

# Report to be presented in 16<sup>th</sup> Joint AGRESCO meeting of NAU

Name of sub-committee: Basic Science

Date of Meeting of sub-committee: 05<sup>th</sup> and 6<sup>th</sup> May 2020

## Summary:

Farmers recommendation		Scientific recommendation		New Technical Programme		Ongoing programme
Presented	Accepted	Presented	Accepted	Presented	Accepted	
03	03	20	17	10	10	24

16.1	Recommendation for Farmers community
16.1.1	<p><b>Effect of phosphate solubilizing microbes in wheat (<i>Triticum aestivum</i>) under saline conditions</b></p> <p>1) The farmers of South Gujarat heavy rainfall zone IV growing wheat under saline conditions are advised to apply PSB-S NAU isolate (<math>1 \times 10^8</math> cfu/ml) @2.5 lit/ha or PSF-S NAU isolate (<math>1 \times 10^7</math> cfu/ml) @2.5 lit/ha or PSB-S NAU isolate (<math>1 \times 10^8</math> cfu/ml) @1.25 lit/ha + PSF-S NAU isolate (<math>1 \times 10^7</math> cfu/ml) @1.25 lit/ha along with cent per cent recommended dose of chemical fertilizers to realize higher grain and straw yield with higher net return over RDF alone.</p> <p>દક્ષિણ ગુજરાતનાં ખેત આબોહવાકીય પરિસ્થિતિ-૪ના ક્ષારીય જમીનમાં ઘઉંનું વાવેતર કરતાં ખેડૂતોને ભલામણ છે કે વાવેતર સમયે પીએસબી-એસ NAU Isolate (સીએફયુ- <math>1 \times 10^8</math>/મીલી) @ ૨.૫ લી/હે અથવા પીએસએફ-એસ NAU Isolate (સીએફયુ- <math>1 \times 10^7</math>/મીલી) @ ૨.૫ લી/હે અથવા પીએસબી-એસ NAU Isolate (સીએફયુ- <math>1 \times 10^8</math>/મીલી) @ ૧.૨૫ લી/હે + પીએસએફ-એસ NAU Isolate (સીએફયુ- <math>1 \times 10^7</math>/મીલી) @ ૧.૨૫ લી/હે ની જમીન માવજત ભલામણ કરેલ રસાયણિક ખાતર સાથે આપવાથી માત્ર ભલામણ કરેલ રસાયણિક કરતાં વધારે ઉત્પાદન તેમજ વધુ નફો મેળવી શકાય છે.</p> <p>2) The farmers of South Gujarat heavy rainfall zone IV growing wheat under saline conditions are advised to apply PSB-S NAU isolate (<math>1 \times 10^8</math> cfu/ml) @2.5 lit/ha or PSF-S NAU isolate (<math>1 \times 10^7</math> cfu/ml) @2.5 lit/ha or PSB-S NAU isolate (<math>1 \times 10^8</math> cfu/ml) @1.25 lit/ha + PSF-S NAU isolate (<math>1 \times 10^7</math> cfu/ml) @1.25 lit/ha along with 50% dose of chemical phosphatic fertilizers in the soil at the time of sowing to realize higher grain and straw yield and to save 50% phosphatic chemical fertilizer.</p>

