**PROCEEDINGS OF THE XI COMBINED JOINT AGRESCO MEETING OF AGRICULTURAL ENGINEERING AND AIT / AGRIL. ENGINEERING, DAIRY AND FOOD TECHNOLOGY / DAIRY SCIENCE AND FPT & BE / AGRIL. ENGINEERING OF STATE AGRICULTURAL UNIVERSITIES OF GUJARAT HELD AT AAU, ANAND DURING 7-9 APRIL, 2015**

**11.5 AGRICULTURAL ENGINEERING AND AIT / AGRIL. ENGINEERING, DAIRY AND FOOD TECHNOLOGY / DAIRY SCIENCE AND FPT & BE / AGRIL. ENGINEERING**

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| **Chairman** | : | Dr. N. C. Patel, Hon’ble VC, AAU |
| **Co-Chairmen** | : | Dr. D. C. Joshi, Dean, FPT & BE, AAU  Dr. N. K. Gontia, Dean, Agri. Engg., JAU |
| **Rapporteurs** | : | Dr. R. F. Sutar, AAU  Dr. R. Subbaiah, JAU |

The details of recommendations and new technical programmes presented, discussed and approved during the session are as under:

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| --- | --- | --- | --- | --- | --- | --- |
| **Universities** | **Recommendations** | | | | **New Technical Programmes** | |
| **Farming/Industry Community** | | **Scientific Community** | |
| **Proposed** | **Approved** | **Proposed** | **Approved** | **Proposed** | **Approved** |
| AAU | 20 | 20 | 5 | 4 | 36 | 36 |
| JAU | 6 | 6 | 3 | 2 | 7 | 7 |
| NAU | 6 | 2 | 1 | 1 | 10 | 9 |
| SDAU | 1 | 0 | 5 | 5 | 10 | 7 |
| Total | 33 | 28 | 14 | 12 | 63 | 59 |

