Indian Potato News

A Half Yearly Newsletter of Indian Potato Association

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From President's Desk

The country's revival in several sectors since independence has been unprecedented and unparalleled. The Indian government has designated this year as 'Azadi Ka Amrut Mahotsav' to commemorate and celebrate 75 years of progressive India, as well as the great history of its people, diverse culture, and achievements in various disciplines. The official voyage of "Azadi Ka Amrut Mahatsov" began on March 12, 2021, and will conclude on August 15, 2023, following a 75-week countdown to our 75th anniversary of independence. The Prime Minister emphasised the importance of five pillars as a guiding force for moving forward while retaining dreams and responsibilities as inspiration: Freedom Struggle, Ideas at 75, Achievements at 75, Actions at 75, and Resolves at 75. Agriculture is the country's most important industry, and it is responsible for the country's food grain self-sufficiency. Previously known as a "begging bowl," the country is now known as the "bread basket," feeding not only its own people but also exporting several food items to the rest of the world. Between 1950-51 and 2020-21, the country increased food grain production 5.6 times, horticultural crop production 10.5 times, fish production 16.8 times, milk production 10.4 times, and egg production 52.9 times, resulting in a visible impact on national food and nutritional security. In the country, horticulture production has surpassed food grain production. This year's August 26th was marked by a nationwide campaign for 'Food and Nutrition for Farmers'.

The Indian Potato Association, Shimla, and the ICAR-Central Potato Research Institute, Shimla, had also organised special events such as Kisan Gosthi, an international conference, seminars, and interactions with the farming community on the themes of "Food and Nutrition for Farmers" and "Natural Farming." The country has undoubtedly achieved a record level of food grain production, ensuring food security for all of us, but the picture is different when it comes to nutritional security in the country. This is reflected in the country's rising rates of malnutrition, stunting, and wasting among children. The annual UN FAO report this year is titled "The International Year of Fruits and Vegetables 2021 (IYFV)," as declared by the UN General Assembly. The goal was to raise awareness of, direct policy attention to, and share best practises on the nutritional and health benefits of fruit and vegetable consumption, the contribution of fruit and vegetable consumption to the promotion of diversified, balanced, and healthy diets and lifestyles, and to reduce fruit and vegetable loss and waste. The Indian government has also launched a number of initiatives to ensure nutritional security. Several bio-fortified varieties of various crops have been released, each enriched with a different nutrient. Bio-fortification differs from conventional fortification in that it aims to increase nutrient levels in crops during plant growth rather than during crop processing. Iron-biofortification of rice, beans, sweet potato, cassava, and legumes is one example, as is zinc-biofortification of wheat, rice, beans, sweet potato, maize, and provitamin. Potatoes (*Solanum tuberosum* L.) are a nutritious food crop due to their high yield potential, edible energy, and nutritive value. With global economic development accelerating and food habits changing, there is ample opportunity for increased potato demand in terms of fresh consumption, processing, export, and quality seed. This would result in greater diversification of production, consumption, utilisation, and trade, boosting the global economy. Potato production must increase by 89 percent to 711.5 million tonnes by 2050 to meet rising demand. However, rising cultivation costs, particularly farm inputs, stagnant productivity, shrinking cultivable land area, more complex biotic and abiotic stresses, insufficient availability of quality seeds and varieties, post-harvest loss, insufficient value addition, and climate change pose serious threats to sustainable potato production and utilisation. To meet future challenges and capitalize on opportunities, the research and development network would need to be strengthened further in order to increase productivity.