	<p>દક્ષિણ ગુજરાતનાં ખેત આબોહવાકીય પરિસ્થિતી-૪ ના ક્ષારીય જમીનમાં ઘઉંનું વાવેતર કરતાં ખેડૂતોને ભલામણ છે કે પાકના વધારે ઉત્પાદન તેમજ વધુ નફો મેળવવા તથા ૫૦% ફોસ્ફરસના રસાયણિક ખાતરના બચત માટે ઘઉંના વાવેતર સમયે પીએસબી-એસ NAU Isolate (સીએફયુ-૧X૧૦૮/મીલી) @ ૨.૫ લી/હે અથવા પીએસએફ-એસ NAU Isolate (સીએફયુ-૧X૧૦૭/મીલી) @ ૨.૫ લી/હે અથવા પીએસબી-એસ NAU Isolate (સીએફયુ-૧X૧૦૮/મીલી) @ ૧.૨૫ લી/હે + પીએસએફ-એસ NAU Isolate (સીએફયુ-૧X૧૦૭/મીલી) @ ૧.૨૫લી/હે ની જમીન માવજત ૫૦% ફોસ્ફરસના રસાયણિક ખાતર સાથે વાવણી સમયે આપવું.</p> <p><b>( Action: Professor &amp; Head, Dept. of Plant Pathology, NMCA, NAU, Navsari)</b></p>
16.1.2	<p><b>Evaluation of different methods for manure preparation from straw and threshing waste of rice</b></p> <p>Farmers are advised to use <i>Bacillus licheniformis</i> X6 and <i>Aspergillus</i> sp. XF9 to get good quality of organic manure in short time period (114 days) from rice straw waste using NADEP method.</p> <p>ખેડૂતો ડાંગરના પરાળમાંથી ગુણવત્તાયુક્ત સૈદ્રિય ખાતર ઓછા સમયમાં બનાવવા માંગતા હોય તેને ડાંગરના પરાળને બેસિલસ લાઇકેનિફોર્મિસ એક્સ6 અને એસ્પેર્ગિલ્લુ એસ્પર્જિલસ સ્પી. એક્સએફ૯ કલ્ચર આપી નાડેપ પદ્ધતિ દ્વારા ખાતર બનાવવાની ભલામણ કરવામાં આવે છે.</p> <p><b>( Action: Professor &amp; Head, Dept. Food Quality Testing Lab., NMCA, NAU, Navsari)</b></p>
16.1.3	<p><b>Effect of exogenous application of brassinosteroid on yield and quality of tomato (<i>Solanum lycopersicum</i> L.)</b></p> <p>The farmers of South Gujarat heavy rainfall agroclimatic zone AES III growing tomato GT-2 variety are advised to spray 1.0 ppm brassinolide at 25, 50 and 75 days after transplanting for enhancing the post harvest quality and obtaining higher yield and net return.</p> <p>દક્ષિણ ગુજરાત વધુ વરસાદવાળા વિસ્તારમાં ટામેટા જીઈટીઈ ૨ જાતનું વાવેતર કરવા વાળા ખેડૂતોને વધુ ઉત્પાદન અને ચોખ્ખો નફો મેળવવા માટે તેમજ લણણી પછી ની ગુણવત્તા વધારવા માટે ૧૦૦ પીઈપીઈએમઈ બ્રાસિનોલાઈડનો ટામેટાની ફેર રોપણી કર્યા પછી ૨૫ ૫૦ અને ૭૫ દિવસે છંટકાવ કરવાની ભલામણ કરવામાં આવે છે.</p>

	<b>( Action: Professor &amp; Head, Dept. of Plant Molecular Biology &amp; Biotech, ACHF, NAU, Navsari)</b>
<b>16.2</b>	<b>Recommendation for Scientific community</b>
<b>16.2.1</b>	<p><b>Optimization of denovo regeneration protocol and selection of glyphosate tolerant line for <i>Cynodon dactylon</i> variety Selection 1</b></p> <p>It is informed to the scientific community to use MS + 4.0 mg/l 2,4-D for highest callus induction frequency for <i>in vitro</i> regeneration of <i>Cynodon dactylon</i> using node as an explant. MS+0.1mg/l BAP and MS+0.1 mg/l IBA are to be used for maximum shoot and root regeneration respectively. Best hardening was observed with coco peat, vermicompost and sand in the ratio of 2:1:1.</p> <p><b>( Action: Principal, ASBI, NAU, Surat)</b></p>
<b>16.2.2</b>	<p><b>Optimization of amylase production by soil isolate under solid state fermentation (SSF)</b></p> <p>It is informed to the scientific community as well to the enzyme producing industries that <i>Bacillus subtilis</i> strain VSP4, gave maximum amylase production (169.72 U/gds) under solid state fermentation using 5 g wheatbran supplemented with 0.05 g of starch, 0.1 g of yeast extract and 5 mM of CaCl<sub>2</sub> having media pH 10.00 after 60 hr of incubation at 60°C in incubator.</p> <p><b>( Action: Principal, ASBI, NAU, Surat)</b></p>
<b>16.2.3</b>	<p><b>Influence of various nanoparticles on contamination in micropropagation of banana</b></p> <p>It is informed to the scientific community that silver nanoparticles (~ 13.0 nm) at 10.0 mg/l concentration synthesized from <i>Ocimum tenuiflorum</i> L. (tulsi) leaf extract with MS medium reduced the contamination to 12.6 % in <i>in- vitro</i> regeneration of banana.</p> <p><b>( Action: Principal, ASBI, NAU, Surat)</b></p>
<b>16.2.4</b>	<p><b>Screening of cotton genotypes for salinity tolerance</b></p> <p>It is informed to scientific community that cotton genotypes GISV-218 and G. Cot-16 are salinity tolerance up to EC<sub>1:2.5</sub> (13.14 dS/m) while G.Cot-10 and G. Cot-100 are salinity susceptible based biochemical analysis.</p> <p><b>( Action: Research Scientist, Main Cotton Research Station, NAU, Surat)</b></p>
<b>16.2.5</b>	<p><b>Biochemical traits in relation to insect tolerance of wild species and cross derivatives involving wild species of cotton</b></p> <p>It is informed to scientific community that the WS08- {(G.6 X <i>G.ano</i>) X <i>G.tom</i>} X G.Cot-100, WS07- ALB X <i>G.anomalum</i>, WS05-(G.67 X MOCO)F1 X G.Cot-11, WS25- Large Mango Leaves and WS06- ALB X <i>G. anomalum</i> showed most lowered sucking pest infestation and square damage among the wild entry and cross derivatives selected for analysis. Among these five genotype, {(G.6 X <i>G.ano</i>) X <i>G.tom</i>} X G.Cot-100 showed higher total phenol, tannin and surface wax content at sucking pest infestation. {(G.6 X <i>G.ano</i>) X <i>G.tom</i>} X G.Cot-100 also showed higher trichome density and hairiness character. While Large Mango Leaves and ALB X <i>G.anomalum</i> showed higher gossypol content at boll worm infestation and hence recommend for further breeding programs.</p> <p><b>( Action: Research Scientist, Main Cotton Research Station, NAU, Surat)</b></p>
<b>16.2.6</b>	<p><b>Study of free living nitrogen fixing bacterial diversity with respect to seasonal variation</b></p> <p>It is informed to scientific community to use the isolate A19 (<i>Streptomyces coelicolor</i>)</p>

