



Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu

Directorate of Research

Administrative Block, Main Campus, Chatha-180009

Minutes of 16th Research Council Meeting held on 09th March, 2016

16th Research Council Meeting (RCM) of Sher-e-Kashmir University of Agricultural Sciences & Technology of Jammu was convened on 09th March, 2017 in the Conference Hall, SKUAST-J, Main Campus, Chatha under the Chairmanship of Prof. Pradeep K. Sharma, Hon'ble Vice-Chancellor, SKUAST-Jammu to assess the status of on-going research and chalk out the road map for research to be taken in future.

Dr. A.K.Sarial, Vice-Chancellor, CSKHPKV, Palampur, H.P. and Dr. Kusumakar Sharma, Former ADG (Edu. Division), Indian Council of Agricultural Research, New Delhi were the experts of eminence in the fields of Agriculture and Veterinary Sciences, respectively. Dr. Jag Paul Sharma, Director Research, SKUAST-J, Dr.K.S.Risam, Director Extension, SKUAST-J, Dr. T.A.S.Ganai, Director Education, SKUAST-J, Dr. Deepak Kher, PPMO, SKUAST-J, Dr. D.P.Abrol, Dean, Faculty of Agriculture, Dr. M.M.S. Zama, Dean, Faculty of Veterinary Sciences and Animal Husbandry, Dr. S.A.Mallick, Dean, Faculty of Basic Sciences, Dr. R.K.Arora, I/c KVKs, Heads of Divisions of all three faculties, Coordinator, School of Biotechnology and Directors of the line departments, In-charge Stations/Sub-Stations and concerned scientists participated in the meeting (Annexure 'A').

At the outset, Director Research & Member Secretary of Research Council Meeting welcomed Prof. Pradeep Kumar Sharma, Hon'ble Vice-Chancellor, SKUAST-J and Chairman of the Research Council Meeting, invited experts Dr. A.K.Sarial, Vice-Chancellor, CSKHPKV, Palampur, H.P. and Dr. Kusumakar Sharma, Former ADG (Education Division), ICAR, New

Delhi, Officers of the University, Heads of various divisions of all the three faculties, Officers from Line Departments, In-charge Stations, Sub-stations and others for being a part of 16th Research Council Meeting. Thereafter, Director Research made a powerpoint presentation on “Research at a glance: New horizons” and briefed the house about activities of Directorate of Research, including 08 Research Stations. He informed the house that the university currently undertaking 124 externally funded adhoc research projects, having financial outlay of approximately Rs. 45.0 Crores. He expressed concern over the huge yield gaps in farmers’ fields and experimental fields in major crops, viz. rice, maize and wheat. Director Research also highlighted the focused areas of research, encompassing yellow rust resistant varieties in wheat, refinement of local strains of Rajmah and Basmati, development of composites in maize especially for hilly areas, quality seed production in vegetables, and development of soil fertility maps. He emphasized on the “Participatory Research” as the major thrust area in future and also informed that the approach was, already in vogue at Regional Horticultural Research Sub Station (RHRS), Bhaderwah for rajmah seed production.

Director Research proposed that research programmes in the University should be crop and issue specific. Hence, presentation in RCM should also be programme specific, which was approved by the council. He proposed the following researchable areas where SKUAST-Jammu would focus accordingly all faculties and research stations would set priorities as per these programmes. The programmes were discussed threadbare and given the final nod, and upon that the experiments falling under these programmes would be adequately funded subject to the available financial resources. The research programmes are as under:

1. Basmati improvement program with focus on RS Pura Basmati.
2. Wheat improvement program with focus on drought and yellow rust resistant varieties.
3. Maize improvement program with focus on composites.
4. Oil seeds and Pulses improvement programmes.
5. Organic Farming.
6. Bio-prospecting of herbal plants.
7. Improvement of fruits, vegetables, ornamental crops and value addition.
8. Improvement of livestock production and productivity.
9. Characterization and improvement in indigenous breeds.
10. Diagnosis and management of important livestock diseases.
11. Livestock feed, fodder and forage crops.
12. Epidemiology of important livestock diseases and their zoonotic potential.
13. Food safety and environmental hygiene.
14. Designing/ importing prototype for farm machineries relevant to hill and mountain agriculture.

Feedback from line departments was taken which is as under:

Joint Director, Department of Horticulture: highlighted various problems being encountered in the field of horticulture and sought intervention of SKUAST-Jammu on the issues.

- He substantiated that Govt. of J&K has sanctioned Rs. 32.0 lakhs/ha for encouraging high density apple plantations and apprised the house that these high density apple plantations are doing very well in Kashmir province. He requested the SKUAST-Jammu to develop a separate package of practices for high density apple plantation w.r.t. Jammu province.

(Action: RHRSS, Bhaderwah)

- He apprised the house that Horticulture census shall hopefully be completed by April, 2017, and to complete this important task help of SKUAST-Jammu shall be required in terms of preparation of formats especially for calculation of economics involved in horticultural activity. He requested the university authorities for assistance from the disciplines of Economics & Horticulture for the Horticulture census being taken up by the Department.

(Action: Division of Fruit Science, Division of Agricultural Economics and Statistics)

Sh.R.N.Pandita, Joint Director, Fisheries: represented the Department of Fisheries, Govt. of J&K. He raised certain issues in the light of instructions issued by the Govt. of J&K to double the Fish production in the state.

- Introduction of other fingerlings of Mangur (cat fish) on the similar lines as in the states like U.P. and Bihar. He further added that the seed of Mangur is also available in these states.
- Development of high protein feed formulations especially to tackle the problem of mortality of fishes at juvenile stage.