**11.5.1 Recommendations**

**A. Farming/Industry Community**

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| **Anand Agricultural University** | | |
| 11.5.1.1 | **Manufacture of dairy/non-dairy processed cheese and Mozzarella cheese analogue** | |
| An acceptable quality Mozzarella cheese analogue (MCA) can be produced utilizing rennet casein and vegetable fat employing the formulation and process technology developed by AAU, Anand. The MCA had required baking qualities when used as a pizza topping and was cheaper than natural cheese by 22%. | |
| રેનેટ કેસિન પ્રોટીન સ્ત્રોત અને વેજીટેબલ ફેટ, ફેટ સ્રોત તરીકે ઉપયોગ કરી મોઝરેલા ચીઝ એનાલોગ ઉત્પાદનની આણંદ કૃષિ‍ યુનિવર્સિટી દ્રારા વિકસાવેલ ટેકનોલોજીની ભલામણ કરવામાં આવેછે. જે પીઝા ટોપીંગ માટે દૂધ આધારિત કુદરતી મોઝરેલા ચીઝથી ચઢિયાતી બેકિંગ લાક્ષણિકતાઓ ધરાવેછે. આ મોઝરેલા ચીઝ એનાલોગ કુદરતી ચીઝ કરતા ૨૨ટકા સસ્તી છે.  **(Action: Prof. & Head, DT, DSC, Anand)** | |
| 11.5.1.2 | **Studies on utilization of sweet cream buttermilk solids in the manufacture of frozen delicacies** | |
| The procedure developed for manufacture of acceptable quality *Kulfi*byAnand Agricultural University recommends replacing 20% of whole milk with sweet cream buttermilk (SCBM) and adopting vacuum pan concentration instead of open pan concentration.Use of SCBM to partly replace whole milk led to reduction in the raw material cost by 7%. | |
| આણંદ કૃષિ‍ યુનિવર્સિટી દ્વારા કુલ્ફીના ઉત્પાદન માટે પ્રક્રિયા વિકસાવવામાં આવેલ છે. જેમાં કુલ્ફી બનાવવા દૂધમાં ૨૦% સ્વીટક્રીમ બટર મીલ્કનો ઉપયોગ તથા ઓપન પાન સંકેન્દ્રણ પધ્ધતિની સરખામણીમાં વેક્યુમ પાન સંકેન્દ્રણ પધ્ધતિનો ઉપયોગ કરવાથી કુલ્ફીમાં સંતોષકારક ગુણવત્તાની સાથેસાથે રોમટેરીયલની કિંમતમાં ૭% નો ઘટાડો મેળવી શકાય છે.  **(Action: Prof. & Head, DT, DSC, Anand)** | |
| 11.5.1.3 | **Iron Fortification in *Kulfi*** | |
| It is recommended to prepare acceptable quality iron fortified *kulfi* by addition of ferric ammonium citrate (30 ppm iron) just before freezing of *kulfi* mix and the product was acceptable up to 90 days at -18±2°C. | |
| સ્વીકાર્ય ગુણવત્તાવાળી આયર્ન ફોર્ટિફાઇડ કુલ્ફી ફેરિક એમોનિયમ સાઇટ્રેટ (૩૦પીપીએમઆયર્ન) ફ્રીજીંગ પહેલાં ઉમેરીને બનાવવાની ભલામણ કરવામાં આવે છે. આ કુલ્ફી-૧૮±૨° સે તાપમાને ૯૦ દિવસ સુધી જાળવી શકાય છે.  **(Action: Prof. & Head, DT, DSC, Anand)** | |
| 11.5.1.4 | **Preparation of ‘*Choco-cheese*’ Ice cream** | |
| Acceptable ‘*Choco-cheese*’ ice cream can be produced utilizing processed cheese shreds coated with chocolate syrup as flavouring and utilizing ‘cheese flavour’ as background flavouring according to the method developed at AAU, Anand. | |
| આણંદ કૃષિ‍ યુનિવર્સિટી,આણંદ દ્વારા વિકસાવવામાં આવેલ પદ્ધતિ અનુસાર ચોકલેટ સીરપ સાથે લેપિત પ્રોસેસ્ડ ચીઝ શ્રેડ અને સ્વાદ તરીકે 'ચીઝફ્લેવર' ના ઉપયોગથી સ્વીકાર્ય 'ચોકો-ચીઝ' આઇસક્રીમ બનાવવાની ભલામણ કરવામાં આવે છે.  **(Action: Prof. & Head, DT, DSC, Anand)** | |
| 11.5.1.5 | **Standardization of formulations for preparation of ice candy type frozen product using whey** | |
| The process technology developed by Anand Agricultural University, Anand is recommended for preparation of paneer whey candy by utilizing 70% whey. This candy had better quality than candy prepared from water. | |
| આણંદ કૃષિ‍ યુનિવર્સિટી,આણંદ દ્વારા વિકસાવેલ પનીર વ્હે કેન્ડી બનાવવા માટેની પધ્ધતિમાં ૭૦% પનીર વ્હે વાપરવાની ભલામણ કરવામાં આવેછે. આવી કેન્ડીની ગુણવત્તા પાણીમાંથી બનાવેલી કેન્ડી કરતાં સારી હોય છે.  **(Action: Prof. & Head, DC, DSC, Anand)** | |
| 11.5.1.6 | **Formulation of dried probiotic mix containing *Lactobacillus helveticus* MTCC 5463** | |
| A dried probiotic mix formulation of *Lactobacillus helveticus* MTCC 5463 (C) developed by AAU is recommended. It can be prepared by mixing it with L- ascorbic acid as reducing agent (R) and skim milk powder as bulking agent (B) in the ratio of C: R: B = 20: 20: 60 (w/w). The formulation when packed and stored in aluminium foil sachets showed shelf-life up to 18 months at 5±2°C (8.90 log cfu/g) and up to 2 months at 25±2°C (8.19 log cfu/g). | |
| લેક્ટોબેસિલસ હેલ્વેટીક્સ MTCC 5463 (C) નું પ્રોબાયોટીક પાઉડર મિશ્રણ બનાવવા માટે તેમાં એસ્કોર્બીક એસિડ(R) રીડયુસીંગ એજન્ટ અને સ્કીમ મીલ્ક પાઉડર (B) જથ્થા વર્ધક તરીકે C:R:B=૨૦:૨૦:૬૦(W/W)ના પ્રમાણમાં ભેળવવાની ભલામણ છે. સદર મિશ્રણ જ્યારે એલ્યુમિનિયમ વરખ પેકેટમાં સંગ્રહિત રાખીયે તો, ૫±૨oસે તાપમાને ૧૮ મહિના સુધી (8.90log cfu/g) તથા ૨૫±૨oસે તાપમાને ૨મહિના સુધી (8.19 log cfu/g) જાળવી શકાય છે.  **(Action: Prof. & Head, DM, DSC, Anand)** | |
| 11.5.1.7 | **Development of probiotic/*dahi*culture dosage forms - tablets, sachets, capsules** | |
| Entrepreneurs and dairy processors interested in manufacturing culture in appropriate dosage forms (tablets, capsules, sachets) are advised to adopt the technology developed by Anand Agricultural University, Anand. Such dosage form contains dahiculture and probiotic cultures as active ingredients, the live cells is >107cfu/g having a shelf life of 6 months at refrigerated temperature. For making fermented milk, one unit of dosage form, i.e., 1 sachet/1 capsule/1tablet of 300 mg as inocula per 100 ml of milk requires overnight incubation at 37⁰C. | |
| ઔદ્યોગિક સાહસિકો અને ડેરીપ્રોસેસર્સ જે યોગ્ય ડોઝ સ્વરૂપોમાં કલ્ચર ઉત્પાદનમાં રસ ધરાવે છે તેમના માટે આણંદ કૃષિ યુનિવર્સિટી,આણંદ દ્વારા દહીં કલ્ચર તેમજ પ્રોબાયોટીક કલ્ચરને ટીક્ડી,કેપ્સ્યુલ કે પડીકી જેવા સ્વરૂપમાં તબદીલ કરવાની ટેક્નોલોજી વિક્સાવવામાં આવી છે કે જેની સંગ્રહ ક્ષમતા રેફ્રીજરેટરના તાપમાને ૬ મહિના અને તેમાં પ્રતિગ્રામ ૧૦૭ કરતા વધારે જીંવત બેક્ટેરીયા જળવાઈ રહે છે. ૩૦૦ મી.ગ્રા. ની ૧ ટીકડી/કેપ્સ્યુલ/પડીકીને ૧૦૦ મીલી દૂધમાં મેળવી ૩૭૦સે તાપમાને રાખવાથી સારું ફરમેંટેડ મીલ્ક બનાવી શકાય છે.  **(Action: Prof. & Head, DM, DSC, Anand)** | |
| 11.5.1.8 | **Iron fortification of buttermilk and selected fermented dairy products** | |
| Acceptable quality iron fortified probiotic fermented milk can be manufactured by fortifying milk with ferric ammonium citrate (15 ppmiron) without adverse effect on probiotic count. The product has a keeping quality of 12 days when stored at 4+2oC. | |
| સ્વીકાર્ય ગુણવત્તાવાળું આયર્ન ફોર્ટિફાઇડ પ્રોબાયોટિક ફરમેંટેડ મિલ્કનું ફેરિક એમોનિયમ સાઇટ્રેટ (૧૫પીપીએમ આયર્ન) ઉમેરીને પ્રોબાયોટિક બેક્ટેરીયા પર પ્રતિકૂળ અસર વિના ઉત્પાદન કરી શકાય છે. આ ફરમેંટેડ મિલ્કને ૪±૨°સે તાપમાને ૧૨દિવસ સુધી જાળવી શકાય છે.  **(Action: Prof. & Head, DM, DSC, Anand)** | |
| 11.5.1.9 | **Drying behavior of carrots and its utilization in preparation of ethnic food products** | |