Narendra Kumar Pandey
President IPA & Director (A)
ICAR-Central Potato Research Institute, Shimla-171001

IN THIS ISSUE

New Reports/ Research outcomes

Gluten-free potato porridge and semolina

Arvind Kumar Jaiswal, Pinky Raigond, Milan Kumar Lal, Sushil S Changan, Dharmendra Kumar, Brajesh Singh

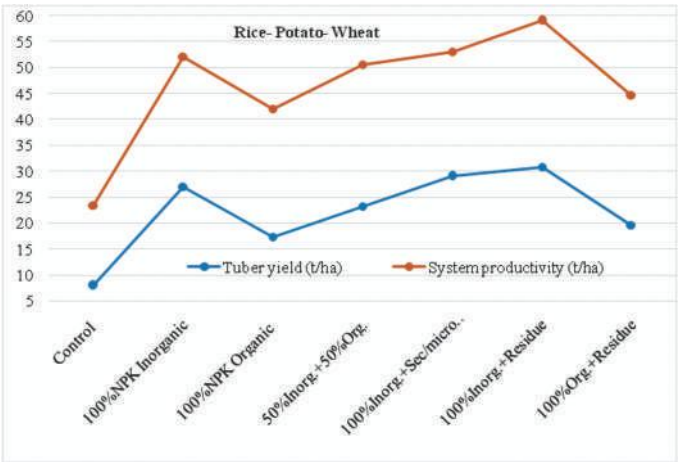
Potato is one of the most important food crops in the world which is a good source of minerals, carbohydrates, fiber, antioxidants, starch, and vitamins. But the short shelf life of potatoes due to its perishability is a big challenge for its preservation at the consumer level. Among the different preservation methods drying is commercially accepted and economic for preserving the vegetables and reducing the bulk weight. In this direction ICAR-CPRI has standardized the process for dehydration of fresh potato as well as particle size of dehydrated potato for their utilization in the form of Porridge/Daliya and Semolina. We all are well aware of dishes and sweets prepared from wheat based porridge and semolina similar to that ICAR-CPRI developed potato porridge can be cooked in milk or water and eaten with salt or sugar added. It can be consumed as breakfast or whenever a light meal is required with added fruits or vegetables by the population of all ages. Moreover, potato porridge is a gluten-free alternative of wheat porridge for a population suffering from celiac disease or wheat allergy. Due to fasting friendly properties, its demand will be higher during festive seasons/ Navratri, and other occasions where cereals and millets cannot be consumed. The technology involves the use of the whole potato of medium to high dry matter varieties. Potatoes of all size, shape, and duration of storage can be used for making the porridge and semolina. These products have a shelf life of 9 months if stored in a cool, dark and dry place.

Potato porridge/daliya

Long term plant nutrition effect on rice-potato- wheat system productivity

Sanjay Rawal, Mohammad Alimuddin Khan, Manoj Kumar, Vijay Kumar Dua, Naresh Chand Upadhayay, Pooja Mankar

Potato is widely sandwiched in predominant rice-wheat cropping system in Indo-Gangetic plains of India. However, intensification of this system raises questions on its sustainability due to higher input use. For this, a replicated long term field experiment was conducted during 2005-06 to 2018-19 at CPRI RS Modipuram in Ustochrept soils consisting seven treatments. Rice cv. Sugandha-5 (150: 60: 60 kg/ha), potato cv. Kufri Pukhraj (180: 80: 100 kg/ha) and wheat cv. Pusa Gold (120: 60: 30 kg/ha) were given recommended doses of N: P: K for the region through organic and inorganic sources. In thirteenth crop cycle, 100% inorganic nutrition+crop residue (30.1 t/ha) started exhibiting improvement (11.5%) in potato yield over 100% inorganic treatment (27.0 t/ha). Similar trend was observed in system productivity (13.2%). Absolute control still maintained tuber and system productivity of 7.1 and 23.4 t/ha, respectively. In 100% organic nutrition, potato could maintain 64.3% productivity in comparison to 100% inorganic treatment. Productivity of rice and wheat was similar in organic and inorganic nutrition. Observations suggest that inherent capacity of soil still supports crop yields, and integration of inorganic-organic sources would be better for achieving sustainable productivity in this system. Further, system based optimum nutrient requirements should be worked out for different agro-ecologies of Indo-gangetic plains after utilising available crop residues within this system.