(Action: Scientist Fisheries, F.V.Sc. R.S.Pura)

Dr. Sant Ram, Director, Department of Sheep Husbandry: raised the problem of inbreeding in sheep because of lack of importation of sheep breeds from outside the state. He requested SKUAST-Jammu to make efforts for import of good sheep stocks for breeding purpose to improve wool and mutton production in this region of the state.

Hon'ble Vice Chancellor, SKUAST-Jammu, Prof. Pradeep K. Sharma in his opening remarks emphasized that right direction was very important to reach the desired goals in research. He further stressed upon to concentrate more on site-specific research and strategic research to have deliverable outcomes. He appreciated the efforts of Director Research, SKUAST-Jammu for giving the insight of research activities going on in the SKUAST-Jammu in a very meticulous manner.

The following issues were highlighted by Hon'ble Vice Chancellor, SKUAST-Jammu for attention of the concerned units of the university.

- Development of package and practices w.r.t. high density plantation of mangoes and other horticultural crops.

(Action: ACHR, Udheywala)

- To frame a committee under the chairmanship of Sr. Scientist, AICRP on Agro-meteorology to redefine the agro-climatic zones taking all the standard guidelines in to account. Due consideration must be given to micro-climatic conditions and not just confine to elevation and rainfall etc. while delineation of agro-climatic zones/agro-climatic situations existing in Jammu province.

(Action: AICRPAM, Chatha)

- To bridge yield gaps by improving the productivity of various crops particularly in rainfed areas of the Jammu region. He further desired that scientists should write multidisciplinary projects based on the site-specific problems and requirements.

(Action: I/c KVKs and Directorate of Research)

TECHNICAL SESSION- I

At the outset Director Research, SKUAST-Jammu presented the proceedings of the 15th RCM and placed before the house for confirmation. The same were confirmed by the house.

Hon'ble Vice Chancellor, SKUAST-Jammu directed Dr. K.K. Sood, Prof. & Head, Agroforestry to estimate biomass/volume of the trees growing in the farming system unit at Chatha and calculate the economics involved.

(Action: Division of Agroforestry)

Chairman directed the Scientists that the recommendations for laying out OFTs should be routed through respective Deans and Director Research or as the case may be.

(Action: Director Research, Dean FoA& Dean FVSc)

A uniform naming system for varieties, need to be adopted by the University. Dr. A.K. Sarail, Hon'ble Vice Chancellor, CSKHPKV, Palampur suggested that it should be done by adding Jammu as prefix, followed by name of concerned crop. But as there was no consensus in the house, the Hon'ble Vice Chancellor, SKUAST-Jammu directed the Director Research to frame a committee for finalization and recommendation of uniform nomenclature of crop varieties of SKUAST-Jammu.

(Action: Director Research)

On presentation of results of experiment on the "Effect of hydrogel and limited irrigations on growth and yield of wheat" Hon'ble Vice Chancellor, SKUAST-Jammu desired that this trial should be repeated under rainfed conditions for further validation of results and recommendations thereof.

(Action: ACRA, Dhainsar)

Dr. V.K. Wali presented the data on ongoing student experiments of the Division of Pomology namely "Impact of foliar application of zinc, iron, and boron on morpho-physiological characteristics of Kinnow mandarin" and "Effect of foliar application of calcium nitrate, silver nitrate and zinc sulphate on yield, quality and shelf-life of peach (cv. Shan-e-Punjab) under Jammu sub-tropics". The Chairman directed the concerned Scientist to present the final recommendations after completion of the experiment in the next RCM and added that on-farm validation by laying out OFTs in collaboration with KVKs should be done before giving final recommendations.

(Action: Division of Fruit Science)

Dr. Lalit Mohan Gupta, Assoc. Prof., Division of Agroforestry presented the results of concluded project, "Conservation, Production and Sustainable Management of Shatavar (*Asparagus recemosus* Willd)" and reported that 4 accessions of Shatavar viz., IC471923, IC471922, IC471911 & IC471909 were found superior over others in terms of higher dried tuber yield. He further informed that mini trials of IC 471923 shall be laid out in the ensuing season. The

Chairman directed the concerned Scientist to layout On Farm Trials of the said accession also in addition to minikit trials to arrive at final recommendations.

(Action: Division of Agroforestry)

Dr. Asim Kumar Mondal, Prof. Division of Soil Science & Agricultural Chemistry presented the results of concluded experiment on “studies of zinc in rice wheat growing soils in subtropical areas of Jammu region” and reported that application of $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$ @ 10 kg ha^{-1} resulted in highest grain protein and sugar content in basmati rice. He further reported decline in starch content % of Basmati rice with increase in dosage $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$ @ 30 kg ha^{-1} . Prof. A.K. Sarial, eminent expert directed the concerned Scientist to formulate an experiment in collaboration with division of Agronomy and validate the results on both soil and the crop.

(Action: Division of Soil Science & Ag. Chemistry and Division of Agronomy)

Dr. K. R. Sharma, Prof. and Head, Division of Soil Science & Agricultural Chemistry presented the results of concluded experiment on “studies on soil boron dynamics and nutrition in broccoli (*Brassica oleracea* var. *italica*)” and reported that soil application of borax @ 15 kg ha^{-1} along with recommended application of N, P and K and 100% FYM resulted in significant increase in yield of broccoli than other treatments in comparison. Also, spraying of borax @ 0.3% at 45 days along with recommended application of N, P and K and 100% FYM after transplanting resulted in higher boron content in broccoli at curd initiation as well as harvest stage than other treatments in comparison. The house directed the concerned Scientist to test the recommendation at farmers field through KVK's for inclusion in package and practices.