| Vacuum tray drying with blanching technique is recommended for drying of carrot (red variety) shreds over other methods of drying. Acceptable quality of carrot *halwa*can be prepared using dried carrot shreds. Dried carrot shreds can be stored for about five months in HDPE or metalized polyester film bags at ambient conditions. | |
| બ્લાન્ચિંગ ટેકનિક સાથે વેક્યૂમ ટ્રે સૂકવણી પદ્ધતિ ગાજર(લાલ)ના છીણને સૂકવવા માટે ભલામણ કરવામાં આવે છે. સૂકા ગાજરના છીણમાંથી સ્વિક્રુત ગુણવત્તા વાળો ગાજરનો હલવો બનાવી શકાયછે.સૂકા ગાજરના છીણને સામાન્ય વાતાવરણની પરિસ્થિતિમાં એચડીપીઇ અથવા મેટલાઈજ્ડ પોલિએસ્ટર ફિલ્મ બેગમાં લગભગ પાંચ મહિના માટે સંગ્રહ કરી શકાય છે.  **(Action: Prof. & Head, DE, DSC, Anand)** | |
| 11.5.1.10 | **Mechanization and optimization of parameters for the preparation of *Burfi* in multipurpose scraped surface heat exchanger** | |
| *Burfi*can be prepared from buffalo milk using modified Scraped Surface Heat Exchanger (SSHE) having spring loaded Teflon scraper blade. The operating conditions of the SSHE required are 2.5 kg/cm2 steam pressure, 30 rpm scraper speed, 30 kg loading per batch and 1 h 40 min time. The steam consumption during manufacturing of *Burfi* is 1.45 kg per kg of water evaporated and electricity consumption is 0.12 kWh per kg of product. | |
| ભેંસના દૂધમાંથી બરફી બનાવવા માટે સ્પ્રિંગ આધારીત ટેફલોનબ્લેડ ધરાવતા નવીનીક્રૃત સ્ક્રેપસ ર્ફેસ હીટ એક્સ્ચેન્જર (એસએસએચઇ) નો ઉપયોગ કરી શકાય છે. આ રીતે૧ કલાક અને ૪૦ મીનીટમાં બરફી બનાવવા માટે ૨.૫કિ.ગ્રા./ચો.સે.મી. વરાળ દબાણ, ૩૦આર.પી.એમ. સ્ક્રેપરસ્પીડ અને એક બેચમાં ૩૦કિ.ગ્રા. દૂધનો જથ્થો લેવામાં આવે છે. આ સ્ક્રેપસર્ફેસ હીટ એક્સ્ચેન્જરમાં બરફી બનાવતી વખતે દૂધમાંથી ૧કિ.ગ્રા. પાણી બાષ્પીભવન કરવા ૧.૪૫કિ.ગ્રા. વરાળ વપરાય છે જ્યારે ૧કિ.ગ્રા. બરફી બનાવવા ૦.૧૨યુનીટ (kWh) વીજળીનો વપરાશ થાય છે.  **(Action: Prof. & Head, DE, DSC, Anand)** | |
| 11.5.1.11 | **Bottle gourd based blended juice** | |
| The entrepreneurs and food processors interested in production of bottle gourd based blended juice are advised to use technology developed by Anand Agricultural University. Developed technology involves blanching, formulation, thermal processing and storage stability. The technology enables production of blended juice from bottle gourd, aonla, lemon and ginger without addition of chemical preservatives. The formulated product can be stored up to 180 days under ambient conditions. | |
| ઉદ્યોગકારો અને સાહસિકોને આણંદ કૃષિ યુનિવર્સિટી દ્વારા વિકસાવવામાં આવેલ દૂધીના બ્લેન્ડ જ્યુસ ઉત્પાદન અંગેની ટેકનોલોજીનો ઉપયોગ કરવાની ભલામણ કરવામાં આવે છે. વિકસીત ટેકનોલોજીમાં બ્લાંચીંગ, ફોર્મ્યુલેશન, થર્મલ પ્રોસેસીંગ અને સ્ટોરેજ સ્ટેબીલીટીનો સમાવેશ થાય છે. આ ટેકનોલોજી થકી દૂધી, આમળા, લીંબુ અને આદુના બ્લેન્ડ જ્યુસનું ઉત્પાદન કોઈ પણ જાતના રાસાયણિક પ્રિઝર્વેટીવ ઉમેર્યા સિવાય થઇ શકે છે. આ રીતે તૈયાર થયેલ બ્લેન્ડ જ્યુસની સંગ્રહશક્તિ સામાન્ય તાપમાને ૧૮૦ દિવસ સુધીની હોય છે.  **(Action: Prof. & Head, PHE, FPT & BE, Anand)** | |
| 11.5.1.12 | **Ohmic heating system for thermal processing of papaya pulp** | |
| The entrepreneurs and fruit pulp processors interested in preservation of papaya pulp are advised to use ohmic heating processing technology developed by Anand Agricultural University. The processing technology showed that the ohmic processed pulpcould retain better nutrients,was stable and acceptable upto 84 days of storage under refrigerated condition at 7±2°C. | |
| પપૈયાના પલ્પના પરિરક્ષણમાં રસ ધરાવતા ઉધોગસાહસિકો અને ફ્ળોના પલ્પનાં ઉત્પાદકોને આણંદ  કૃષિ  યુનિવર્સિટી  દ્વારા વિકસાવેલ ઓમીંક હીટીંગ પ્રક્રીયાનો ઉપયોગ કરવાની સલાહ છે. આ પ્રક્રીયાથી બનાવેલ પલ્પમાં વધારે પોષક તત્વો જાળવી શકાય છે અને રેફ્રીજરેટેડ (૭±૨0C) તાપમાને ૮૪ દિવસ સુધી ગુણવતા સાથે જાળવણી કરી શકાયછે.  **(Action: Prof. & Head, FE, FPT & BE, Anand)** | |
| 11.5.1.13 | **Starter cultures for the production of superior quality *Idli*** | |
| The entrepreneurs and producers interested in production of uniform quality *Idli*batterare advised to use combination of *Lactobacillus rhamnosus* MTCC 5462 + *Leuconostocmesenteroides* 029 + *Candida versatilis* NCIM 3431 + *Saccharomyces cerevisiae* starter cultures suggested by Anand Agricultural University for the controlled fermentation of *idli* batter. | |
| એક સરખી ગુણવતાવાળી ઈડલીનું ખીરું બનાવવામાં રસધરાવતા ઉધોગસાહસિકો અને ઉત્પાદકોને આણંદ કૃષિ યુનિવર્સિટી દ્વારા ઈડલી ખીરા માટે વિકસાવેલ ખાસ મેળવણ દ્વારા આથવણ કરી ખીરું બનાવવાની તકનીકનો ઉપયોગ કરવાની ભલામણ કરવામાં આવે છે.  **(Action: Prof. & Head, FQA, FPT & BE, Anand)** | |
| 11.5.1.14 | **Antioxidants for the keeping quality of fried banana chips** | |
| Food entrepreneurs interested in manufacturing banana chips are recommended to add Tertiary Butyl Hydro Quinone (TBHQ) as antioxidant in frying oil as suggested by Anand Agricultural University and advised to pack in MetPET pouches to enhance its shelf life by 4 weeks. | |
| કેળાની ચિપ્સના ઉત્પાદનમાં રસ ધરાવતા ઉધોગસાહસિકો અને ઉત્પાદકોને તળવાના તેલમાં ટી.બી.એચ.કયું.એન્ટિઓક્સીડન્ટ ઉમેરવાની ભલામણ કરવામાં આવે છે. આ રીતથી તળેલ કાતરીને મેટપેટ પાઉચમાં પેક કરવાથી આશરે ૪ અઠવાડિયા સુધી વધારે સંગ્રહી શકાય છે.  **(Action: Prof. & Head, FQA, FPT & BE, Anand)** | |
| 11.5.1.15 | **Super critical fluid extraction of essential oils from ginger and turmeric** | |
| The entrepreneurs and food processors interested in production of volatile oils from ginger and turmeric are advised to use supercritical extraction technology developed by Anand Agricultural University. This technology involves better recovery of volatile oils using blanching, slicing, drying, sieving and supercritical fluid extraction at controlled pressure and temperature. The process results in better quality essential oils as compared to conventional extraction methods. | |
| આદુ અને હળદર માંથી વોલેટાઈલ ઓઈલના ઉત્પાદનમાં રસ ધરાવતા ઉધોગ સાહસિકો અને ઉત્પાદકોને આણંદ કૃષિ યુનિવર્સિટી દ્વારા વિકસાવેલ સુપરક્રીટીકલ એકસ્ટ્રેકશન તકનીકનો ઉપયોગ કરવાની સલાહ આપવામાં આવેછે. આ તકનીકમાં વધારે વોલેટાઈલ ઓઈલ મેળવવા માટેની બ્લાન્ચીંગ, સ્લાઈસીંગ, સુકવણી, ચાળણી અને નિયંત્રિત પ્રેસર અને તાપમાન પર સુપરક્રીટીકલ ફલુઈડએકસ્ટ્રેકશન બાબતનો સમાવેશ કરેલ છે. આ પ્રક્રીયાથી પરંપરાગત એકસ્ટ્રેકશનની રીત કરતા ઉત્તમ ગુણવતાવાળુ એસેંશીયલ ઓઈલ પ્રાપ્ત કરી શકાય છે.  **(Action: Prof. & Head, FQA, FPT & BE, Anand)** | |
| 11.5.1.16 | ***Kajukatli* with artificial sweetener/s** | |