	<p>and A28(<i>Bacillus altitudinis</i>) due to their multiple <i>in vitro</i> plant growth promoting activities along with the free living nitrogen fixing potential.</p> <p style="text-align: right;"><b>( Action: Principal, CoA, NAU, Bharuch)</b></p>
<b>16.2.7</b>	<p><b>Assessment of various anti-nutritional factors from different varieties of pigeon pea</b></p> <p>It is informed to the scientific community that, genotypes AVPP-1 and GNP-2 are prominent for their anti-nutritional content in whole seed while genotypes AVPP-1 is prominent for its anti-nutritional content in seed coat also.</p> <p style="text-align: right;"><b>( Action: Principal, CoA, NAU, Bharuch)</b></p>
<b>16.2.8</b>	<p><b>Isolation and characterization of endophytic bacteria from Finger millet</b></p> <p>It is informed to scientific community that finger millet root endophytic isolates <i>Bacillus subtilis</i> (EP 6) and <i>Achromobacter xylosoxidans</i> (EP 17) showed multiple plant growth promoting abilities under <i>in vitro</i> conditions.</p> <p style="text-align: right;"><b>( Action: Principal, CoA, NAU, Waghai)</b></p>
<b>16.2.9</b>	<p><b>Study of starch quality in greater yam <i>Dioscorea alata</i></b></p> <p>It is informed to the scientific community that greater yam genotypes NGY9, NGY3 and NGY1 showed highest resistant starch, refrigeration stability (syneresis %) and starch gel clarity (transmittance %) receptively and further this genotypes can be used for greater yam breeding programme.</p> <p style="text-align: right;"><b>( Action: Professor &amp; Head, Dept. of Soil Science &amp; Agri. Chem., NMCA, NAU, Navsari)</b></p>
<b>16.2.10</b>	<p><b>Isolation and characterization of plant growth promoting Actinomycetes from rhizospheric soil</b></p> <p>It is informed to scientific community that <i>Streptomyces enissocaesilis</i> IB 7.2 found most potent for multiple plant growth promotion characters like nutrient solubilization, antagonistic potential, extracellular hydrolytic enzyme secretion and plant growth hormone production under <i>in vitro</i> conditions.</p> <p style="text-align: right;"><b>( Action: Professor &amp; Head, Dept. of Plant Pathology, NMCA, NAU, Navsari)</b></p>
<b>16.2.11</b>	<p><b>Optimization of micropropagation protocol for different genotypes of banana</b></p> <p>It is informed to the scientific community that out of ten diverse banana genotype; Chean kadai, Lalkel and Rajapuri genotype showed better growth response to micropropagation protocol comprised of shoot tip explants surface sterilization treatment [Carbendarim (1.25 mg/l) + Chloromphenicol (500 mg/l) for 45 minutes + 1.0 % HgCl<sub>2</sub> solutions for 10 minutes] followed by shoot multiplication [BA (3.0 mg/l) + adenine sulphate (2.0 mg/l)] and root induction [<math>\frac{1}{2}</math> MS + 1.0 mg/l IBA] treatment.</p> <p style="text-align: right;"><b>( Action: Dept. of GPB (Plant Physiology), NMCA, Navsari)</b></p>
<b>16.2.12</b>	<p><b>Status of heavy metals in green leafy vegetables grown under South Gujarat region</b></p> <p>It is informed to scientific community that none of vegetable sample was found exceeding the maximum permissible limit for different elements except nickel in spinach and fenugreek. Moreover, the survey of pesticides residues in the three leafy vegetables that is fenugreek, spinach and amaranthus from different markets of South Gujarat revealed that all the sample were detected below permissible value for different pesticides.</p> <p style="text-align: right;"><b>( Action: Professor &amp; Head, Dept. Food Quality Testing Lab., NMCA, NAU, Navsari)</b></p>
<b>16.2.13</b>	<p><b>Surveillance of afla toxin in pasteurized and raw milk</b></p>

