Bacillus subtilis* Strain C3 Isolated in India; Genome Announcement: Volume 4, Issue 2, e00104-16
12. D.S.Mutkule, Z.P.Patel, L.V.Getiya, Susheel Singh and Amar Mote (2017) Seasonal abundance of brinjal shoot and fruit borer under south Gujarat condition. *Journal of Agrometeorology*
13. Kheni K, Vyas TK (2017) Characterization of Exopolysaccharide Produced by *Ganoderma* sp TV1 and Its Potential as Antioxidant and Anticancer Agent. *Journal of Biologically Active Product from Nature* 7(2): 72-80.
14. Vyas TK, Desai P, Patel AR, Patel KG (2017) Exploitation of *Leuconostoc mesenteroides* sub sp *mesenteroides* from Indian fermented food for curd preparation. *Int. J. Curr. Microbiol. Appl. Sci.* 6(10) : 3137-3144
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19. N S Thakur, Dinesh Kumar, R P Gunaga, Susheel Singh (2017) Allelopathic propensity of the aqueous leaf extract and leaf litter of *Melia Dubia* cav. On pulse crops. *Journal of Experimental Biology and Agricultural Sciences.* 5(5):644-655

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24. Vipul M Patil, Susheel Singh, KG Patel and ZP Patel (2018) Effect of Sun Drying and Grinding on the Residues of Six Insecticides in Chilli Fruits. *Pesticide Research Journal* Vol. 30(2): 140-146.
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27. Lokesh Kumar Saini, KG Patel, Susheel Singh and Kranti B Patil (2019) Effect of soil applied granular insecticides on soil chemical properties in sugarcane ecosystem. *International Journal of Chemical Studies* 7(2): 1311-1314
28. VM Patil, S Singh, SS Thorat, KG Patel and ZP Patel (2019) Persistence of different insecticide in Chilli fruits. *International Journal of Chemical Studies* 7(3): 2132-2135

### **Review Article**

1. Kelvin D Gandhi, PR Faldu, KG Patel, VH Solanki, RV Kansara, S Singh, Vyas TK (2018) Plant Polyphenol Oxidase: Biochemical Properties and Browning of Fruits and Vegetables. *Indian Journal of Agricultural Biochemistry* 31 (1), 1-8



## Popular Article

1. Susheel Singh, Keyur N. Patel and K.G. Patel (2014) Total Quality Management in Analytical Laboratories, Agrobios Newsletter, Jodhpur XIII(4):140-142, September 2014, Article No.100
2. Nitesh S. Litoriya, Susheel Singh and Vanrajsinh H. Solanki(2014) Biosensor and their Application in Agriculture, Agrobios News letter, Jodhpur XII(12):7-8 May, 2014, Article No. 2
3. Susheel Singh, Nitesh S. Litoriya and Vanrajsinh H. Solanki (2014) Processing and Utilization of ginger, Agrobios Newsletter, Jodhpur XII(12)7: 84-85 May,2014 Article No. 56
4. Vanrajsinh H. Solanki and Nitesh S. Litoriya(2014) Tilling- Harvesting Functional Genomics for crop Improvement, Agrobios Newsletter, Jodhpur XIII(1):22-24, June, 2014. Article No. 14
5. Nitesh S. Litoriya and Susheelsingh (2014) Nutritional Quality of fruits and vegetables grown with organic fertilizers, Agrobios Newsletter, Jodhpur XIII(1):58-59, June, 2014. Article No. 39
6. Nitesh S. Litoriya and Vanrajsinh H. Solanki (2014) Tracer techniques in plant Analysis., Agrobios Newsletter, Jodhpur XIII(5):10-12 October, 2014 Article No. 4
7. Prachi Desai, Sweta Patel and Avantika Patel (2015). Single cell Protein. Agrobios Newsletter. Vol. No.-14: 121-123.
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11. Prachi Desai, Avantika Patel and Sweta Patel (2015). Xylooligosaccharides as prebiotics from Agricultural by-products: Production and Applications. Agrobios Newsletter. Vol. No.-14: 140-141.
12. Avantika Patel, Prachi Desai and Sweta Patel, (2015). Mushrooms: Health Benefits. Agrobios Newsletter. Vol. No.-14: 121-123.
13. Priti Faldu and Trupti K Vyas (2016). Broccoli : The boon for health. Agrobios Newsletter, 15 (5): 136 137.
14. Vyas TK, Priti Faldu (2016). Microbial pigments and its industrial application. Agrobios Newsletter, 15 (3): 20-21
15. Vyas TK, Priti Faldu (2017). Iron nano particles antimicrobial agents. Agrobios Newsletter, 15 (8): 14-15.