Plant nutrition effect on tuber and system productivity (2017-18)

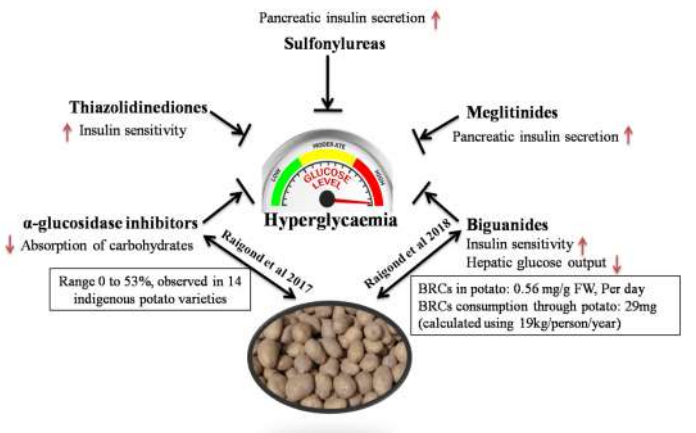
Novel studies on anti-diabetic compounds in potatoes

Pinky Raigond, Vandana Parmar, Asha Thakur, Som Dutt, Sushil S. Changan, Dharmendra Kumar, Milan Kumar Lal, Brajesh Singh

Anti-diabetic compounds such as biguanide and related compounds, α-glucosidase inhibitors, total phenols and chlorogenic acid in Indian potato varieties (released by CPRI) have been evaluated at ICAR-CPRI. For treatment of diabetes, pharmacological agents such as sulphonylureas, biguanides, α-glucosidase inhibitors, thiazolidinediones and meglitinide are used. Among these pharmacological agents, biguanides increase insulin sensitivity and decrease glucose absorption and hence reduce hyperglycaemic. Biguanides related compounds include guanidine, galegine, metformin, phenformin, urea, biuret, L-arginine and few others. Among these compounds, metformin is the first line drug of choice used for the treatment of type II diabetes. Potatoes have been reported to contain antidiabetic compounds such as biguanide and related compounds, particularly metformin. These compounds are present in potato peel, flesh and even in sprouts. The concentration of BRCs varied from 0.47-1.90 mg/g FW in peel

and from 0.42-1.17 mg/g FW in flesh. α–glucosidase inhibitory enzyme/ inhibitors contributes in management of hyperglycemia, linked to type II diabetes. Therefore early stages of type II diabetes could be controlled via inhibition of α–glucosidase, which participates in the overall digestion and uptake of carbohydrates from the diet. α-glucosidase inhibitory activity was reported in range from 0.3 to 53% in Indian potatoes. Polyphenols decrease hyperglycemia and improve acute insulin secretion and insulin sensitivity. The possible mechanisms include decrease in glucose absorption in the intestine, inhibition of carbohydrates digestion, stimulation of insulin secretion, modulation of glucose release from the liver, activation of insulin receptors and glucose uptake in insulin-sensitive tissues, modulation of intracellular signaling pathways, and gene expression. Total phenols in Indian potatoes ranged from 27 to 145mg/100g DW. Chlorogenic acid is dominating phenolic acid and almost 90% of total phenol is chlorogenic acid in potatoes. Chlorogenic acid acts as insulin sensitizer and plays same function as that of metformin. Chlorogenic acid in seven potato varieties ranged from 9-110 µg/g FW in flesh and 162-329 µg/g FW in peel.

In line with presence of various types of antidiabetic compounds in potatoes, the lyophilized potato powder has shown antihyperglycemic activity in diabetic rats. Lyophilized powder of three indigenous potato varieties viz. K. Bahar (contains biguanide related compounds, phenols), K. Pushkar (contains α-glucosidase inhibitory activity, biguanide related compounds, phenols) and K. Surya (contains highest concentration of antioxidants compared to other two varieties, biguanide related compounds, phenols) administered to streptozotocin induced diabetic rats showed blood glucose lowering properties. Powder of potato variety K. Surya decreased the blood sugar level more than metformin. Single dose (300mg/kg body weight) of K. Surya and K. Pushkar caused time dependent decrease in blood glucose level in hyperglycemic rats. After 5 h of treatment blood glucose decreased to 23.6% with metformin (control), whereas decrease reported with K. Surya and K. Pushkar powder was 29.7% and 18% respectively. Variety K. Bahar did not exert any significant effect on blood glucose level in streptozotocin induced diabetic rats. This study showed that varieties rich in antioxidants and antidiabetic compounds exhibit blood glucose lowering properties. Overall all these studies/results indicate that potato may not be as harmful for diabetics and obese as much they are blamed for.