| The sugar free *kajukatli* can be prepared satisfactorily using artificial sweetener sucralose and bulking agent,isomalt by using technology developed by Anand Agricultural University. | |
| બલ્કિંગ એજંટ તરીકે આઇસોમાલ્ટ અને કૃત્રિમ સ્વીટનર સુક્રાલોઝનો ઉપયોગ કરીને આણંદ કૃષિ યુનિવર્સિટી ટેકનોલોજી દ્વારા સુગર ફ્રી કાજુકતલી સંતોષકારક રીતે બનાવી શકાય છે.  **(Action: Prof. & Head, FQA, FPT & BE, Anand)** | |
| 11.5.1.17 | **Development of nutri-rich health bar** | |
| The bakery industry and entrepreneurs interested in production of nutritious “Health Bar” using oat, barley and whole wheat flour as well as selected nuts and honey are advised to adopt the formula and procedure developed by Anand Agricultural University. The product packed in aluminium foil has a storage life of about 2 months at ambient temperature. | |
| બેકરી વાનગીઓના ઉત્પાદકો અને ઉદ્યોગ સાહસિકોને આણંદ કૃષિ યુનિવર્સિટી દ્વારા ઓટ,જવ અને ઘઉંનો લોટ તેમજ સુકા મેવા અને મધનો ઉપયોગ કરી વિકસાવવામાં આવેલ પૌષ્ટિક “હેલ્થબાર”ના ઉત્પાદન અંગેની ટેકનોલોજીનો ઉપયોગ કરવા ભલામણ કરવામાં આવે છે. આ હેલ્થ બાર સામાન્ય વાતાવરણમાં એલ્યુમિનિયમ ફોઇલમાં ૨મહિના સુધી સંગ્રહી શકાય છે.  **(Action: Prof. & Head, PFSHE, FPT & BE, Anand)** | |
| 11.5.1.18 | **Low cost millet based supplementary food** | |
| A millet based supplementary mix developed by Anand Agricultural University is nutritionally rich. Supplementary mix of 100 gper day is recommended to meetpartlythe nutritional requirement of infants. The product can be stored for 4 months under ambient conditions. | |
| આણંદ કૃષિ યુનિવર્સિટી દ્વારા ધાન્ય માંથી વિકસાવેલ પૂરક આહાર સારૂ પોષણ મૂલ્ય ધરાવે છે. નવજાત શિશુના રોજિંદા પોષણની કેટલીક જરૂરિયાત સંતોષવા માટે દૈનિક ૧૦૦ ગ્રામ પુરક આહારની ભલામણ કરવામાં આવે છે. સામાન્ય વાતાવરણમાં આપુરક આહારને ૪ મહિના સુધી સંગ્રહી શકાય છે.  **(Action: Prof. & Head, PFSHE, FPT & BE, Anand)** | |
| 11.5.1.19 | **Performance evaluation of different sowing methods for *rabi*maize (GM-3)** | |
| Farmers of middle Gujarat region are recommended to use tractor drawn multi crop planter having inclined plate type seed metering mechanism and 60 cm row to row distance for sowing of *rabi* maize crop to save time (@ 60 man-hours/ha ) and cost ( @ 67.9% ) as compared to manual dibbling. | |
| મધ્ય ગુજરાત વિસ્તારના ખેડૂતો માટે ટ્રેકટરથી ચાલતાં તિરછીપ્લેટવાળા બીજ મીટરિંગ મેકનીઝમ અને ૬૦ સે.મી.ના બે ચાસ વચ્ચેના અંતરે રવી મકાઈની વાવણી કરવામાટે મલ્ટીક્રોપ પ્લાન્ટર ઉપયોગમાં લેવા માટે ભલામણ કરવામાં આવે છે, જેનાથી હાથ વડે કરવામાં આવતા ડીબલીંગની સરખામણીમાં સમયમાં પ્રતિ હેકટરે ૬૦ માનવ કલાકો અને ખર્ચમાં ૬૭.૯ ટકાની બચત થાય છે.  **(Action: Prof. & Head, Department of FMPE, CAET, AAU, Godhra)** | |
| 11.5.1.20 | **Fertilizer dose recommendation for the Web Based Soil Health Card Portal (Adding one new module to existing application)** | |
| Soil Health Card portal developed by Anand Agricultural University is recommended for use of farmers of Gujarat, who are interested to supplement Nitrogen, Phosphorus and Potash (NPK) through use of urea, DAP and MOP fertilizers. | |
| આણંદ કૃષિ યુનિવર્સિટી દ્વારા બનાવવામાં આવેલ જમીન આરોગ્ય પત્રક પોર્ટલ દ્વારા નાઈટ્રોજન, ફોસ્ફરસ અને પોટાશ તત્વોને યુરિયા, ડીએપી અને મ્યુરેટ ઓફ પોટાશ ખાતર દ્વારા પૂર્તિ કરવા ઈચ્છતા ખેડૂતોને જમીન આરોગ્ય પત્રક પોર્ટલનો ઉપયોગ કરવા ભલામણ કરવામાં આવે છે.  **(Action: Director of IT, ITC, AAU, Anand)** | |
| **Junagadh Agricultural University** | | |
| 11.5.1.21 | | **Impact of irrigation regimes and mulching on the economic productivity of drip irrigated cotton** |
| Farmers of South Saurashtra Agro-climatic Zone growing Bt. Cotton are advised to adopt drip irrigation (with 1.2m lateral spacing, 40cm dripper spacing and emitter discharge of 2 lph) in raised bed covered with silver black plastic mulch of 20 micron and irrigate every alternate day at 0.8ETc level (or to operate system for 2 to 3.5hrs, 2.25 to 3.25 hrs and 1.25 to 3hrs during September-October, November-December and January respectively) for acquiring higher yield (33%) and water use efficiency (79%), higher water productivity (91%) and higher net return over no mulch. |
| દક્ષિણ સૌરાષ્ટ્ર ખેત આબોહવાકીય વિસ્તારના ખેડૂતોને ભલામણ કરવામાં આવે છે કે, બીટી કપાસના વાવેતરમાં ટપક પિયત પધ્ધતિ (બે લેટરલ વચ્ચેનું અંતર: ૧.૨મી, ડ્રીપર વચ્ચેનું અંતર: ૪૦ સે.મી., ડ્રીપર ડીસ્ચાર્જ: ૨ લીટર/કલાક) સાથે બેડ બનાવી તેના ઉપર ૨૦ માઈક્રોનનું સિલ્વર કાળું પ્લાસ્ટિક પાથરી તેને એકાંતરે દિવસે ૦.૮ ઈટીસી લેવલે (અથવા સપ્ટેમ્બર-ઓક્ટોબર માસમાં ૨-૩.૫ કલાક, નવેમ્બર-ડીસેમ્બર માસમાં ૨.૨૫-૩.૨૫ કલાક અને જાન્યુઆરી માસમાં ૧.૨૫-૩કલાક) ચલાવવાથી મલ્ચીંગ વગરના કપાસની સરખામણીમાં વધુ ઉત્પાદન (૩૩%), પાણી વપરાશની કાર્યક્ષમતા (૭૯%) તથા પાણીની ઉત્પાદકતા (૯૧%) તેમજ વધારે આવક મેળવી શકાય છે.  **(Action: Centre of Excellence on Soil & Water Management, RTTC, JAU, Junagadh)** |
| 11.5.1.22 | | **Extraction of Pectin from Kesar Mango Peel by Resins** |
| Mango processors are recommended to adopt a process technology developed by Junagadh Agricultural University for the production/extraction of pectin from mango peel using cation exchange resin as an extracting medium with peel to extracting medium ratio of 1:4, extraction pH of 2.56, extraction temperature of 80 °C, extraction time of 60 min and two extractions. This method can give better yield and quality of pectin with benefit cost ratio (BCR) of 1.17. |
| કેરીનું પ્રોસેસીંગ કરતા પ્રોસેસરોને કેરીની છાલમાંથી પેકટીન મેળવવા માટે જૂનાગઢ કૃષિ યુનિવર્સિટી દ્વારા વિકસાવવામાં આવેલ પધ્ધતિથી, કેટાયન એક્ષચેન્જ રેઝીનનો એકસટ્રેકશન માધ્યમ તરીકે ઉપયોગ કરી, છાલ તથા નિષ્કર્ષણ માધ્યમનું પ્રમાણ ૧:૪, પી.એચ. આંક ર.પ૬ અને નિષ્કર્ષણ પ્રક્રિયા દરમિયાનનું તાપમાન ૮૦°સે જાળવી ૬૦ મિનિટ સુધી બે વખત આ પ્રક્રિયા કરવાની ભલામણ કરવામાં આવે છે. આ પધ્ધતિથી સારી ગુણવત્તા ધરાવતા પેકટીનનું વધુ ઉત્પાદન મેળવી શકાય છે, જેમાં લાભ અને ખર્ચનો ગુણોતર ૧.૧૭ મળે છે.  **(Action: AICRP on Post-Harvest Technology Scheme, CAET, JAU, Junagadh)** |
| 11.5.1.23 | | **Storage study of wheat harvested by Combine Harvester** |
| The recommendation was approved in Plant Protection group; hence it is deleted from here. |
| **(Action: AICRP on Post-Harvest Technology Scheme, CAET, JAU, Junagadh)** |
| 11.5.1.24 | | **Development and performance evaluation of low cost greenhousefertigation irrigation system** |
| The green house / net house growers are advised to use low cost greenhousefertigation system developed by Junagadh Agricultural University to apply fertilizer through drip irrigation as well as interested manufacturers are recommended for manufacturing this system. |