### **Lead paper presented in National Seminar**

1. K. G. Patel, Susheel Singh, K.N. Patel and Vanrajsinh H. Solanki (2014). “Impact of Organic Farming on Food Quality” at National Seminar on Role of Organic Farming in Climate Resilient and Sustainable Agriculture on 9<sup>th</sup>-10<sup>th</sup> January, 2014. Souvenir page: 229-241.
2. P.G. Shah and Susheel Singh.(2014) Pesticides residues in agricultural commodities at National Seminar on Role Of Organic Farming in Climate Resilient and Sustainable Agriculture on 9<sup>th</sup> -10<sup>th</sup> January,2014. Souvenir page : 132-150.
3. K.G. Patel, Susheel Singh, A.R. Kaswala and P.K. Dubey (2018). Challenges in Nutrient Management in Vegetables Grown Organically Under Protected Environment. Lectured delivered in National Seminar on Technologies and Sustainability of Protected Cultivation for Hi-Valued Vegetable Crops. Organized by ASPEE College of Horticulture and Forestry. Navsari Agricultural University, Navsari – 396450 (Gujarat) held during Feb 1<sup>st</sup> to 3<sup>rd</sup> 2018.

### **Paper presented in International seminar**

1. Prachi Desai, Avantika Patel, Sweta Patel, K G Patel and Trupti K Vyas(2014). Sustainable approach of organic farming on microbial community and nutritional value of banana presented at Global conference on “Technological Challenges & Human Resources for Climate Smart Horticulture Issues and Strategies” at NAU, Navsari. (Souvenir page : 75)
2. Nitesh S Litoriya, Sweta R Patel, Harsur M Jajda, Susheel Singh and K G Patel (2014). Effect of irrigation and nutrient management on nutritional quality of Mango presented at Global conference on “Technological Challenges & Human Resources for Climate Smart Horticulture Issues and Strategies” at NAU, Navsari, 23-31, May 2014 (Souvenir page :308)
3. Sweta R Patel, Nitesh S Litoriya, Susheel Singh, Vanrajsinh H Solanki and K G Patel(2014). Nutritional assessment of different local varieties of Okra, Brinjal and Mango presented at Global conference on “Technological Challenges & Human Resources for Climate Smart Horticulture Issues and Strategies” at NAU, Navsari. (Souvenir page :308)
4. Susheel Singh, D. S. Mutkule, K. N. Patel, V. H. Solanki, K. G. Patel and Z. P. Patel, (2014) Persistence and dissipation of some novel insecticides in/on brinjal (*Solanum melongena* L.). Presented at Global conference on “Technological Challenges & Human Resources for Climate Smart Horticulture Issues and Strategies” at NAU, Navsari. (Souvenir page :269)