	<p>It is informed to scientific community that occurrence of aflatoxin M1 was higher in winter season followed by monsoon season. Aflatoxin M1 is more in buffalo milk compared cow milk sample. In pasteurised buffalo milk sample, aflatoxin M1 is higher than raw milk whereas in cow milk it was absent.</p> <p><b>( Action: Professor &amp; Head, Dept. Food Quality Testing Lab., NMCA, NAU, Navsari)</b></p>
<b>16.2.14</b>	<p><b>Effect of liquid culture media in micropropagation of banana cv. Grand Naine</b></p> <p>It is informed to the scientific community that cost reduction in the commercial production of banana, liquid culture with 8 ml along with activated charcoal 0.1% gave higher number of shoots, number of roots, number of leaves and length of shoots with reduction of cost per litre to 6 INR and per bottle cost was 0.05 INR. Thus, we can save 76 paisa per bottle.</p> <p><b>( Action: Professor &amp; Head, Dept. of Plant Molecular Biology &amp; Biotech, ACHF, NAU, Navsari)</b></p>
<b>16.2.15</b>	<p><b>Amino acid profiling of released varieties of pigeon pea from SAUs of Gujarat</b></p> <p>It is informed to the scientific community that highest amount of free amino acids (1.00%) was found in GT-103, whereas highest protein content (22.21%) was present in BP-16-261. Among the essential amino acids, highest valine (1.36 mg g<sup>-1</sup>) in GT-102, highest histidine (9.18 mg g<sup>-1</sup>) and methionine (4.10 mg g<sup>-1</sup>) in GT-103, highest arginine (19.69 mg g<sup>-1</sup>) and tryptophan (11.77 mg g<sup>-1</sup>) in Banas, highest leucine (12.05 mg g<sup>-1</sup>) in AVPP-1, highest phenyl alanine (26.07 mg g<sup>-1</sup>) in AGT-2 and highest lysine (6.58 mg g<sup>-1</sup>) in GJP-1 was reported, that can be considered for future pigeonpea breeding programme.</p> <p><b>( Action: Professor &amp; Head, Dept. of Plant Molecular Biology &amp; Biotech, ACHF, NAU, Navsari)</b></p>
<b>16.2.16</b>	<p><b>Identification and trouble shooting of microbial contamination occurs during canning of mango pulp</b></p> <p>It is informed to scientific community that unpasteurized Kesar mango pulp has been reported to have microorganisms such as <i>Klebsiella pneumoniae</i>, <i>Micrococcus endophyticus</i> and <i>Chryseobacterium indologenes</i>. To avoid contamination of canned mango pulp by these type of microorganisms and to troubleshoot the problem of can spoilage, proper canning of mango pulp should be carried out as shown in the following chart,</p> <p style="text-align: center;"><b>Flowchart of mango pulp canning process</b></p> <p style="text-align: center;">Washing of ripe Kesar mangoes using 3.0 ppm chlorinated water</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Sorting and Cutting of mangoes on inspection cum cutting conveyer by skilled persons</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Mango pulp extraction using two stage pulper by separation of stone, skin and fibers</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Mixing of pulp in 200 kg tanks</p> <p style="text-align: center;">↓</p>