| ગ્રીનહાઉસ / નેટહાઉસ આધારિત ખેતી કરતા ખેડૂતોને ટપક પદ્ધતિથી ખાતર આપવા માટે જુનાગઢ કૃષિ યુનિવર્સિટી દ્વારા વિકસાવવામાં આવેલ લો કોસ્ટ ગ્રીનહાઉસ ફર્ટિગેશન સીસ્ટમનો ઉપયોગ કરવાની ભલામણ કરવામાં આવે છે. તદઉપરાંત રસ ધરાવતા ઉત્પાદકોને આ સીસ્ટમનાં ઉત્પાદન હેતુ પણ ભલામણ કરવામાં આવે છે.  **(Action: Prof. & Head,Department of RE & RE, CAET, JAU, Junagadh)** |
| 11.5.1.25 | | **Studies on microclimate and plant growth of capsicum under different type of Shade net** |
| The farmers of South SaurashtraAgroclimaticZone are recommended to adopt white coloured 50% shade nethouse for cultivation of capsicum. This type of nethouse results in early production approximately 10-12 days, protection from insects/pests, diseases and higher yield of capsicum as compared to use of green, black and blue coloured shade nethouse. |
| દક્ષિાણ સૈારાષ્ટ્ર કૃષિ આબોહવાકીય વિસ્તારનાં કેપ્સીકમ (શીમલા મીર્ચ) ઉગાડતા ખેડુતોને સફેદ કલરના પ૦ ટકા શેડવાળા નેટહાઉસ વાપરવાની ભલામણ કરવામાં આવે છે. આ પ્રકારનાં નેટહાઉસ વાપરવાથી અંદાજીત ૧૦-૧ર દિવસ પાકનું વહેલું ઉત્પાદન આવે છે, રોગ-જીવાતથી પાકનું રક્ષણ થાય છે તેમજ લીલા, કાળા અને ભુરા કલરનાં નેટહાઉસ કરતા વધુ ઉત્પાદકતા મેળવી શકાય છે.  **(Action: Prof. & Head,Department of RE & RE, CAET, JAU, Junagadh)** |
| 11.5.1.26 | | **Effect of mulch and irrigation level by drip on water use efficiency and yield of water melon** |
| The farmers of South Saurashtra Agroclimatic Zone are advised to use silver black plastic mulch (20 µm) with drip irrigation at 0.6 ETclevel to achieve higher crop production of water melon in summer season.   |  |  |  |  | | --- | --- | --- | --- | | Details of mulching technology : | | Details of irrigation system : | | | 1. | Mulch film : 20 µm silver black plastic | 1.  2.  3.  4. | Lateral spacing : 180 cm  Dripper spacing : 40 cm  Dripper discharge : 2 lph  Irrigation scheduling :   1. Feb. : 20 to 45 min/day 2. March: 30 to 95 min/day 3. April : 70 to 105 min/day 4. May : 70 to 90 min/day | | 2. | Bed size :(a) Top width : 40 cm  (b) Bottom width : 70 cm  (c) Height : 30 cm | | 3. | No. of row per bed : 2 |  | | 4. | Spacing : (a) Bed spacing : 180 cm  (b) Row spacing : 20 cm  (c) Plant spacing : 40 cm |  | |
| દક્ષિણ સૈારાષ્ટ્ર કૃષિ આબોહવાકીય વિસ્તારના ખેડુતોને ઉનાળુ ઋુતુ દરમ્યાન તરબૂચના પાકનું વધુ ઉત્પાદન મેળવવા માટે ર૦ માઈક્રોન જાડાઈવાળી સીલ્વર બ્લેક કલરની પ્લાસ્ટીક મલ્ચનો ઉપયોગ કરી અને ૦.૬ ઈટીસી લેવલે ટપક પધ્ધતી દ્વારા પીયત આપવાની ભલામણ કરવામાં આવે છે.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | બેડ અને પ્લાસ્ટીક મલ્ચ અંગેની માહિતી : | | ટપક પધ્ધતિ અંગેની માહિતી : | | | | ૧ | પ્લાસ્ટીક ફિલ્મ : ર૦ માઈક્રોન સીલ્વર બ્લેક કલર | ૧  ર  ૩  ૪ | લેટરલનુ અંતર : ૧૮૦ સે.મી.  ડ્રીપરનુ અંતર : ૪૦ સે.મી.  ડ્રીપર ડિસ્ચાર્જ રેઈટ : ર લીટર/કલાક  ડ્રીપ ચલાવવાનો સમય :  અ. ફેબ્રુઆરી: ર૦ થી ૪પ મીનીટ/દિવસ  બ. માર્ચ: ૩૦ થી ૯પ મીનીટ/દિવસ  ક.એપ્રિલ: ૭૦ થી ૧૦પ મીનીટ/દિવસ  ડ. મે: ૭૦ થી ૯૦ મીનીટ/દિવસ | | ૨ | બેડનું માપ :  અ. ઉપરની પહોળાઈ : ૪૦ સે.મી.  બ. નીચેની પહોળાઈ : ૭૦ સે.મી.  ક. ઉચાઈ : ૩૦ સે.મી. | | ૩ | પ્રતિ બેડ હારની સંખ્યા : ર |  | | ૪ | અંતર :  અ. બેડનું અંતર : ૧૮૦ સે.મી.  બ. બે હાર વચ્ચેનું અંતર : ર૦ સે.મી.  ક. બે છોડ વચ્ચેનું અંતર : ૪૦ સે.મી. |  |   **(Action: Prof. & Head,Department of RE & RE, CAET, JAU, Junagadh)** |
| **Navsari Agricultural University** | | |
| 11.5.1.27 | | **Preparation of ready to serve (RTS) beverage from banana pseudostem sap** |
| House suggested to present this recommendation next year after incorporating following suggestions next year   1. Ingredients combinations should have been used at a time in all treatments. 2. Vitamin C, PH, TSS should be reassessed. 3. Thermal process parameters require optimization.   **(Action: I/c, CE on PHT, Navsari)** |
| 11.5.1.28 | | **Study of effect of drainage on banana production in South Gujarat** |
| House suggested to present this recommendation in next year after incorporating following suggestions   1. Surface drainage coefficient for banana is to be calculated. 2. Amount of runoff to be given based on rainfall to design the trench. 3. Trench detail design is to be provided.   (**Action: I/c Prof. & Head, Dept. of Agril. Engg., NMCA, Navsari)** |
| 11.5.1.29 | | **Effect of laser leveling on crop water requirement and growth of castor crop** |
| House suggested to present this recommendation in next year after incorporating following suggestions   1. Leveling index is to be defined 2. Slope recommended should be matched with the slope or border irrigation design   **(Action: I/c Prof. & Head, Dept. of Agril. Engg., NMCA, Navsari)** |
| 11.5.1.30 | | **Study on levels of nitrogen and intra-row spacing on yield of drip irrigated castor (*rabi***) |
| The recommendation was approved in Crop Production group; hence it is deleted from here.  **(Action: Research Scientist, SWMRU, Navsari)** |
| 11.5.1.31 | | **Design, development and evaluation of biomass based cook stove** |
| Design of funnel shaped cooked stove developed by NavsariAgricultural University is recommended to rural artisans, manufacturers and general public for community cooking of 60-70 number of meal using dry wood branches, which can reduce the fuel consumption by 3.97 kg/hr with average thermal efficiency of 20.19 % as compared to three bricks cooking chulha system. |
| સુકા જલાઉ લાકડાનો ઉપયોગ કરી ૬૦-૭૦ થાળી સામુદાયીક રસોઈ બનાવવા નવસારી કૃષિ યુનીવર્સીટીધ્વારા તૈયાર કરેલ નળીયા આકારના રસોઈ ચુલા વાપરવાની ભલામણ ગ્રામ્ય કારીગરો,ઉત્પાદન કર્તાઓ અનેપ્રજા માટેકરવામાં આવે છે. આમ કરવાથી ત્રણ ઈંટ રસોઈ ચૂલ્હાની સરખામણીમાં ૩.૯૭ કિ.ગ્રા/કલાક ઈંધણની બચતની સાથે ર૦.૧૯ % ઉષ્મા ઉપયોગ ક્ષમતા મળે છે.  **(Action: Dean, CAET,Dediapada)** |
| 11.5.1.32 | | **Development and evaluation of low cost solar still** |
| House suggested to present this recommendation next year after incorporating following suggestions   1. Higher transmittance covering material should be used. 2. Change the shape giving more surface area facing the sun.   **(Action: Dean, CAET,Dediapada)** |
| **Sardarkrushinagar Dantiwada Agricultural University** | | |
| 11.5.1.33 | | **Development of value added kalakand using papaya fruit** |
| The programme is to be presented next year with incorporation of value adding parameters.  **(Action: Prof. & Head, LPT Dept., Veterinary College, SDAU, Sardarkrushinagar)** |