(Action: Division of Soil Science & Ag. Chemistry and I/c KVKs)

Dr. A. Samanta, Senior Scientist, Water Management Research Centre, Chatha presented the results of concluded experiment on “studies on alternate wetting and drying irrigation regimes management in basmati rice through field water measuring tube device under light texture soil” and reported that application of irrigation after 7 cm drop of water level below surface from 7 DAT to 10 days prior to harvest stage resulted in significant increase in grain yield of basmati rice than farmers practice thereby resulting in 18 % water saving. The Chairman directed the concerned Scientist to discuss it with Director Research and to continue the experiment till final recommendation is made for onward listing in OFT on farmers field through KVKs.

(Action: Water Management Research Centre and I/c KVKs)

Dr. R.K. Gupta, Professor and Head, Division of Vegetable Sciences and floriculture informed the house that varieties of Spinach, beet, fenugreek and coriander are ready for release by the division. The Hon'ble Vice Chancellor, SKUAST-Jammu directed the concerned Scientist for submission of revised proposals to the Directorate of Research for release through SVRC.

(Action: Division of Vegetable Sciences and Floriculture)

Dr. R.K. Bali, Professor and Head, Division of Sericulture informed the house that out of 6 varieties of mulberry the feeding of leaves of variety S 1635 resulted in highest single cocoon weight, single shell weight and total filament length than other varieties in comparison. Hence the recommendation of variety S 1635 can be taken to the field for commercial propagation at field level. The chairman directed to submit of release proposal after testing it on farmers field. He should conduct the further validation of the findings in association with sericulture (department and KVKs).

(Action: Division of Sericulture & I/c KVKs)

Dr. Bodhu Ram Bazaya, Senior Scientist, AICRP (Weed Management) presented the results of concluded experiment entitled “Weedy rice management strategies in basmati rice (*Oryza sativa* L.) under subtropical irrigated conditions of Jammu” and recommended that the stale seed bed treated with glyphosate @ 1.5 kg ha⁻¹ or paraquat @ 0.8 kg ha⁻¹ as the most economical and effective method of weed control for weedy rice in transplanted rice. The Chairman, Prof. Pradeep Kumar Sharma directed the concerned Scientist to test the recommendation at farmers' field as OFT through KVK's for inclusion of technology in university package and practices.

(Action: Division of Agronomy and Directorate of Extension)

Dr. Meenakshi Gupta, Associate Professor, Division of Agronomy presented the results of concluded experiment “Effect of graded levels of N, P and K on growth, yield and quality of fine grain rice (*Oryza sativa*) cultivars under subtropical conditions” and “Effect of zinc fortification on yield and quality of basmati rice under subtropical conditions of Jammu” and reported that application of N:P₂O₅:K₂O @ 60:35:15 kg ha⁻¹ and 4 % Zinc through zincated urea + 0.2% Zn foliar spray along with recommended levels of P & K significantly increased the

grain yield of fine rice and basmati rice respectively than other treatment in comparison. She was directed to test the recommendation at farmers field as OFT through KVK's for inclusion in package and practices.

(Action: Division of Agronomy and I/c KVKs)

Dr. Ram PhoolPuniya, Junior Scientist, AICRP (Weed Management) presented the results of concluded experiment "Effect of weed management practices on growth and yield of rice (*Oryza sativa* L.) under aerobic conditions" and recommended that application of pendimethalin @ 1.0 kg ha⁻¹ (Pre.) followed by bispyribac Sodium @ 30 g ha⁻¹ at 25 DAS followed by fenoxaprop-p-ethyl @ 60 g ha⁻¹ and pendimethalin @ 1.0 kg ha⁻¹ (Pre.) followed by azimsulfuron @ 25 g ha⁻¹ at 25 DAS followed by fenoxaprop-p-ethyl @ 60 g ha⁻¹ at 30 DAS were the most effective and economical treatments in controlling weeds in aerobic rice. He was directed to test the recommendation at farmers field as OFT through KVK's for inclusion in package and practices.

(Action: Division of Agronomy and I/c KVKs)

Dr. Vijay Khajuria, Jr. scientist-Agronomy, presented the results of concluded experiment "Effect of graded levels of N, P and K on growth, yield and quality of fine rice (*Oryza sativa* var. Pusa 1509) cultivars under subtropical conditions" and reported that application of N:P₂O₅:K₂O @ 90:60:60 kg ha⁻¹ significantly increased the grain yield of fine rice than other treatment in comparison. The co-chairman, Prof. A.K. Saria informed the house that Pusa 1509 has not taken up as expected in the farmers field and hence the experimentation on it is a mere wastage of resources. However, The chairman, Professor P.K. Sharma asked the HOD to club all trials pertaining to nutrient management in fine rice grain cultivars for making final recommendation during the ensuing season and directed the concerned Scientists to validate the final recommendation at farmers field as OFT through KVK's for inclusion in package and practices.

(Action: Division of Agronomy and I/c KVKs)

Dr. Jyoti Kachroo, Professor and Head, Division of Agricultural economics & ABM presented the results of concluded study "Economic contribution of Farming System components towards livelihood security in Jammu region" The chairman, Professor P.K. Sharma asked the HOD to prepare a comprehensive survey report in 3 months for the benefit of farming community.