5. Susheel Singh, K. N. Patel, V. H. Solanki, K. G. Patel, D. S. Mutkule and Z.P. Patel (2014). Residues and dissipation pattern of Novaluron and Indoxacarb in/on okra (*Abelmoschus esculentus*) presented at Global conference on “Technological Challenges & Human Resources for Climate Smart Horticulture Issues and Strategies” at NAU, Navsari.
6. H. V. Pandya, P. P. Dave, S D Patel, S M Patel, K. G Patel, SusheelSingh, K. N Patel and K. D. Parmar (2014). Residues of some insecticides in/on Indian bean pod presented at Global conference on “Technological Challenges & Human Resources for Climate Smart Horticulture Issues and Strategies” at NAU, Navsari.
7. H V Pandya, P P Dave, S D Patel, S M Patel, K G Patel, Susheel Singh, K N Patel and K D Parmar (2014). Status of residues of insecticides in/on Indian bean after Ubadia preparation. Presented at Global conference on “Technological Challenges & Human Resources for Climate Smart Horticulture Issues and Strategies” at NAU, Navsari.
8. ShaileshTayade, Susheel Singh, Z P Patel and K G Patel.(2014) Residue implications of carbendazim in/on mango (*Mangifera indica* L. var. Kesar) and its dislodgement due to hot water treatment. Presented at Global conference on “Technological Challenges & Human Resources for Climate Smart Horticulture Issues and Strategies” at NAU, Navsari. (Souvenir page:227-228).
9. Vadnerker P, Vyas TK, Faldu PR, Patel KG (2016) Exopolysaccharide of Calocybe mushroom as potential antioxidant agent, Int Conference on Nutraceuticals & Functional Foods : Challenges & Opportunities, 6 – 8 December, 2016, Anand Agriculture University, Anand,pp 97
10. Vadodariya PR, Karmakar N, Tripathi S, Faldu PR, Narwade A (2016) Effect of cooking on antioxidant status of Indian bean, Int Conference on Nutraceuticals & Functional Foods : Challenges & Opportunities, 6 – 8 December, 2016, Anand Agriculture University, Anand,pp 95
- 11.Mehta A, Singh D, Suthar KP, Mogal C, Singh S, Patel NB, Sanjeev K, Ahmed T (2016). Effect of pre-harvest water stress on phenol and glucosinolates in cabbage during post harvest storage. Int Conference on Nutraceuticals & Functional Foods : Challenges & Opportunities, 6 – 8 December, 2016, Anand Agriculture University, Anand,pp 28
12. Ahir U, Vadnerker P, Vyas TK, Gandhi A, Kapadiya C, Patel KG. (2017) Plant growth promoting potentials of *Pseudomonas auroginosa* AP isolated from Dandi, Gujarat, India. Presented at International Symposium on “Emerging Biological Trends in 21st Century” on 5th Nov, 2017 at School of Science, P.P Savani University, Dhamdod, Kosamba, Gujarat, India, Abstract book page No. 130

## **Paper presented in National Seminar/ Conference/Workshop/symposium/training**

1. K.G. Patel, H. M. Jajda, Sweta R. Patel, B.N. Kolambe and Susheel Singh.(2013) Study on quality of organically and conventionally grown mango, banana and papaya under south Gujarat condition at National Seminar on New Vista In Food Processing with Quality Assurance For Augmenting Rural Prosperity at Udaipur on 21-22<sup>nd</sup> June, 2014. Souvenir page :84
2. Trupti Vyas, P. Desai., S. Patel, A. Patel, K G Patel, Z. P. Patel (2013) Microbial quality surveillance of milk sample from local vender at Navsari. National Seminar on “Quality Initiatives in Dairy Value Chain” organized at Ahmedabad on 9-11<sup>th</sup> Dec 2013.
3. Jajda, H.M., Patel K.G., Patel Sweta R., Solanki V.H., Patel K.N. and Satasiya,
4. K.F. (2013) Effect of Nutrient and Irrigation management System on quality of mango at National seminar on “Tropical and subtropical fruits” held at Navsari Agril. University during Jan. 9-11<sup>th</sup> , 2013.
5. Jajda, H.M., Patel, K.G., Solanki, V.H. and Patel, K.N.(2013) Iron, zinc and copper determination from plant samples using ICP-MS at National seminar on “Tropical and subtropical fruits” held at Navsari Agril. University during Jan. 9-11<sup>th</sup>, 2013
6. Sweta R. Patel, Nitesh S. Litoriya, Vanrajsinh H. Solanki and K.G.Patel (2014) “Comparative Studies On Nutritional Quality Of Fresh Mango Pulp And Commercial Packaged Mango Pulp” at National seminar on role of organic farming in climate resilient and sustainable agriculture on 9 -10<sup>th</sup> January 2014
7. Prachi S. Desai, Sweta R. Patel, Trupti Vyas, Avantika R. Patel, N.S. Litoriya, and K.G.Patel.(2014) Microbial and Elemental analysis of different organic manures used in banana organic farming at National seminar on role of organic farming in climate resilient and sustainable agriculture on 9 -10<sup>th</sup> January 2014
8. Trupti K Vyas, Prachi Desai, Avantika R Patel, Shweta Patel and K G Patel (2015) Exploring Lactic acid bacteria from traditional fermented food : their possible application as probiotic bacteria in curd preparation in national seminar on “Emerging trends in food quality And safety” at Anand Agricultural University on 15-16 October, 2015
9. Susheel Singh, Keyur N. Patel , Vanraj H. Solanki, K.G. Patel (2015) Residues and dissipation pattern of deltamethrin 2.8 EC in okra under South Gujarat conditions presented in national seminar on “Emerging trends in food quality And safety” at Anand Agricultural University on 15-16 October, 2015
10. Vanraj Solanki, Kelvin Gandhi, Susheel Singh (2015) Optical Techniques: Alternative Tools for