**B. Scientific Community**

|  |  |  |
| --- | --- | --- |
| **Anand Agricultural University** | | |
| 11.5.1.34 | **Energy assessment in onion dehydration plant** | |
| The cost of production of the dehydrated onion products largely depends upon the consumption of electricity during processing. An onion dehydration plant producing onion powder, onion kibbled and granulated dehydrated onion units are advised to carry out energy audit of their plants frequently and are advised to follow the electrical energy conservation measures like (i) frequent maintenance of existing machines, (ii) avoiding higher HP units than required.  **(Action: Prof. & Head, FE, FPT & BE, Anand)** | |
| 11.5.1.35 | **Comparative study on various drying techniques of cluster bean** | |
| The scientists working in thin layer drying are advised to use following Midilli model (a = 0.97892, k=0.00422, n=1.04471, b=1.16502) as compared to Lewis, Hendersons and Pabis, Modified Hendersons and Pabis, Logarithmic, Two-term, Verma, Page, Parabolic, Weibull and Wang and Singh to predict the moisture ratio of vegetable cluster bean.  **(Action: Prof. & Head, PAE, AAU, Dahod)** | |
| 11.5.1.36 | **Investigation on Spatial & Temporal Variability of Infiltration under Real Field Conditions** | |
| Based upon experimental findings, the Horton’s and Kostiakov’sinfiltrationmodelsare recommended as best choices for use by Hydrologist/Watershed Managers/NGO’s and Command area/ Irrigation Engineers respectively for predicting soil infiltration rates (mm/hr) in middle Gujarat region. The regionalised parametric values of models are given below, which could be utilized for alike ungauged locations in the region.   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Soils/Test Location | | Horton’s Model  *f = fc + (f0-fc)\*e-k\*t* | | | | Kostiakov’s Model  *f = α .c . t α-1* | | | | Soils | Test locations | *f0* | *fc* | *k* | *Eff (%)* | α | *c* | *Eff (%)* | | Clay loam (Red) | *Vadodara* (Khanda, Mangrol, Atali, Bodaka, Handod, Ganpatpur, Sankheda, Bhildar, Novar, Jambusar, Kadana, Khank)  *Panchmahal*(Godhra, Parvadi, Kotda, Chanchopa, Kansudi, Kakanpur, Thambhia, Aerandi, Dholakuva)  *Dahod*(Zalod, Chotrodiya, Thekra, Dhevadiya)  *Kheda* (Radhu, Kathvada, Mahiji) | 224.2 | 54.9 | 2.67 | 73 | 0.67 | 119 | 85 | | Sandy loam (Medium black) | *Vadodara* (Bhilapur, Dhabhoi, Bhilodiya, Asodara, Koked, Navapur, Sankheda, Ambapura, Bhatpur, Dhardi, Ganeshvad)  *Anand* (Khabhoraj, Boriavi, Vadod, Vasad, Napad)  *Panchmahal* (Kakanpur, Padhiyar, Kaniyanamuvada, Harinamuvada, Andaranamuvada) | 246.4 | 35.7 | 8.84 | 86 | 0.54 | 70.6 | 86 | | Loamy Sand (Black-Goradu) | *Dahod* (Pethapur, Ghamdi, Vagela, Chakaliya, Mundaheda, Vasiya, Karanba, Varod, Bajarvada)  Gandhinagar (Zak, Vadod, Bahiyal, Karoli) | 127 | 39.1 | 2.27 | 83 | 0.71 | 79.8 | 70 |   **(Action: Prof. & Head, Department of SWE, CAET, AAU, Godhra)** | |
| 11.5.1.37 | **Performance evaluation of canal irrigation in Panchmahal and Vadodara area** | |
| Irrigation managers, engineers and canal scheduling co-operatives of command areas of Middle Gujarat region are advised to adopt deficit irrigation concept to mitigate the gap between supply and demand as the prevailing canal performance indices viz. adequacy, dependability, equity and efficiency, vary in the range of 0.69 – 0.81, 0.28 – 0.49, 0.29 – 0.44 and 0.79 – 0.95 respectively. For enhancing canal performance, suitable remedial measures are recommended because the command area in study region yields relatively less annual groundwater recharge, in the range from 246 to 704 mm with an average value of 463 mm. The recharge rate in the region could be taken in the range of 0.0007 – 0.0019 m/d with an average of 0.001 m/d.  **(Action: Prof. & Head, SWE, CAET, AAU, Godhra)** | |
| 11.5.1.38 | **Development of Online Objective/MCQ examination for students ofAnandAgricultural University** | |
| Web based Online examination system is recommended for use at the State Agricultural Universities as it is easy to use,transparent,time saving and user friendly for faculties as well as students.**(Action: Director of IT, ITC, AAU, Anand)** | |
| **Junagadh Agricultural University** | | |
| 11.5.1.39 | | **The Impact of Seawater Intrusion on the Qualitative Parameter of Ground Water** |
| |  |  |  |  | | --- | --- | --- | --- | | SN | Costal belt region | Best fit model | R2 | | 1 | 0-5 km | ECPM = 0.6364(ECbm) -0.00166(RF) +2.9495 | 0.83 | | 2 | 5-10km | ECPM = 0.6965(ECbm)-0.000359(RF)+1.2837 | 0.64 | | 3 | 10-15km | ECPM = 0.4171(ECbm)-0.000267(RF)+ 1.5592 | 0.64 | | 4 | 15-20km | ECPM = -0.3577(ECbm)-0.0000683(RF)+1.8636 | 0.82 | | ECbm and ECpm are the groundwater EC(dS/m) during pre and post monsoon, RF=monsoon rainfall(mm) | | | |   The following scientific information as models developed for rainfall and groundwater EC are released for the scientific communities/line departments of state/central governments/NGOs working in the coastal belts of the Saurashtra region.  **(Action: AICRP on Irrigation Water Mgt, Dept.of SWE, JAU, Junagadh)** |
| 11.5.1.40 | | **An assessment of suitability of groundwater for drip irrigation in Saurashtra region** |
| The following scientific information is released for the scientific community.   * The pH of the groundwater was observed higher (more than 7) in all districts of the Saurashtra region. The maximum ground water samples (99.14%) were found in category scale forming but non corrosive class. * Based on the EC, SAR and RSC of the groundwater, 56.24%, 18.4%, 6.64% and 18.68% samples were found under categories of good water, saline water, high SAR saline water and alkali water class respectively. * The hardness of the groundwater in Jamnagar, Rajkot, Surendranagar, Junagadh and Porbandar districts were varying from 9 to 177, 12 to 206, 12 to 292, 10 to 221 and 12-176 respectively.   **(Action: AICRP on Irrigation Water Mgt, Department of SWE, JAU, Junagadh)** |
| 11.5.1.41 | | **Performance of MIS in Canal Command Area** |
| Note: House suggested to continue the study for one more year and bring detailed analytical information.  **(Action: Post Graduate Diploma in Agri Business Managament, JAU, Junagadh)** |
| **Navsari Agricultural University** | | |
| 11.5.1.42 | | **Data Mining approach for improvement in co-operative operations: A case of Amalsad co-operative with special reference to Sapota value chain** |
| The software developed by NAU using Amalsad co-operative with special reference to Sapota value chain case study can be replicated for other co-operative societies of south Gujarat region trading in Sapota.  **(Action: Director of IT, NAU, Navsari)** |
| **Sardarkrushinagar Dantiwada Agricultural University** | | |
| 11.5.1.43 | | **Study on wetting pattern of trickle source in loamy sand soils** |
| In loamy sand soils of North Gujarat, it is recommended for the scientists to consider low capacity drippers (≤ 4 lph) to minimize deep percolation losses of irrigation water while designing drip system in field crops with dripper spacing of ≤ 50 cm.  **(Action: Research Scientist, Center for Watershed Mgmt. Participatory Research & Rural Engineering, Sardarkrushinagar)** |
| 11.5.1.44 | | **Study on roof water harvesting for ground water recharge** |
| In North Gujarat (AES-I) rainfall conditions, the roof water harvesting and ground water recharging are suggested for sustainability of ground water. The system for roof water harvesting using PVC conveyance system and percolation pit @ 0.0232 m3 capacity per m2 roof area can be constructed @ Rs. 102 / m2 roof area.  **(Action: Research Scientist, Center for Watershed Mgmt. Participatory Research & Rural Engineering, Sardarkrushinagar)** |
| 11.5.1.45 | | **Utilization of goat milk for preparation of value added indigenous milk products** |
| Goat milk Dahi with acceptabale sensory attributes can be prepared using 2% mixed dahi culture NCDC 167 (*Lactococus lactis* ssp *lactis*, *Lactococus lactis* ssp *cremoris*, *Lactococus lactis* ssp *diacetyl lactis* along with *Leuconostoc* ssp.) at 30°C for 12 hours. At refrigeration temperature (4±1°C), the product can be stored without affecting sensory quality up to 10 days.  **(Action: Prof. & Head, Dept. of LPT, College of Vety. Sc. and AH, Sardarkrushinagar)** |
| 11.5.1.46 | | **Studies on fresh and stored goat meat patties fortified with dietary fibres** |
| Fibre enriched goat meat patties can be prepared by incorporating 4 % Psyllium husk and using conventional electrical oven at 180°C for 15 min. Psyllium husk fortified meat patties had better sensory attributes as compared to 5 % wheat and barley bran fortified patties. Vacuum packaged product had better sensory scores compared to conventional packaged products up to 20 days of storage at Refrigeration temperature (4±1°C).  **(Action: Prof. & Head, Dept. of LPT, College of Vety. Sc. and AH, Sardarkrushinagar)** |
| 11.5.1.47 | | **Studies on chicken seekh kabab incorporated with citrus fruit by-products** |
| Good quality chicken seekh kabab can be prepared by using either 8% Mosambi or 4 % orange (pomace and juice mixture). Vacuum packaged product had better sensory scores compared to conventional packaged products up to 18 days of storage at refrigeration temperature (4±1°C).  **(Action: Prof. & Head, Dept. of LPT, College of Vety. Sc. and AH, Sardarkrushinagar)** |