Innovative method to make crispy French fries using microwave heating prior to frying

Bandana, Vineet Sharma, Brajesh Singh, Manoj Kumar

Microwave frying for food products may be considered as a new way of improving the quality of the fried foods. In this study, the effects of microwave on quality of French fry were monitored. French fries (dimension of 1cm x1cm x 1cm) were divided into four portions and subjected to microwave heating for 1minutes, 2 minutes, 3minutes and without microwave heat. Microwave heating was followed by deep fat frying till the French fries reached the scale of acceptance. During the operation, 180°C of temperature was maintained during frying. Among the treatments, French fry colour was best (score 2.3) with 3 min microwave heating and 1.5 min frying as compare to control (5.0) (without microwave heating and with 5 min frying). Results recorded that time of frying decreased with microwave heating and droopiness was not observed after keeping French fries up to one hour before consumption as compared to traditional method.

Role of foliar P in potato

Ridham Kakar, Yara Fertilisers India Pvt Ltd.

Proper phosphorus management is critical for successful potato production. Potatoes have essentially high phosphorus requirements for increasing the number and weight of tubers, but a root system is incapable of sustainable and efficient P uptake. Furthermore, soil-applied P suffers from limitations like soil pH, texture, and P mobility which effect crop use efficiency and relative yield. Criticality and limitations pertaining to P and volatility in P fertilizer market, make it inevitable to compliment soil-applied phosphorus through foliar. However, foliar-applied P should be in the form which is safe and has ease in uptake through stomatal and cuticular pores. Also, for increasing the chance of uptake, foliar fertilizer should have improved wetting (smaller contact angle at leaf fertilizer interface). But before both uptake and translocation, foliar fertilizer must adhere to the leaf. Bearing all these criteria in mind Yara formulated foliar phosphorus which has a right and rare combination of 23 % P and 3 % Ca. This foliar phosphorus is not based on potassium phosphate, which is a non-formulated product and not recommended for foliar application, making it safe. Yara's foliar

phosphorus has been formulated with both a wetting and sticking agent leading to efficient foliar uptake and recovery of nutrients. Application of this foliar phosphorus at high phosphorus requiring stages of potato extends P use efficiency and sufficiency in the plants. Furthermore, this foliar phosphorus contains several times lower levels of heavy metals compared to the other counterparts. Also, its huge tank mixability makes it convenient and economical for the farmer to apply with other crop protection agrochemicals. India initiated the use of this foliar phosphorus @ 500 ml/acre at tuber initiation and tuber bulking stages, at various locations in UP and Punjab (Var- Chipsona, Pukhraj and Jyoti). Results showed 29 to 40 % increase in tuber number, 11 to 40 % increase in tuber weight and 10-12 q/acre increased yield.

Conference/ Seminar /Events

International Potato e-Conference New Paradigms in Food Security and Industrial Applications (23-26th Nov., 2021)