- Pesticide Residue Analysis in Food Industry. presented in national seminar on “Emerging trends in food quality And safety” at Anand Agricultural University on 15-16 October, 2015
11. Vipul Parekh, Susheel Singh, Vanraj H Solanki and Kelvin Gandhi (2015) Role of Molecular Diagnostic Techniques in Food Safety. presented in national seminar on “Emerging trends in food quality And safety” at Anand Agricultural University on 15-16 October, 2015
  12. Vipul Patil, Susheel Singh, Kelvin Gandhi (2015) Food Safety And Security : Think Globally Act Locally presented in national seminar on “Emerging trends in food quality And safety” at Anand Agricultural University on 15-16 October, 2015
  13. Desai Prachi, Patel Avantika, Patel Sweta, Vyas Trupti, Patel KG (2015) Edible insects : Food for thought presented in national seminar on “Emerging trends in food quality And safety” at Anand Agricultural University on 15-16 October, 2015
  14. Patel Sweta, Litoriya Nitesh, Jajda HM, Singh Susheel, Patel KG (2015). Comparison of analytical efficacy of conventional and IR based techniques for the biochemical characterization of rice, soybean and pigeon pea. preparation in national seminar on “Emerging trends in food quality And safety” at Anand Agricultural University on 15-16 October, 2015
  15. Vyas TK, Vadnerker P, Sharma KK, Kalyani IH, Faldu P, Patel KG (2016) Antioxidant and anticancer potential of Ganoderma sp. : Promising option to cultivate using agroforestry waste Forest and Tree based landuse system for livelihood, nutritional and environmental security, 21-23 December, 2016, Navsari Agricultural University, Navsari,NAU-ISTS-4/273, pp 95
  16. Mutkule DS, Patel Z.P. and Susheel Singh (2016) Persistence and dissipation of indoxacarb in/on brinjal (*Solanum melongena* L.) Organised by Indian Phytopathological Society, New Delhi and Deptt. of Plant Pathology, COA, Udgir, Dist, Latur.
  17. Faldu P, Gandhi K, Kansara R, Patel KG, Singh S (2016) Exploring the nutritional potential of wild and underutilized minor fruits of South Gujarat. National Seminar on Forest and tree-based land use systems Livelihood, Nutritional and environmental Security. Held NAU, Navsari during December 21st to 23rd, 2016(NAU-ISTS-6/257
  18. Kamlesh G. Patel, Kelvin D. Gandhi, Susheel Singh and Vanrajsinh H. Solanki (2017) Organic Farming: Tools to Achieve Goals of Sustainable Agriculture. Reference Manual. ICAR Sponsored Winter School on “Approaches for Doubling Farmers’ Income”. Organized by College of Agriculture, Navsari Agricultural University, Campus Bharuch, Dist. Bharuch-392 012 (Gujarat) held during 1st to 21st November, 2017.pp:229-237
  19. Susheel Singh, K.G. Patel and Rohan V. Kansara, V.H. Solanki (2017).Need And Scope of Food Quality Characterization for the Sustenance and Maximization of Farmer’s Income. Reference Manual. ICAR Sponsored Winter School on “Approaches for Doubling Farmers’ Income”. Organized by College of Agriculture, Navsari Agricultural University, Campus Bharuch, Dist.