**11.5.2 New Technical Programmes**

**Anand Agricultural University**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No.** | **Centre/Title** | **Suggestions** | **Remarks** |
| 11.5.2.1 | **Centre: SMC College of Dairy Science, Anand** | | |
| Title: Study on use of *Mulberry in* development of Natural Ice cream | Approved with following suggestion/s:   1. Rate of addition of mulberry, treatment and procedure to be included.   (**Action: Prof. & Head, DT, DSC, Anand** ) | - |
| 11.5.2.2 | Comparative appraisal of physical, chemical, instrumental and sensoryevaluation methods for monitoring oxidative deterioration of ghee | Approved with following suggestion/s:   1. Incorporate sampling plan for ghee.   **(Action: Prof. & Head, DC, DSC, Anand)** | - |
| 11.5.2.3 | Development of methods for detection of adulteration in Milk and Milk Products | House approved the project.  **(Action: Prof. & Head, DC, DSC, Anand)** | - |
| 11.5.2.4 | Utilization of paneer whey in cultured buttermilk | Approved with following suggestion/s:   1. Include PET bottle along with glass bottle as packaging material.   **(Action: Prof. & Head, DC, DSC, Anand)** | - |
| 11.5.2.5 | Preparation of ghee from camel milk and evaluation ofshelf life | Approved with following suggestion/s:   1. In sensory analysis of ghee, body and texture parameter need to be incorporated.   **(Action: Prof. & Head, DC, DSC, Anand)** | - |
| 11.5.2.6 | Engineering interventions for commercial production of *‘kheer&doodhpak’* | House approved the project.  (**Action: Prof. & Head, DE, DSC, Anand)** | - |
| 11.5.2.7 | Process re-engineering for the manufacture of '*shrikhand'* | House approved the project.  (**Action: Prof. & Head, DE, DSC, Anand)** | - |
| 11.5.2.8 | Energy efficient innovative process for manufacture of long-life *‘carrot halwa*& *bottle gourd halwa’* | Approved with following suggestion/s:   1. Simplify the title as “Development of commercial process for manufacture of *‘carrot halwa*& *bottle gourd halwa*”*.* 2. Include the carrot variety fromJunagadh, if feasible.   (**Action: Prof. & Head, DE, DSC, Anand)** | - |
| 11.5.2.9 | Optimization of biomass production for probiotic *Lactobacillus helveticus* MTCC 5463 | House approved the project.  (**Action: Prof. & Head, DM, DSC, Anand)** | - |
| 11.5.2.10 | Development of value added fermented milk containing drumstick | Approved with following suggestion/s:   1. Include two more dairy products i.e. ice cream and buttermilk. 2. The revised title is “Development of value added buttermilk, dahi and ice cream containing drumstick”.   (**Action: Prof. & Head, DM, DSC, Anand)** | - |
| 11.5.2.11 | Evaluation of bacterial culture for treatment of dairy effluent | House approved the project.  (**Action: Prof. & Head, DM, DSC, Anand)** | - |
| 11.5.2.12 | Bio-prospecting of lactic cultures from north-eastern regions to develop  functional fermented soya foods with potential health benefits | House approved the project.  (**Action: Prof. & Head, DM, DSC, Anand)** | - |
| 11.5.2.13 | **Centre: FPT & BE, Anand** | | |
| Development of whey based RTS fruit beverage from musk melon and lemon | House approved the project.  **(Action:Prof. & Head, PHE, FPT & BE, Anand)** | - |
| 11.5.2.14 | Design and development of SSHE for *kajukatli*manufacturing | House approved the project.  **(Action: Prof. & Head, FE, FPT& BE, Anand)** | - |
| 11.5.2.15 | Ohmic heating of mango pulp | House approved the project.  **(Action: Prof. & Head, FE, FPT& BE, Anand)** | - |
| 11.5.2.16 | Design and development of DELTA robot for handling of food products | House approved the project.  **(Action: Prof. & Head, FE, FPT & BE, Anand)** | - |
| 11.5.2.17 | Study on water use and conservation in food industry | Approved with following suggestion/s:   1. Category of target industry and capacity need to be incorporated. 2. Revised title as “Study on effective water utilization in food industry”.   **(Action: Prof. & Head, FE, FPT & BE, Anand)** | - |
| 11.5.2.18 | Super critical fluid extraction of oleoresins from red chilli | Approved with following suggestion/s:   1. Analysis of antimicrobial and antioxidant activity to be incorporated in the text.   **(Action: Prof. & Head, FQA, FPT & BE, Anand)** | - |
| 11.5.2.19 | Prevalence and antimicrobial resistant pattern of Salmonella in raw milk in Anand town | House approved the project.  **(Action: Prof. & Head, FQA, FPT & BE, Anand)** | - |
| 11.5.2.20 | Ready to eat extruded food product from tomato pomace | Approved with following suggestion/s:   1. Revise the title as “Development of ready to eat extruded food product from tomato pomace”.   **(Action: Prof. & Head, FPT, FPT & BE, Anand)** | - |
| 11.5.2.21 | Development of juice extraction process of wood apple fruit | Approved with following suggestion/s:   1. Incorporate TSS analysis of pulp. 2. Temperature and time of treatments need to be modified.   **(Action: Prof. & Head, FPT, FPT & BE, Anand)** | - |
| 11.5.2.22 | Process development of micronutrient rich powder for women | Approved with following suggestion/s:   1. Modify the text of objective number one.   **(Action: Prof. & Head, FPT, FPT& BE, Anand)** | - |
| 11.5.2.23 | Supercritical fluid extraction of carotenoid from vacuum dried pumpkin powder | House approved the project.  **(Action: Prof. & Head, FPT, FPT& BE, Anand)** | - |
| 11.5.2.24 | Canning of mango slices | Approved with following suggestion/s:   1. Revise the title as “Preservation technology for mango slices”. 2. Modify the treatments. 3. Analysis of yeast and mold need to be attempted.   **(Action: Prof. & Head, FPT, FPT& BE,Anand)** | - |
| 11.5.2.25 | Study on *in vitro*antioxidant and antidiabetic activity of garden cress seed (*Lepidiumsativum*) | House approved the project.  **(Action: Prof. & Head, PFEHE, FPT & BE, Anand)** | - |
|  | **Centre: CAET, Godhra** | | |
| 11.5.2.26 | Production technology for preparation of banana powder | House deferred with the presented project and suggested a new project entitled, “Development of appropriate harvest and post-harvest technology for custard apple for tribal area of Gujarat”.  **(Action: Prof. & Head, APE, CAET,Godhra)** | - |
| 11.5.2.27 | Integrated land and water resources management in the Panam canal command for maximization of net annual return | Approved with following suggestion/s:   1. Recast the title as “Evaluating canal scheduling approaches for optimum productivity” in Panam irrigation command area.   **(Action: Prof. & Head, SWE, CAET,Godhra)** | - |
| 11.5.2.28 | To modify three point linkage system of sowing machines drawn my medium tractors to facilitate their operation by using mini tractor | Approved with following suggestion/s:   1. Recast the title as “Modification of three point linkage system of tractor drawn sowing machine suitable for the use by mini tractor”. 2. Objectives may be suitably recasted.   **(Action: Prof. & Head, FMP, CAET,Godhra)** | - |
| 11.5.2.29 | Modification and field evaluation of mini tractor drawn semiautomatic potato planter | Approved with following suggestion/s:   1. Recast the title as “Development and evaluation of mini tractor drawn semi- automatic potato planter”. 2. Objectives may be suitably recasted.   **(Action: Prof. & Head, FMP, CAET,Godhra)** | - |
| 11.5.2.30 | Development and evaluation of electric motor operated vertical feed maize sheller | Approved with following suggestion/s:   1. A small gear box may be used for speed reduction in place of multiple chain drives. 2. Manual feeding should be replaced with hopper based feeding mechanism.   **(Action: Prof. & Head, FMP, CAET,Godhra)** | - |
|  | **Centre: AIT, Anand** | | |
| 11.5.2.31 | Web based application for analysis of Randomized Block Design and Split-Plot design | House approved the project.  **(Action: Dean, AIT,Anand)** | - |
|  | **Centre: DIT, Anand** | | |
| 11.5.2.32 | Development of web based Procurement Management System | House approved the project.  **(Action: DIT, Anand)** | - |
| 11.5.2.33 | Development of web based Online Tour Program | House approved the project.  **(Action: DIT, Anand)** | - |
| 11.5.2.34 | Development of mobile based application for farmers | Approved with following suggestion/s:   1. Recast the objective as “To develop a mobile application for dissemination of information to the farmers”.   **(Action: DIT, Anand)** | - |
| 11.5.2.35 | Development of web based Online Billing System | Approved with following suggestion/s:   1. Recast the title as “Development of web based online bill processing system”.   **(Action: DIT, Anand)** | - |
| 11.5.2.36 | Development of Web Based PG Module of Student Corner for Anand Agricultural University | House approved the project.  **(Action: DIT, Anand)** | - |

**Junagadh Agricultural University**

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| **Sr. No.** | **Centre/Title** | **Suggestions** | **Remarks** |
| 11.5.2.37 | **Centre: CAET, Junagadh** | | |
| Development and performance evaluation of a low cost plastic mulch laying machine | House approved the project.  **(Action: Prof. & Head, FMP, CAET, Junagadh)** | - |
| 11.5.2.38 | Enzymatic pre-treatment in the processing of pigeon pea | Approved with following suggestion/s:   1. Cooking time, broken percentage and cost saving should be recorded.   **(Action: Prof. & Head, PFE, CAET, Junagadh)** | - |
| 11.5.2.39 | Role expectation of farm women in harvest and post-harvest activities of groundnut crop in Junagadh district | House approved the project.  **(Action: Prof. & Head, AEEE, CAET, Junagadh)** | - |
| 11.5.2.40 | Effect of coloured plastic mulches on cultivation of tomato crop | House approved the project.  **(Action: Prof. & Head, RERE, CAET, Junagadh)** | - |
| 11.5.2.41 | Effect of protected environment on off-season seedling raising of papaya | House approved the project.  **(Action: Prof. & Head, RERE, CAET, Junagadh)** | - |
| 11.5.2.42 | Evaluation of mulching technology for bunch type groundnut crop | Approved with following suggestion/s:   1. Water saving should be recorded.   **(Action: Prof. & Head, RERE, CAET, Junagadh)** | - |
| 11.5.2.43 | Development and Standardization of *Burfi* using buffalo milk and *Cucurbitapepo* pulp | House approved the project.  **(Action: Dean, College of Vet. Sci. & Animal Husbandry, Junagadh)** | - |