ICAR-Central Potato Research Institute (CPRI) in collaboration with International Potato Centre (CIP) and Indian Potato Association (IPA) organized an International Potato e-Conference - New Paradigms in Food Security and Industrial Applications during 23-26th November, 2021. The conference was inaugurated by Dr. T Mohapatra, Secretary, DARE & DG, ICAR, New Delhi as chief guest. The inaugural session was presided over by Dr. A.K. Singh DDG (HS), ICAR and Dr. Sam Mohanty, Regional Director, CIP, Asia, Dr. Parvinder Kaushal, VC, YSPUHF, Solan and Prof. H.K. Chaudhary, VC, CSKHPKV, Palampur were the guests of honour. In the conference all major researchable issues were discussed under six themes covering potato genetic resources, potato breeding, omics, disease and pest resistance, physiology and post-harvest management, artificial intelligence, precision agriculture, crop management, climate change and extension technologies. The conference also had a dedicated session on industry and seed value chain. There were 20 international lead talks by eminent potato researchers and industry experts across the globe representing all major potato growing nations, 22 national speakers, 42 oral presentations, 57 poster presentations and 185 registered participants. The international resource persons represented the major organizations like The James Hutton Institute, Scotland; Oregon State University, USA; University of Wisconsin-Madison USA; Wageningen University, The Netherlands; CIP, Peru; Cornell University, USA; Colorado State University, USA; Bayer Crop Science Ltd.; Simplot, Australia etc. The event was conceived and organized to mark the International year of Fruits and Vegetables, 2021 and celebration of 75th year of Indian Independence. The major partners viz., CIP, Technico, Allround, UPL, Pepsico, McCain, Bhatti Biotech, Mahindra HZPC and Agdia were the sponsors of the conference. The institute has taken the cognizance to the major recommendations emanated during the conference.

Potato Farmers- Exporters- Scientist Interface

ICAR-Central Potato Research Institute Regional Station Modipuram organized an interactive meeting and visit of early potato export trial harvest for potato growers and exporters on 04 January 2022. The institute is already running a project for promoting and strengthening potato export from India particularly from Uttar Pradesh and Gujarat. Efforts are on for selecting promising potato varieties and developing production & protection technologies for high quality potato production. Initial findings are encouraging as stakeholders showed keen interest in varieties Kufri Neelkanth and Kufri Kiran, and in one advanced water stress tolerant hybrid WS/ 07-113. Stakeholders were also encouraged for making a supply chain of potato export from western UP during interactive session.

Visit to the field trials

Discussion between farmers, exporters and scientist

National Symposium

A National Symposium on "Strategic Plant Disease Management for Food Security" was jointly organized by ICAR-Central Potato Research Institute, Shimla and Indian Society of Plant Pathologists (INSOPP), Punjab Agricultural University, Ludhiana on 6-7 December, 2021 at ICAR-CPRI, Shimla. This symposium was organized by Dr Sanjeev Sharma, PS & Head (A), Division of Plant Protection, ICAR-CPRI, Shimla in the capacity of Organizing Secretary. About 125 participants from Himachal Pradesh, Punjab, Haryana, Delhi, Jammu & Kashmir, Uttarakhand and Gujarat participated in the event.

Development and demonstration of drone-based potato crop management technologies

A potato farmer's meet was organized by ICAR- CPRI, Bayer Crop Science and General Aeronautics on 06 December 2021 at ICAR-CPRI RS Jalandhar. The session was planned to create awareness about the potential of drone-based potato crop management technologies. Representatives of all three organizations made presentations of drone technology, potato crop management and compatible chemicals for drone usage. In addition, General Aeronautics carried out live demonstrations of efficient autonomous variable rate spray technology. Different aspects of this technology were discussed during both sessions. Farmer's queries mainly focused on drone operations in different weather and crop conditions, safety and economics of this technology. The growers' response was highly encouraging, and they are eagerly looking forward to leveraging this technology as soon as it is made available.

Awards/Honours/Promotions

Dr. Ravinder Kumar, Senior Scientist (Plant Pathology), Division of Plant Protection, IC AR-CPRI, Shimla, Himachal Pradesh was awarded IPA-Chandra Prabha Singh Young Scientist Award for the year 2019-20 in recognition of his outstanding contribution in potato research and development.

Dr. Prem Singh Dahiya, Ex-PS, ICAR-CPRI, Shimla was awarded the fellowship of Indian Potato Association, Shimla for the year 2020 for his outstanding contributions in the field of potato research and development.

Dr. Jagdev Sharma, PS, ICAR-CPRI, Shimla was awarded the fellowship of Indian Potato Association, Shimla for the year 2020 for his outstanding contributions in the field of potato & grape research and development.

Dr. SNS. Chaurasia, Principal Scientist and Ex. Head, Division of Vegetable Production, ICAR-IIVR, Varanasi, UP was awarded the fellowship of Indian Potato Association, S himla for the year 2021 for his outstanding contributions in the field of vegetable research and development.