Bharuch-392 012 (Gujarat) held during 1st to 21st November, 2017.pp:268-284

20. Susheel Singh, Kelvin Gandhi, V.H. Solanki and K.G. Patel (2017) Environmental risk assessment: an integral component of Comprehensive Pest Risk Analysis. Compendium of lectures in ICAR sponsored winter school on Pest risk analysis - A Tool in Selection of Quality Planting Material and Pest Forecast. Organized by ASPEE College of Horticulture and Forestry. Navsari Agricultural University, Navsari – 396450 (Gujarat) Held during 1.11.2017 to 21.11.2017.
21. Sutariya BP, Vadnerker P, Vyas TK, Gandhi A, Kapadiya C, Patel KG. (2017) Indole acetic acid production and phosphate solubilization by novel isolate *Providencia* sp. Presented at International Symposium on “Emerging Biological Trends in 21st Century” on 5th Nov, 2017 at School of Science, P.P Savani University, Dhamdod, Kosamba, Gujarat, India, Abstract book page No. 129
22. Neethu T. M., K. G. Patel, S. Sree Ganesh and Gandhi Kelvin D (2018). Optimization of nutrient status of organic manure prepared from agro-wastes by using isolated cellulolytic and lignolytic bacteria. Paper presented in National Seminar on Technologies and Sustainability of Protected Cultivation for Hi-Valued Vegetable Crops. Organized by ASPEE College of Horticulture and Forestry. Navsari Agricultural University, Navsari – 396450 (Gujarat) held during Feb 1st to 3rd 2018.
23. Ramani P, Singh S, Solanki VH, Saini LK, Patel KG (2019). Impact of soil amendments on microbial and enzymatic activity of soil treated with Hexaconazole and Tebuconazole. Presented in National symposium on Sustainable Management of Pests and Diseases in Augmenting Food and Nutritional Security held during January 22-24, 2019 at ACHF, NAU, Navsari
24. Ramani P, Singh S, Saini LK, Solanki VH, Patel KG (2019). Effect of Soil Amendments on Persistence of Hexaconazole and Tebuconazole in Soil and its Terminal Residues in Tomato. Presented in National symposium on Sustainable Management of Pests and Diseases in Augmenting Food and Nutritional Security held during January 22-24, 2019 at ACHF, NAU, Navsari.

### **Book**

1. Singh S, Saini LK, Patel KG (2018). Instant Notes on Soil Science. Published by Neoti Book Agency Pvt Ltd. new Delhi (ISBN No. 978-81-936295-1-2)
2. K.G. Patel, A.R. Kaswala, P.K. Dubey, Susheel Singh, and A.N. Sabalpara (2017). સજીવ ખેતી (Sajiv Kheti). Published by Aspee College of Horticulture and Forestry, Navsari agricultural University, Navsari University Publication No.4/2017-18

## Book chapter

1. K.D. Parmar and Susheel Singh (2014). ખાદ્ય પદાર્થોમાં જંતુનાશકોના અવશેષો નનવારવાના ઉપાયો (*Khadhya Padarthoma Jantunashakona Avshesho Nivarvana Upayo*)" *Paaksanrakshan*, Published by AAU, Anand. Pp. 276- 278.
2. K.G. Patel, V.H. Solanki, Susheel Singh, A.R. Kaswala and P.K. Dubey (2016). સેંદ્રિય ખેતીનું મહત્વ અને શક્યતાઓ. (Sendriya khetinu mahatva ane shakyatao). Sajiv Khetima pak sanraksan.PP-1:5
3. Susheel Singh, V.H. Solanki, K.D. and K.G. Patel (2016). પરંપરાગત અને સેંદ્રિય ખેતી પેદાશોમાં જંતુનાશક દવાઓના અવશેષોની પરિસ્થિતિ. Paramapargat ane sendriya kheti pedashoma jantunashak davoana avsheshoni paristhiti . Sajiv Khetima pak sanraksan.PP-6:10
4. Susheel Singh, K.G. Patel, P.V. Mehta, P.K. Dubey (2017). મૃદા સ્વાસ્થ્ય: લાભકારી એવં ટિકાઝુ કૃષિ કા એક અભિન્ન અંગ .GSFC Krishijivan Apr-June 2017:36-38
5. K.G. Patel, Susheel Singh, A.R. Kaswala and P.K. Dubey (2018). Challenges in Nutrient Management in Vegetables Grown Organically Under Protected Environment. Lecture delivered in National Seminar on Technologies and Sustainability of Protected Cultivation for Hi-Valued Vegetable Crops. Organized by ASPEE College of Horticulture and Forestry. Navsari Agricultural University, Navsari – 396450 (Gujarat) held during Feb 1st to 3rd 2018
6. Susheel Singh and KG Patel (2018). Nutrient management under protected cultivation. Practical Manual Published by ACHF, NAU, Navsari during 2018 (Skill Development Training on "Protected Cultivation" 27th August to 20th September, 2018
7. K. G. Patel, T. R. Ahlawat, Susheel Singh, Vipulkumar Parekh, M. S. Sankanur (2019) Book of Abstracts of National Workshop on "Pesticides Residues: Management and Techniques for Food Safety and Security" organized under NAHEP-CAAST-NAU project during Feb-25-26 2019 at NAU Navsari