(Action: Division of Agricultural Economics & ABM)

Dr. BrijNandan, Sr. Scientist-Agronomy, PRSS, Samba presented the results of two concluded experiments under AICRP (Pulses) entitled “Evaluation of *kharif* urdbean cultivars under rainfed conditions of Jammu region” and “Conservation agricultural practices for enhancing productivity of Chickpea based cropping systems (Cereal/Oilseed/Pulse-Chickpea) in rainfed areas” and reported that PU 31 variety of Urd bean resulted in significant increase in crop yield of Him Mash 1 and other varieties in comparison. Whereas, among the conservation tillage treatments maximum seed yield of chickpea was recorded in conventional tillage plots coupled with mulching which was found to be significantly higher than reduced and zero tillage in comparison. The concerned Scientist was directed to test PU-31 in KVK's, farmers' field and zero till for inclusion in package and practices.

(Action: PRSS, Samba and Directorate of Extension)

Technical Session II: Faculty of Veterinary Sciences

Dr. S.K.Kotwal, Prof. & Head, Division of Veterinary Public Health and Epidemiology presented the concluded projects. He presented salient achievements of all research projects.

Prevalence of *Listeria monocytogenes* in sheep and goat flocks of nomads:

A total of one hundred and sixty five samples comprising of Sheep faeces (n=33), Sheep rectal swabs (n=30), Goat faeces (n=32), Goat rectal swabs (n=30), Nomadic handlers hand swabs (n=20) and Nomadic handlers stool samples (n=20) were processed that revealed 32 (19.39%) isolates of *Listeria* species. Out of these 13 (7.87%) were identified as *L. Monocytogenes* and 19 (11.51%) other *Listeria* species. The prevalence of *L. Monocytogenes* from sheep and goat faeces and rectal swabs was 6.06%, 10.00%, 9.37% and 16.66% respectively.

Incidence of bacterial pathogens in ready-to-eat milk products and study their biofilm production potential:

The study assessed the occurrence of *Staphylococcus aureus*, *Escherichia coli*, *Bacillus cereus* and *Listeria monocytogenes* in ready to eat milk products. Out of 100 samples of ready to eat milk products (cream roll, burfi, rasmalai, badaam milk and milk cake, 20 each), a total of 69 bacterial isolates comprised of 38 of *E. coli*, 19 of *S. aureus* and 12 of *B. cereus* were

obtained. The highest incidence of *E. coli*, *S. aureus* and *B. cereus* was in cream roll as 40%, 45% and 20%, respectively.

Isolation of Bacterial Pathogens from Veterinary Hospitals and their Assessment for Biofilm Production Potential:

The study assessed the bacterial pathogens circulating in veterinary hospitals of Jammu including their biofilm production. A total of 170 samples originating from veterinary clinical cases {diarrhea (n=45), mastitis (n=45), wounds (n=30), otitis externa (n=17) and cystitis (n=3)} and veterinary hospital environment {table tops (n=5), trevis (n=5), medical instruments (n=10) and hand swabs (n= 10)} were analyzed. One hundred and eighteen bacterial isolates, 94 from veterinary clinical cases and 24 from hospital environment were obtained.

Studies on Isolation and Characterization of *Escherichia coli* from sheep, goats and their handlers:

A total of 170 samples comprising of 30 faecal samples and 30 rectal swabs of each sheep and goats, 25 stool samples and 25 hand swabs of their handlers were collected from in and around Jammu district and processed for the isolation of *E. coli*. Sixty five biochemically confirmed isolates including 27 of sheep, 26 of goats and 12 of their handlers were obtained. In vitro virulence characterization of isolates exhibited that 55.5% of isolates of sheep and 50% isolates of goats took colour of Congo red dye, similarly 25.9% and 34.6% isolates of sheep and goats respectively were haemolytic on blood agar, but none of human isolate was found pathogenic on both of the in vitro pathogenicity assays.

Sero-prevalence Studies of brucellosis among goats and humans using different serological tests:

A study was conducted to determine the prevalence of Brucellosis in goats and humans in and around border areas of Jammu, J&K, India using different serological tests viz. RBPT, STAT and I-ELISA. A total of 425 serum samples, 350 from goats and 75 from humans were tested by RBPT, STAT and I-ELISA. Overall sero-prevalence of 1.14% was recorded in goats.

Studies on incidence and the enterotoxigenic profile of *B. cereus* in meat and meat products:

A total of 150 samples comprising 50 each of, raw mutton, raw chicken and chicken biryani were analyzed for incidence and the enterotoxigenic profile of *Bacillus cereus*. Out of 52 presumptive

B. cereus isolates confirmed by conventional biochemical methods, 44 isolates produced a product of 475 base pairs on PCR by targeting species specific *gyrB* gene.

Evaluation of Hygienic Quality of Raw Meat (Mutton And Chicken) and Characterization of Isolated Pathogens:

The present study was undertaken to evaluate the hygienic quality of raw mutton and chicken along with characterization of the isolated pathogens. A total of 145 samples (mutton-75, chicken-70) were collected from different locations of Jammu city. Mean \pm SE values (log₁₀cfu/g) of standard plate count, *E. coli* count and *Staphylococcus aureus* count in mutton samples were 6.12 \pm 0.08, 3.30 \pm 0.55 and 4.08 \pm 0.15, respectively and the counts in chicken samples were 6.17 \pm 0.05, 3.99 \pm 0.13 and 4.16 \pm 0.09, respectively.

Hon'ble Vice-Chancellor desired that a set of recommendations specifically for butchers, consumers and food inspectors should be prepared and communicated through extension booklets/leaflets.