Drs. Vinay Bhardwaj and his associates were conferred IPA-Gold medal for best research paper entitled "Efficiency and reliability of marker assisted selection for resistance to major biotic stresses in potato" published in Potato Journal in the year of 2019.

Dr Sanjeev Sharma, PS & Head (A), Division of Plant Protection, ICAR-CPRI, Shimla, was awarded the fellowship of the Indian Society of Plant Pathologists (IN SOPP), PAU, Ludhiana for the year 2021 for his outstanding contributions in the field of potato research and development.

Dr. Vinay Bhardwaj, Principal Scientist, Division of Crop Improvement & Seed Technology, ICAR-CPRI, Shimla was awarded the fellowship of Indian Society of Genetics & Plant Breeding (ISGPB) for the year 2021 for his outstanding contributions in the field of potato research and development.

Dr Chandra Sekhar Praharaj, PS and Head, Crop Production Unit, ICAR-DGR, Junagadh conferred ISA Gold Medal 2018 during International Agronomy Congress 2021 held at PJTSAU, Hyderabad from Nov 23-27, 2021.

Dr Chandra Sekhar Praharaj, PS and Head, Crop Production Unit, ICAR-DGR, Junagadh was recognized as Editor of Indian Journal of Agronomy for the 2020-22.

Dr Chandra Sekhar Praharaj, PS and Head, Crop Production Unit, ICAR-DGR, Junagadh conferred Reviewer Excellence Award -2021 in recognition of significant and outstanding contribution to the Journals viz., Indian Journal of Agricultural Research and Legume Research- an International Journal.

Dr. Anuj Bhatnagar, PS, ICAR-CPRI, RS, Meerut (UP) was conferred best oral presentation award for the entitled "Efficacy and economics of novel insecticides against sucking insect pests of potato (Solanum tuberosum Linn.) in Northern India" during Golden Jubilee International conference on Global perspective in crop protection for food security held at TNAU, Coimbatore, India from 08-10 December, 2021.