## Awards

### A: Poster

1. Shailesh Tayade, Susheel Singh, Z P Patel and K G Patel (2014). Residue implications of carbendazim in/on mango (*Mangifera indica* L. var. Kesar) and its dislodgement due to hot water treatment. Presented at Global conference on "Technological Challenges & Human Resources for Climate Smart Horticulture Issues and Strategies" at NAU, Navsari, (Souvenir page: 227-228.)

2. Prachi S. Desai, Sweta R. Ratel, Trupti Vyas, Avantika R. Patel, N.S. Litoriya, and K.G. Patel. (2014) Microbial and Elemental analysis of different organic manures used banana organic farming at National seminar on role of organic farming in climate resilient and sustainable agriculture on 9th - 10th January 2014.
3. Patel Avantika, Desai Prachi, Patel Sweta, Vyas Trupti, Patel KG (2015) Antimicrobial activity of some lactic acid bacteria isolated from fermented food. First prize in “Science Excellence - 2015”, at Gujarat University, Ahmedabad on 26 Sept, 2015.
4. Vadnerker Priya, Vyas Trupti (2015) Exploring mushroom exopolysaccharide for their potential anticancer activity. First prize in “Science Excellence - 2015”, at Gujarat University, Ahmedabad on 26 Sept, 2015.
5. Patel Sweta, Litoriya Nitesh, Patel KG, Patel Avantika, Desai Prachi (2015) Effect of different processing techniques on the nutritional and anti-nutrient composition of chick pea. First prize in “Science Excellence - 2015”, at Gujarat University, Ahmedabad on 26 Sept, 2015.
6. L. K. Saini, K. G. Patel, Susheel Singh and Kelvin D. Gandhi (2019) Effect of soil applied granular insecticide on microbial population in sugarcane grown soil. Secured 1<sup>st</sup> rank in best poster presentation at National workshop on Pesticide residue management and techniques for food safety and security, NAU, Navasri held 25-26 February, 2019.
7. Ashish. C. Patel, L. K. Saini, U. M. Nakarani, N. G. Umretiya and K. G. Patel. (2019) Household processes and pesticide residue in vegetables. Secured 2<sup>nd</sup> rank in best poster presentation at National workshop on Pesticide residue management and techniques for food safety and security, NAU, Navasri held 25-26 February, 2019.

**B: Oral presentation**

8. Susheel Singh, Keyur N. Patel , Vanraj H. Solanki, K.G. Patel (2015) Residues and dissipation pattern of deltamethrin 2.8 EC in okra under South Gujarat conditions presented in national seminar on “Emerging trends in food quality And safety” at Anand Agricultural University on 15-16 October, 2015.
9. L. K. Saini, K. G. Patel, Susheel Singh and V. H. Solanki. (2019) Persistence and dissipation kinetics of phorate and its metabolites in the soil of sugarcane ecosystem. Secured 1<sup>st</sup> rank in best oral presentation at National workshop on Pesticide residue management and techniques for food safety and security, NAU, Navasri held 25-26 February, 2019.



### **C. Individual/ Merit based/Scholarship/other awards**

10. Young Scientist Award conferred to Dr. Susheel Singh in field of Agriculture and Allied field By SVSU, Lucknow. Presented at National Seminar on “Transforming Agriculture to Doubling of Farmers Income” Held at BBAU Lucknow (Feb. 10-11, 2018), India,
11. Young Scientist award in the field of pesticide residue delivered to Dr. Susheel Singh National Symposium on Sustainable Management of Pests and Diseases management in Augmenting Food and Nutritional organized by Navsari Agricultural University, Navsari (Gujarat) during January 22-24, 2019

# Photo Gallery