(Action:Veterinary Public Health and Epidemiology)

Dr.A.K.Gupta, Assoc. Prof. & Head, presented concluded project "Role of ultrasonography in diagnosis of surgical affections of gastrointestinal tract in bovineon clinical cases of bovines suffering from surgical affections of GI tract it is recommended that intestinal obstruction and ileus in cattle could be confirmed with 100% accuracy based on presence of distended intestinal loops with passive movement fluid ingesta and presence of peritoneal fluid between intestinal loops.

Intestinal obstruction could be confirmed with 100% accuracybased on presence of distended intestinal loops with clear hyperechoic near and far walls; and freely moving echogenic intestinal contents.

Presence of peritoneal fluid & lesser no. of loops/field Because of early & accurate diagnosis of intestinal obstruction success rate following surgery is >90%.

Reticular abscess can be seen as hypoechoic to anechoic cavity only when located close to right abdominal wall. However, there may be false negativecases

Diaphragmatic hernia should be suspected when crescent shaped reticulum is seen cranial to 5th intercostal space. However, there may be false positivecases

Dr. Kusumakar Sharma advised that field Veterinarians of J.&K. state government should be recommended to the importance and relevance of ultrasonography.

(Action: Veterinary Surgery and Radiology)

Dr. Mudasir Sultana, Prof. and Head, Division of Veterinary Pharmacology and Toxicology, made presentation on “studies on the effect of Quercetin on diabetic wound and hypertension in rats”. She concluded that Quercetin @ 100mg/kg B.W. produced antidiabetic effect in streptozotocin induced diabetes. Wound healing property has been excellently produced by 1% topical application of Quercetin alone and 1% topical application + 100mg/kg B.W. of Quercetin orally in diabetic wound. Quercetin @ 20mg/kg B.W for six weeks in rats was sufficient enough to reduce DOCA-salt induced hypertension and recommended that these lab animal models study can be further used for human models too.

Dr. S. Kumar, Assoc. Prof., & Head, Division of Livestock Products and Technology, presented concluded projects “Effect of *Tribulus terrestris* and *Asparagus racemosus* on storage quality of chevon sausages”, “Effect of *Colocasia esculenta*, *Ipomea batatas* and *Coffea arabica* on the quality attributes of restructured mutton blocks”, “Effect of *Bacopa monnieri* and *Ocimum sanctum* on storage quality of chicken nuggets”, and also presented salient achievements of DST funded project “Empowerment of rural women through training programme on development of value added livestock products.

Effect of *Tribulus terrestris* and *Asparagus racemosus* on storage quality of chevon sausages: Chevon sausages were used as a model meat product and incorporated with different concentrations of *Tribulus terrestris* and *Asparagus racemosus* (0.25%, 0.50%, 0.75%) separately and were vacuum packaged and assessed for various lipid oxidative stability and storage quality parameters under refrigerated ($4 \pm 1^{\circ}\text{C}$) conditions at regular intervals of 0, 14, 28, 42 and 56 days. Both *Tribulus terrestris* and *Asparagus racemosus* showed a significant ($P < 0.05$) effect on the lipid oxidative stability as the treated products exhibited significantly ($P < 0.05$) lower TBARS (mg malonaldehyde/kg) values. A significant ($P < 0.05$) effect was also observed on the microbiological characteristics of the products as treated products showed significantly lower values for microbial and yeast and mould counts and for free fatty acid (% oleic acid) values.

Effect of *Colocasia esculenta*, *Ipomoea batatas* and *Coffea arabica* on the quality attributes of restructured mutton blocks.

The present study was undertaken to evaluate the effect of *Colocasia esculenta*, *Ipomoea batatas* and *Coffea arabica* on the quality attributes of restructured mutton blocks. Based on product yield and sensory scores, 15% added water level, 18 minutes of massaging time and 40 minutes of cooking time were found to be optimum for the development of restructured mutton blocks. *Colocasia esculenta* powder was incorporated at three different levels viz. 1%, 3% and 5% and was adjudged as optimum at 3% level on the basis of various quality parameters. *Ipomoea batatas* powder was also incorporated at three different levels viz. 1%, 3% and 5% and was also adjudged as optimum at 3% level on the basis of various quality parameters.

Effect of *Bacopamonnieri* and *Ocimum sanctum* on storage quality of chicken nuggets.

The study was undertaken to explore the antioxidant properties of locally available herbs viz. *Bacopamonnieri* and *Ocimum sanctum* in enhancing the shelf-life of chicken nuggets. Meat products are very vulnerable to spoilage due to excessive fats and protein contents. Therefore, chicken nuggets fortified with 1, 2, and 3% of extracts of *Bacopamonnieri* and *Ocimum sanctum* along with control was studied to explore the potency of these locally available herbs on oxidative stability and storage quality of chicken nuggets on 0, 7, 14 and 21 days in refrigerated ($4 \pm 1^{\circ}\text{C}$) condition.

Dr. A. K. Taku, Head, Division of Veterinary Microbiology and Immunology presented two concluded externally funded projects “National Center on Veterinary Type Culture Collection (VTCC)”. He presented projects highlight and salient achievements of the projects. Culture accessioned during 2016-17 given as under:

- This is a network project in which we act as a nodal centre for collection of veterinary microbes from field samples.
- The clinical samples are processed for isolation, identification, biochemical and molecular characterization. Authentication of the microbial cultures is carried out by at least two or three full-length genes.

- So far more than 127 bacterial cultures belonging to *Staphylococcus aureus*, *Escherichia coli*, *Proteus*, *Salmonella*, *Bacillus*, and *Streptococcus* isolated from Jammu region have been accessioned and submitted to the Veterinary Type Culture Collection centre, Hissar having veterinary significance.