Dr. Sundaresha S, Sr. Scientist, ICAR-CPRI, Shimla was conferred best oral presentation award for the entitled "Proposed Biosafety Research Level (BRL) stage trials for evaluation of the marker free KJ66SP951 potato event possessing field resistance to late blight" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. KN Chourasia, Scientist, ICAR- CRIJAF, Kolkata was conferred best oral presentation award for the entitled "PotSatDB (Potato Satellite Data Base): First comprehensive database of simple sequence repeat markers in Potato" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Mr. Ashwani Kumar, Ph. Scholar, ICAR-CPRI, Shimla and his associates were conferred best poster presentation award for the entitled "Generation of the DMC1 mutants by using RNA interference (RNAi) approach in Potato" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. VK Gupta, Pr. Scientist, ICAR-CPRI, RS, Meerut was conferred best oral presentation award for the entitled "Two-decade journey of potato processing in India and future prospects" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. RP Kaur, Sr. Scientist, ICAR-CPRI, RS, Jalandhar was conferred best oral presentation award for the entitled "Assessment of Variability for keeping quality parameters and selection of good keeping accessions in the Indian Germplasm collection" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. Salej Sood, Sr. Scientist, ICAR-CPRI, Shimla and his associates were conferred best poster presentation award for the entitled "High throughput Screening for Self-Compatibility and Homozygosity using KASP Markers for Diploid Hybrid TPS Breeding" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Ms. Amruta S Bhat, Assistant Professor, UHS, GKVK, Bengaluru, Karnataka and her associates were conferred best poster presentation award for the entitled "Studies on the field performance of apical rooted cuttings in potato: a new technology to produce quality disease free seed tubers locally in Karnataka" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. Ashwani K Sharma, Pr. Scientist, ICAR-CPRI, Kufri, Shimla and his associates were conferred best poster presentation award for the entitled "Studies on production behavior of fresh and one year older aeroponic mini tubers under protected conditions in high hills" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. Yogita Bohra, Assistant Professor, PAU, Ludhiana was conferred best oral presentation award for the entitled "Relay of mechanisms underlying "Cu-Chi-Tri" consortia for potato late blight disease management" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. Mohd. Abas Shah, Scientist, ICAR-CITH, Srinagar was conferred best oral presentation award for the entitled "Evaluation of chlorine dioxide for the management of Common scab of potato" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. Subhash S, Scientist, ICAR-CPRI, RS, Meerut was conferred best oral presentation award for the entitled "Essential oils applied on sticky traps increase trapping of aphids in Potato under field condition" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. Ravinder Kumar, Sr. Scientist, ICAR-CPRI, Shimla and his associates were conferred best poster presentation award for the entitled "Standardization of a one-step reverse transcription-recombinase polymerase amplification protocol for rapid and sensitive detection of potato virus X in potato" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. Rahul Kumar Tiwari, Scientist, ICAR-CPRI, Shimla and his associates were conferred best poster presentation award for the entitled "Morpho-molecular Identification and Characterization of Potato Dry Rot Caused by Fusarium proliferatum in India" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Mr. Chandan Maharana, Scientist, ICAR-CPRI, Shimla and his associates were conferred best poster presentation award for the entitled "Novel AI based approaches for early detection and management of potato diseases" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. Anil K Choudhary, Sr. Scientist, ICAR-CPRI, Shimla was conferred best oral presentation award for the entitled "Phosphorus economy and yield enhancement in potato through co-inoculation of AM-fungi and PSB in a Himalayan acid Alfisol" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. Sunayan Saha, Scientist, ICAR-CPRI, RS, Jalandhar was conferred best oral presentation award for the entitled "Evapo-transpiration and water productivity associations of seed potato in North-Western plains of India over two decades" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. Prince Kumar, Scientist, ICAR-CPRI, RS, Jalandhar was conferred best oral presentation award for the entitled "Carbon footprint of potato production system of North-West India" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. Kapil Kumar Sharma, ACTO, ICAR-CPRI, Shimla and his associates were conferred best poster presentation award for the entitled "Traceability and certification of seed potato by block chain technology" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. Sanjib Kumar Das, BCKV, Kalyani, West Bengal, India and his associates were conferred best poster presentation award for the entitled "Effect of nano-nitrogen and nano-zinc on growth and productivity of potato (Solanum tuberosum L.) in inceptisol" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. Jagdev Sharma, Pr. Scientist, ICAR-CPRI, Shimla and his associates were conferred best poster presentation award for the entitled "Effect Rice husk ash - a potential source of phosphorus nutrition for potato" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. Sushil S Changan, Scientist, ICAR-CPRI, Shimla was conferred best oral presentation award for the entitled "Vacuum Impregnation: A novel tool for development of ascorbic acid fortified potato and its products" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. Arvind Kumar Jaiswal, Scientist, ICAR-CPRI, RS, Jalandhar was conferred best oral presentation award for the entitled "Sprout suppression in potatoes using an essential oil cocktail: a natural alternative to CIPC" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. Milan Kumar Lal, Scientist, ICAR-CPRI, Shimla and his associates were conferred best poster presentation award for the entitled "Effect of Potato Apical Leaf Curl disease on Resistant starch and Glycemic index of Potato (Solanum tuberosum L.)" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. DK Singh, Sr. Scientist, ICAR-RCER, Patna was conferred best oral presentation award for the entitled "FPO as a potential model for potato marketing and export in Eastern India" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. Sant Kumar, Pr. Scientist, ICAR-NIAP, New Delhi was conferred best oral presentation award for the entitled "Returns from Investment in Potato Research in India" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. Pynbianglang K, Scientist, ICAR-CPRI, Shimla was conferred best oral presentation award for the entitled "Varietal Replacement Rate of Potato in India: Implications for Extension" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

Dr. NK Pandey, Director (A), ICAR-CPRI, Shimla and his associates were conferred best poster presentation award for the entitled "Economic Impact of Early Bulking and Drought-Tolerant Potato Cultivar Kufri Pukhraj in India" during International Potato e-Conference-2021 held virtually at ICAR-CPRI, Shimla, India from 23-26 November, 2021.

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