	<p>Pasteurization of mango pulp in scrape surface pasteurizer at 90°C and adjust 0.4 % acidity. On reaching 90°C temperature, transfer of pulp to storage tank for filling</p> <p style="text-align: center;">↓</p> <p>Cleaning of each can by hot water steam followed by filling of pulp (850g/Cans) and Sealing of cans by double seamer machine</p> <p style="text-align: center;">↓</p> <p>Retorting of filled cans (100°C for 30 min)</p> <p style="text-align: center;">↓</p> <p>Cooling of cans to ambient temperature</p> <p style="text-align: center;">↓</p> <p>Storage (upto 2 months)</p> <p style="text-align: right;"><b>( Action: Professor &amp; Head, Dept. of PHT, ACHF, NAU, Navsari)</b></p>	
<b>16.2.17</b>	<p><b>Identification and validation of sex linked markers in Palmyra palm (<i>Borassus flabillifer</i>)</b></p> <p>1) It is informed to scientific community to use male sex linked PCR based marker NAU_PALMYRAPALM_SCAR620 (F: 5'-CCGTGACTGGTCATAAAGGC-3' and R: 5' -GGTCCCTGACTATCAAGCTAT-3') for early stage identification of male Palmyra palm (<i>Borassus flabellifer</i> L.) from the population to maintain the male:female tree sex ratio in the new plantation.</p> <p>2) The farmers associated with palmyra palm cultivation and seedling preparation at nursery stage are advise to use male sex linked PCR based marker NAU_PALMYRAPALM_SCAR620 for early stage identification of male palmyra palm from the seedling population in order to maintain male:female sex ratio in the new plantation.</p> <p>ખેડૂત સામુદાય માટે ભલામણ :</p> <p>તાડ ની ખેતી તેમજ રોપ ઉછેર સાથે સંકળાયેલા ખેડૂત સામુદાય ને આથી ભલામણ કરવામાં આવે છે કે, નર્સરી માં તાડ ના રોપા માંથી, નર તાડ ના વૃક્ષ ની પ્રારંભિક તબક્કે ઓળખ માટે NAU_PALMYRAPALM_SCAR620 નર લિંગ સંલગ્ન પી.સી.આર આધારિત સૂચકો નો ઉપયોગ કરી શકાય છે, જેથી તાડ ના નવા વાવેતર માં નર તથા માદા વૃક્ષ નો ગુણોત્તર જાળવી શકાય.</p> <p style="text-align: right;"><b>( Action: Professor &amp; Head, Dept. of Basic Science, CoF, ACHF, Navsari)</b></p>	
<b>16.3</b>	<b>New Technical Programme</b>	<b>Name of department &amp; PI</b>
<b>16.3.1</b>	Study on survival and efficacy of microbial bioinoculants in banana pseudostem based Novel	Principal, ASBI, NAU, Surat <b>PI: Dr. H. D. Bhimani</b>
<b>16.3.2</b>	Response of Bt cotton to different plant growth regulators	Research Scientist, Main Cotton Research Station, NAU,

		Surat <b>PI: Dr. H. R. Ramani</b>
<b>16.3.3</b>	Evaluation of biochemical parameters of selected cotton genotypes	Research Scientist, Main Cotton Research Station, NAU, Surat <b>PI: Shri. V. K. Vekariya</b>
<b>16.3.4</b>	Comparative study of biochemical parameters in dry and sprouted seed of green gram	Principal, CoA, NAU, Bharuch <b>PI: Dr. N.H. Garaniya</b>
<b>16.3.5</b>	Molecular characterization of banana genotypes	Dept. of GPB (Plant Physiology), NMCA, Navsari <b>PI: Dr. Ajay V Narwade</b>
<b>16.3.6</b>	Application of CSM-CERES-Rice model for assessment of plant density and nitrogen management of transplanted rice for tropical environment	Dept. of GPB (Plant Physiology), NMCA, Navsari <b>PI: Dr. Ajay V Narwade</b>
<b>16.3.7</b>	Isolation and characterization of chitinolytic bacteria	Professor & Head, Dept. Food Quality Testing Lab., NMCA, NAU, Navsari <b>PI: Dr Trupti K Vyas</b>
<b>16.3.8</b>	Characterization of bioactive molecule produced by <i>Fusarium verticillioides</i>	Professor & Head, Dept. Food Quality Testing Lab., NMCA, NAU, Navsari <b>PI: Dr Trupti K Vyas</b>
<b>16.3.9</b>	Optimization of expression level of recombinant protein from <i>E. coli</i> strains BL21(DE3)	Professor & Head, Dept. of Plant Molecular Biology & Biotech, ACHF, NAU, Navsari <b>PI: Dr. C.V. Kapadia</b>
<b>16.3.10</b>	Exploration and evaluations of mangrove diversity along coastal belt of South Gujarat	Professor & Head, Dept. of Basic Science, CoF, ACHF, Navsari <b>PI: Dr.</b>

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