Cultures accessioned during 2016-17

Depositors ID	Bacterial species	Source	Serogroup/serotype	Remarks
SKJ16-M1	<i>Bacillus cereus</i>	Meat shop	NA	Positive for gyrB and non-haemolytic genes
SKJ16-M2	<i>Bacillus cereus</i>	Meat shop	NA	Positive for gyrB and non-haemolytic genes
SKJ16-M3	<i>Bacillus cereus</i>	Meat shop	NA	Positive for gyrB and non-haemolytic genes
SKJ16-M4	<i>Bacillus cereus</i>	Meat shop	NA	Positive for gyrB and non-haemolytic genes
SKJ16-M5	<i>Bacillus cereus</i>	Meat shop	NA	Positive for gyrB and non-haemolytic genes
SKJ16-M6	<i>Bacillus cereus</i>	Meat shop	NA	Positive for gyrB and non-haemolytic genes
SKJ16-M7	<i>Bacillus cereus</i>	Meat shop	NA	Positive for gyrB and haemolytic genes
SKJ16-M8	<i>Bacillus cereus</i>	Meat shop	NA	Positive for gyrB and non-haemolytic genes
SKJ16-M9	<i>Bacillus cereus</i>	Meat shop	NA	Positive for gyrB and non-haemolytic genes
SKJ16-S1	<i>E. coli</i>	Sheep	NA	Positive for hly

SKJ16-S2	<i>E. coli</i>	Sheep	NA	Positive for stx1 and hly
SKJ16-S3	<i>E. coli</i>	Sheep	NA	Positive for stx2
SKJ16-S4	<i>E. coli</i>	Sheep	NA	Positive for stx1 and hly
SKJ16-S5	<i>E. coli</i>	Sheep	NA	Positive for stx1 and hly
SKJ16-S6	<i>E. coli</i>	Sheep	NA	Positive for stx1
SKJ16-S7	<i>E. coli</i>	Sheep	NA	Positive for stx1 and hly
SKJ16-S8	<i>E. coli</i>	Sheep	NA	Positive for stx1 and hly
SKJ16-H1	<i>Staphylococcus aureus</i>	Human	NA	Positive for nuc, mec, coa, spa, pvl, hla, sea, ermC and aac
SKJ16-H2	<i>Staphylococcus aureus</i>	Human	NA	Positive for nuc, mec, coa, spa, pvl, hla, sea, ermC and aac
SKJ16-H3	<i>Staphylococcus aureus</i>	Human	NA	Positive for nuc, mec, coa, spa, pvl, hla, sea, ermC and aac
SKJ16-H4	<i>Staphylococcus aureus</i>	Human	NA	Positive for nuc, mec, coa, spa, pvl, hla, sea, ermC and aac
SKJ16-H5	<i>Staphylococcus aureus</i>	Human	NA	Positive for nuc, mec, coa, spa, pvl, hla, sea, ermC and aac
SKJ16-C1	<i>Salmonella enterica</i>	Cattle/ calf	Anatum	16S rRNA PCR positive
SKJ16-P1	<i>Salmonella enterica</i>	Poultry	Altona	16S rRNA PCR positive
SKJ16-P2	<i>Salmonella enterica</i>	Poultry	Virchow	16S rRNA PCR positive
SKJ16-P3	<i>Salmonella enterica</i>	Poultry	Reading	16S rRNA PCR positive

Exploration of respiratory metagenome and small ruminants and establishment of referral diagnostic facility:

- Standardisation of OIE recommended diagnostic tests and prevalence studies of common economically important small ruminant disease for speedy and timely diagnosis of diseases of sheep and goat. Under this facility various molecular techniques like PCR, RT-PCR, sandwich ELISA, Direct ELISA, Cell culture will be standardized in the lab and used for rapid and accurate detection of diseases like haemorrhagic septicemia, blue tongue, sheep pox, goat pox, PPR and FMD.
- Respiratory tract sample collection for metagenomics study involve mining of novel genes of practical importance from identified respiratory metagenome.
- Metagenomics of respiratory bacterial community of small ruminants will help in better understanding the aetiological agents involved with the respiratory disease for improved health prospects and animal production.

Remarks of eminent expert Dr. Kusumakar Sharma:

Dr. Kusumakar Sharma, Former-ADG (ICAR) suggested about the scrutinizing of the project proposals through an in-house evaluation committee designated by Director Research, SKUAST-Jammu before their final submission to the funding agencies. He further floated few suggestions before the house as under:

- Participatory research is very important component. It not only tests the efficiency of technology but also provide opportunity for midterm corrections if any.
- Interdisciplinary research should be encouraged to achieve maximum output.
- Integrated farming system and value addition can double the income of farmers.
- Our aim should be as to how the best we can contribute to the National Livestock Policy.
- Exhaustive study should be carryout on characterization and conservation of indigenous breeds of cattle.
- Quality assurance of Indian medicine is essential to make them popular and formulation of Indian medicine with quality control. Fool proof raw material and quality of end product should be assured.
- Diagnosis of livestock diseases should be given emphasis.

- More emphasis should be laid on prevention of diseases in cattle and small ruminants as “Prevention is an investment, treatment is expenditure”.
- Faculty should submit more research projects both at institutional and multi-institutional levels.