**Navsari Agricultural University**

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| **Sr. No.** | **Centre/ Title** | **Suggestions** | **Remarks** |
| 11.5.2.44 | **Centre:Department of Natural Resource Management, ACHF, Navsari** | | |
| Irrigation Scheduling of teak seedling grown in nurseries | Approved with following suggestion/s:   1. Irrigation must be given at every day, every alternate day, every 2 day interval and every 3 day interval. 2. Irrigation must be given in control treatment by *zara*. 3. Total no. of plots must be 4.   **(Action: Prof. & Head, NRM, ACHFNavsari)** | - |
| 11.5.2.45 | **Centre : Center of Excellence on PHT, Navsari** | |  |
|  | Packaging studies of freshly roasted immature sorghum ‘Sorghum Bicolor’ seed (Pauk) | Approved with following suggestion/s   1. In place of glass jar, use PET jar. 2. Observations must be taken upto 2 months or till the product is acceptable.   **(Action: I/c, CE on PHT, Navsari)** | - |
| 11.5.2.46 | Packaging and storage studies of drumstick *‘Moringaoleifera’* and its pulp. | Approved with following suggestion/s:   1. Treatment T5, T6 should be removed for 6 cm size drumstick preservation. 2. Add above treatments for whole drumstick. 3. Take the observations of only moisture content, tenderness, organoleptic evaluation and microbial count. 4. For pulp, study chemical spoilage and organoleptic evaluation. 5. Add one more treatment of shrinkage wrapping of 40 µ LDPE film. 6. For pulp, only tin can must be used. 7. Observations must be taken weekly.   **(Action: I/c, CE on PHT, Navsari)** | - |
| 11.5.2.47 | Design of Card Board box for Packaging of Kesar Mango | House suggested to drop the experiment due to existence of the design of such boxes in market.  **(Action: I/c, CE on PHT, Navsari)** | - |
| 11.5.2.48 | **Centre: Department of Agricultural Engineering, NMCA, Navsari** | |  |
|  | Determining feasibility of an on farm reservoir for rice based cropping system in south Gujarat under climatic change scenario | House approved the project.  **(Action: I/c Prof.& Head, Dept. of Agril. Engg., NMCA, Navsari)** | - |
| 11.5.2.49 | Evaluation of the laser leveled land leveling technology on crop yield, water use productivity & growth of Banana crop in South Gujarat | Approved with following suggestion/s:   1. Leveling index must be calculated. 2. Slope is to be matched with the design of furrow irrigation. 3. Define whether blocked or open furrow.   **(Action: I/c Prof.& Head, Dept. of Agril. Engg., NMCA, Navsari)** | - |
| 11.5.2.50 | **Centre: College of Agricultural Engineering and Technology, Dediapada** | | |
|  | Modeling yield and Evapotranspiration (*Oryza sativa* L.) of rice as influenced by transplanting date and weather parameters | Approved with following suggestion/s:   1. Use software ORIZA instead of DSSAT 2. Weather parameters accounted to predict yield should be spelled. 3. Spell whether AET or PET modeling.   **(Action: Dean, CAET, Dediapada)** | - |
| 11.5.2.51 | **Centre: College of Agriculture, Waghi** | |  |
|  | Quantitative Determination of Soil Erosion and Prioritization of Micro-watersheds using Remote Sensing and GIS | Approved with following suggestion/s:   1. Use the software MUSLE in place of USLE.   **(Action: Dean, College of Agriculture, Waghai)** | - |
| 11.5.2.52 | Assessment of Water Resources of Navsari and Dang Districts using water Quality Index and GIS | Approved with following suggestion/s:   1. Revise the title as “Assessment of quality and quantity ofWater Resources of Navsari and Dang Districts using GIS and water Quality Index. 2. In place of PRM and POM, use the words pre-monsoon and post-monsoon.   **(Action: Dean, College of Agriculture, Waghai)** | - |
| 11.5.2.53 | **Centre: LPT, College of Veterinary Science & A.H., Navsari** | |  |
|  | Studies on development of *burfi* utilizing watermelon (*Citrullus lanatus*) rind | Approved with following suggestion/s:   1. Remove the words ‘Studies on’ in the title.   **(Action: Prof. & Head, Dept. of LPT, College of Veterinary Science & A.H., Navsari)** | - |

**Sardarkrushinagar Dantiwada Agricultural University**

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| **Sr. No.** | **Centre / Title** | **Suggestions** | **Remarks** |
| 11.5.2.54 | **Centre:Center for PHT and Agro Industries, Sardarkrushinagar** | | |
| Dehydration of date palm halves using different drying methods | Approved with following suggestion/s:   1. Only two treatments have been suggested (i) Hot air dryer and (ii) Solar dryer as control. 2. Experiment to be taken with three loading rates, four levels of temperature and two levels of air flow rate.   **(Action: Prof. & Head, Centre for PHT & AI, Sardarkrushinagar)** | Looking to the facilities available in the College three levels of temperature and one level of air flow rate may please be incorporated. |
| **Centre: Center for watershed mgmt. participatory research & rural engineering, Sardarkrushinagar** | | | |
| 11.5.2.55 | Enhancing RWUE of castor crop with use of hydrogel under dryland condition | Approved with following suggestion/s:   1. In title RWUE shall be expanded.   **(Action: Research Scientist, CWMPR & RE, Sardarkrushinagar)** | - |
|  | **Center: College of Renewable Energy & Environmental Engineering, Sardarkrushinagar** | | |
| 11.5.2.56 | Techno-economic feasibility of Solar Water Pumping System in Northern Part of Gujarat, India | Approved with following suggestion/s:   1. Evaluate techno economic feasibility of solar system in farmer fields. 2. How much crop area will be covered under surface and drip should be mentioned. 3. Mention auxiliary water storage structure, if any.   **(Action: Dean, College of RE & EE, Sardarkrushinagar)** | - |
| 11.5.2.57 | Design & Development of dual axis solar tracker for photo-voltaic panel | House suggested to drop the experiment.  **(Action: Dean, College of RE & EE, Sardarkrushinagar)** | - |
| 11.5.2.58 | Performance Assessment of Prototype Savonius Wind Turbine in Low Speed Wind Tunnel | Approved with following suggestion/s:   1. Recast title as ‘Design and development of Prototype Savonius Wind Turbine’.   **(Action: Dean, College of RE & EE, Sardarkrushinagar)** | - |
| 11.5.2.59 | Design and Development of Prototype Kitchen Waste Based Fiber Rigid Plastic (FRP) Biogas Plant | House suggested to dropthe project and suggested to continue same project at university level.  **(Action: Dean, College of RE & EE, Sardarkrushinagar)** | - |
|  | **Center: Shree G N Patel College of Dairy Science and Food Tech., Sardarkrushinagar** | | |
| 11.5.2.60 | Utilization of Milk fat fractions in Selected Bakery products | Approved with following suggestion/s:   1. Procure AMF from market. 2. Use high melting & medium melting triglycerides instead of low melting.   **(Action: Dean, DS & FT, Sardarkrushinagar)** | - |
|  | **Centre: College of Veterinary Science and Animal Husbandry, Sardarkrushinagar** | | |
| 11.5.2.61 | Development of yoghurt from goat milk by selected lactic acid bacteria | House approved the project.  **(Action:Prof. & Head,Dept. of LPT, College of Veterinary Science and Animal Husbandry, Sardarkrushinagar)** | - |
|  | **Center: ASPEE College of Home Science and Nutrition, Sardarkrushinagar** | | |
| 11.5.2.62 | Development of value added nutritious biscuits by incorporation of *Ber* Fruit Crush | Approved with following suggestion/s:   1. Recast title as ‘Development of value added nutritious biscuits by incorporation of macerated*Ber* Fruit’.   **(Action: Dean, ASPEE College of Home Science and Nutrition, Sardarkrushinagar)** | - |
|  | **Center: College of Horticulture, SDAU, Jagudan** | | |
| 11.5.2.63 | Design, Development & evaluation of lemon harvesting device | House suggested to drop the experiment since it has already beendeveloped by JAU.  **(Action: Dean, College of Horticulture, SDAU, Jagudan)** | - |

**11.5.3 General Suggestions**

A. Scientists having more numbers of recommendations/ new technical programs should be allowed/ deputed to the combined joint AGRESCO meeting.

B. The process followed during experimentation should be simple and commercially feasible so as to help in faster adoption of the recommendations.