Remarks of eminent expert Dr. Ashok Saryal:

Dr. A.K Sarial, Vice-Chancellor, CSKHPKV, Palampur, in his concluding remarks stressed that both basic and strategic research are the need of the hour. He also pointed out that the difference in production and productivity between rainfed and irrigated conditions needs to be minimized and water conservation should be given more emphasis to increase the irrigation potential of the fields. He observed that Jammu region, especially the R.S Pura, is well known for quality Basmati, and stressed upon the scientists to make efforts so that maximum quality features of the local germplasm should remain intact. He also remarked that Integrated Farming System is the need of the hour and more focus should be given to IFS. In addition, he also wanted the involvement of Krishi Vigyan Kendras to test the newly developed technologies in the form of On farm Trials. He also suggested to take polyhouse cultivation of vegetables in higher altitude areas and characterization and release of local rice of Bhaderwah region.

Dr. Ashok Sarial, Hon'ble Vice Chancellor, CSKHPKV, Palampur further made some suggestions as under:

- Climatic zones should be delineated to develop climate resilient technologies.
- Climate change should not always be taken in negative perspective but also considered as an opportunity.
- Adaptive changes should be in our practice to counter climatic change.
- Problem oriented research (adaptive research) should be given emphasis.
- Doubling the farmer's income, emphasis should be on their enterprises.
- Prioritize action of compilation researchable areas in time along with line departments.
- Technology must be treated on-farm before recommending.

Remarks of Chairman, RCM Hon'ble Vice Chancellor, SKUAST-Jammu

In his concluding remarks, Hon'ble Vice Chancellor, SKUAST-Jammu, Prof. Pardeep K. Sharma hoped that the research issues highlighted during the current meeting will be kept in mind and the directions will be adhered to in right perspective for speeding up the research programmes for speedy development and transfer of technologies for the benefits of the farming community. He advised research findings be compiled and booklet so developed be distributed to all concerned departments for their use, revalidation and feedback. The chairman thanked the experts for their fruitful remarks and wished that their valuable suggestions shall be taken care of and it will definitely strengthen the research programmes of SKUAST-Jammu for the benefit of farming community.

- Production gap between actual and potential on all crops should be minimized
- Effect of pesticides on fish fauna should be addressed
- Introduction of minor carps to meet state population demand of fish
- Finalize the committee on fish diseases.

The Research Council Meeting ended-up with vote of thanks presented by Dr. Pramod Baru, Associate Director Research.

Submitted for approval please

(Shahid Ahamad)

Dy. Director Research

Director Research

Annexure

List of participants in 16th RCM		
S.No.	Name of Officers	Designation
1.	Prof. Pradeep Kumar Sharma	Hon'ble Vice-Chancellor, SKUAST-Jammu
2.	Dr. A.K Sarial	Hon'ble Vice Chancellor, CSKHPKV, Palampur
3.	Dr.Kusumakar Sharma	Former ADG, ICAR (Edu. Division), New Delhi
4.	Dr. Jag Paul Sharma,	Director Research & Member Secretary,RCM,SKUAST-Jammu.
5.	Dr.K.S.Risam	Director Extension
6.	Dr. T.A.S Ganai	Director Education
7.	Prof. Deepak Kher	PPMO, SKUAST-Jammu
8.	Dr. D.P Abrol,	Dean, Faculty of Agriculture
9.	Dr. M.M.S Zama,	Dean, Faculty of Veterinary Sciences and Animal Husbandry, R.S.Pura, Jammu
10.	Dr. S.A Mallick	Dean, Faculty of Basic Sciences, Chatha
11.	Dr.R.K.Arora	I/c KVKs & ADE, Directorate of Extension, Chatha
12.	Dr. ShahidAhamad	Deputy Director Research, Directorate of Research, SKUAST-Jammu
13.	Dr.Vikas Sharma	Assoc. Prof, Division of Soil Science
14.	Dr.Satish K. Sharma	Asstt. Professor/Farm Manager, Chakroi
15.	Dr. Ramesh Bali	Assoc. Prof., Sericulture, Udheywala
16.	Dr.V.B.Singh	I/C ,FRRSS, Raya
17.	Dr. Praveen Singh	Asstt. Professor ,PBG
18.	Dr. R. Katoch	Prof.&Head, VPA
19.	Dr. M.S. Bhadwal	Assoc. Dean,F.V.Sc.,R.S.Pura
20.	Dr. Anil Kumar	ADR, ACRA, RakhDhiansar
21.	Dr. S.K. Gupta	Professor , Division of Agro Forestry
22.	Dr. Kamal Sharma	Assoc. Prof, Division of VAN
23.	Dr.Vinod Gupta	I/C RARS, Rajouri
24.	Dr.Meenakshi Gupta	Assoc. Prof.(Agronomy)
25.	Dr.P.S.Mahapatra	Assoc. Prof., Division of VPB
26.	Dr.R.K.Sharma	Prof.& HOD , Division of AWN

27.	Dr.S.K.Kotwal	Prof.& HOD, Division of VPHE
28.	Dr. A K Sharma	Assoc. Prof. Division of Agronomy
29.	Dr.Upma Dutta	Asst. Prof (Microbiology)
30.	Dr.Neetu Sharma	Asstt.Prof. Division of Agronomy
31.	Dr.SonikaJamwal	Jr.Scientist (Pl.Path.)
32.	Dr.N.P.Thakur	I/c FSR, Chatha
33.	Dr. A.K. Gupta	Assoc. Professor ,FSR, Chatha
34.	Dr.Brinder Singh	ACRA, Dhainsar
35.	Dr.Rakesh Kumar	Asstt. Professor, RRSS, Raya
36.	Dr.Ravinder Singh Sudan	Sr. Scientist & I/C AICRIP Maize, Udhampur
37.	Dr.V.K.Wali	Prof.& Head , Division of Fruit Science
38.	Dr. D. Chakarborty	Asstt. Prof. , Division of AGB
39.	Dr.M.C.Dwivedi	Asstt. Professor / F.M., Chatha
40.	Dr.Mudasir Sultana	Head, Division of VPT
41.	Dr. Anil Gupta	Professor & Head Division of Plant Pathology
42.	Dr.L.M.Gupta	Assoc.Prof. Division of Agroforestry
43.	Dr.K.K.Sood	Prof.& Head, Division of Agroforestry
44.	Dr.Utsav Sharma	Head, Division of VGO
45.	Dr.MahitalJamwal	Senior Scientist & Head, RHRSS, Bhaderwah
46.	Dr.Manmohan Sharma	Assoc.Prof. SBT, Chatha
47.	Dr. R. R. Jat	Assoc. Dir. Extension, Chatha
48.	Dr, B. R. Bazaya	Assoc. Professor & I/C AICRIP, Division of Agronomy
49.	Dr.NarinderPanotra	Jr. Scientist, OFRC, Chatha
50.	Dr. S. K. Gupta	Prof & Head Division of, F.V.Sc.
51.	Dr. Sunil Kumar	Assoc. Prof. LPT, R. S. Pura
52.	Dr. S.E. H. Rizvi	Prof & Head div. of statistics & CS
53.	Dr. R. Puniya	Jr. Scientist , Agronomy
54.	Dr. P. Baru	Associate Director Research (H.Q.)
55.	Dr. B. S. Jamwal	Chief Scientist, I/C PRSS Samba
56.	Dr.A.K.Razdan	Professor &Head, Division of PBG
57.	Dr.K.R. Sharma	HOD, Soil Science
58.	Dr. A.P. Rai	Asstt. Prof. Soil Science
59.	Dr. A K. Mondal	Prof. Soil Science

60.	Dr. M. P. Sharma	Prof. Division of Soil Science
61.	Dr.Arvind Kumar	Asstt. Prof. LPT
62.	Dr. Vishal Raina	Asstt.Prof.(PBG)
63.	Dr.PardeepWali	Associate Director Research
64.	Dr. A P. Singh	Sr. Scientist, AICRPDA
65.	Dr. R K Gupta	Prof & Head, Veg. Science & Floriculture
66.	Dr. V. Kaul	Prof & Head, Entomology
67.	Dr.AnjuBhat	Assoc. Prof. PHT
68.	Dr.Sant Ram	Director ,SHDJ
69.	Dr.AbhijitSamanta	Sr. Scientist ,WMRC
70.	Dr. Vijay Bharti	Sr. Scientist WMRC
71.	Dr. A K. Gupta	Assoc. Prof. ,Division of VSR.
72.	Dr. P.K. Gupta	Joint, Director A. H .Department, Jammu
73.	Dr. D.K. Chauhan	Jr. Scientist, RHRS,Doda
74.	Dr. Sushil Sharma	Prof &Head ,Agri. Engg.
75.	Dr. Vijay Khajuria	Jr. Scientist, Division of Agronomy
76.	Dr. S. K. Gupta	HOD, ILFC, R. S. Pura
77.	Dr.JyotiKachroo	Prof & Head, AEABM
78.	Dr. Anil Bhat	Asst. Prof. AEABM
79.	Dr.Reena	Sr. Scientist, ACRA Dhainsar
80.	Dr.ParshantBakshi	Incharge, ACHR, Udheywalla
81.	Dr. R.N. Pandita	Joint Director Fisheries
82.	Dr.Rohit Sharma	Jr. Scientist, Jammu
83.	Dr.Sanjesh Gupta	Project Officer Fisheries, Jammu
84.	Dr.BrijNandan	Sr. Scientist, PRSS,Samba
85.	Dr.VikasAbrol	Sr. Scientist, ACRA, SKUAST-Jammu
86.	Dr. Tarvinder Singh	Jt. Director, Horticulture, Jammu
87	Dr. Anil Taku	Head, Vety. Microbiology
88	Dr.Gurdev Chand	Div. Plant Physiology
89	Dr.Peeyush Sharma	Div. of Soil Science & Ag. Chemistry
100	Dr.BalbirDhotra	Asstt. Prof. ACHR, Udhewala
101	Dr. Rajeev Bharat	Jr. Scientist Agronomy
102	Dr.Rajinder Raina	Head VAHEE, FVSc

103	Dr. S.K Singh	Asstt. Prof.Pl.Path. Directorate of Research
104	Dr.R.K.Salgotra	Coordinator, School of Biotechnology
105	Dr. A K Raina	Chief Scientist, Water Management, Chatha
106	Dr. ShaguftaAzmi	Prof & Head, Division of Veterinary Pathology
107	Dr. R. Singh	Prof., Division Veterinary Medicine
108	Dr.Anjani Kumar Singh	Asstt. Prof. (PBG), Chatha
109	Dr. J. S. Soodan	Prof.& Head, TVCC,
110	Dr. Akash Sharma	Asstt. Prof., ACHR, Udheywalla
111	Dr. Devinder Sharma	Entomology, Asstt.Prof., division of Entomology
112	Dr.Vivek M. Arya	Asstt. Professor, Division of Soil Science
113	Dr.Amitesh Sharma	Asstt. Prof.,PBG, Directorate of Research
114	Dr.Vikas Sharma	Asstt.Prof., Division of Plant Physiology & Biochemistry.
115	Dr.Magdeswar Sharma	Asstt.Prof.(Entomology), Megaseed,Chatha