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Evaluation of Potato (*Solanum tuberosum* L.) Hybrids and Varieties for Medium Maturity and Quality Components for North - Central India

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ABSTRACT: A field experiment was conducted at the ICAR-Central Potato Research Station, Gwalior, Madhya Pradesh, during 2019–20 and 2020–21 to evaluate advanced potato hybrids and varieties for quality and biochemical parameters for commercial cultivation in the North Central region of India. A total of 21 potato cultivars (11 hybrids and 10 varieties) were evaluated. A randomized block design was used to plan the experiment in three replications. Two potato varieties (Kufri Lalit, Kufri Neelkanth) and two hybrids (P-28, MS/12-2116) out of twenty-one performed best in respect of their different bio-chemical properties and hence are recommended for the processing industry in North- Central India. The objective of this work was to evaluate tuber yield at medium maturity. Keeping this view in mind, the present study set out to select suitable and improved varieties of potato having superior growth yield & quality characteristics and better economic variability for commercial production for north- Central India. Variations in quality and biochemical parameters, *viz.,* dry matter content (%), starch content, reducing sugar, total soluble solids, protein content, phenols, and total free amino acids, were recorded in two years among hybrids and varieties tested under the study. Dry matter content was significantly highest in hybrid P-12 (19.71%), and hybrid P-28 (22.20%), hybrid PS/6-39 (25.07%) for 75, 90 DAP and senescence. Reducing sugar content was low in control variety Kufri Lalit, (243.00mg/100) at 75 DAP and (183.67%) at 90 DAP and highest reducing sugar content in control Kufri Khyati (252.67mg/100) at 75 DAP and hybrid J/7-37 (263.00mg/100) at 90 DAP. Low phenol content was recorded in hybrid J/7-37 (91.00 mg/100) on both harvesting days. Hybrid MS/8-1148 (94.67mg/100) at 75 DAP and (83.64mg/100) at 90 DAP contains the mean lowest free amino acid content. The highest starch content (%) was recorded in the control variety Kufri Lalit, (74.41%, 76.26%) on both harvesting days. The highest protein content (%) was recorded in hybrid PS/06-88 (4.93%) at 75 DAP and hybrid MCIP/12-185 (5.56%) at 90 DAP. Highest total soluble solids were recorded in hybrid PS/6-39 (5.41 Brix°) at 75 DAP and hybrid PS/6-39 (7.73 Brix°) at 90 DAP. Under the present study, among hybrids J/7-37 (38.74 t/ha), MS/12-2116 (43.63 t/ha), and P-28 (70.03 t/ha), and among controls K. Neelkanth (42.38 t/ha), K. Lalit (49.13 t/ha), and K. Lalima (66.49 t/ha), significantly higher yields were recorded for 75 DAP, 90 DAP, and at senescence two potato varieties (Kufri Lalit, Kufri Neelkanth) and two hybrids (P-28, MS/12-2116) were found to be suitable for farmer. These potato hybrids and varieties will sustain farmers' income in the changing climate scenario in north-central India.

Keywords: Potato varieties, potato hybrids, dry matter, tuber yield, starch content, reducing sugar, total soluble solids, protein content, phenols, and total free amino acids.

INTRODUCTION

The potato (*Solanum tuberosum* L.) is the king of vegetables. It is commonly grown for starchy tubers. Indian vegetable baskets are incomplete without potatoes. Its dry matter, edible energy, and edible protein make it a nutritionally superior vegetable as well as a staple food not only in our country but also throughout the world. It is the fourth largest crop in terms of fresh produce after rice, wheat, and maize (Kabira and Lemaga 2003). In central India, where the potato crop duration is around 90–100 days for a medium duration crop, where it is grown in winter under mild temperatures and short days, the photoperiod is about 10–12 hours a day from October to February. The central region is free from major potato diseases and insects (Pandey *et al.,* 2005). The potato produces more energy and protein per unit area and unit of time than most other major food crops, and it is fat-free (Lutaladio and Castaldi 2009). The potato is also rich in several micronutrients and vitamin C (FAO, 2008), a source of iron, vitamins B1, B3, and B6, and minerals. It is a source of dietary antioxidants, which may play a part in preventing diseases related to ageing, and a source of dietary fibre (Mulatu *et al.,* 2005). Potato is a staple food in most countries and is a good and cheap source of food calories and its high starch content can meet the energy requirements of the people living in food deficit countries. It is a wholesome, nutritious, and versatile food that can come to the rescue of developing countries in alleviating hunger and malnutrition, especially in areas with shrinking land resources. The average composition of the potato is about 80% water, 2% protein, and 18% starch. As a food, it is one of the cheapest and easily available sources of carbohydrates and proteins and contains an appreciable amount of vitamins B and C as well as some minerals. Moreover, the protein in potatoes is of high biological value (Qasim *et al.,* 2013). The crude protein content is 2.0%, and the fat content is very low at 0.1%. The ash, consisting of minerals, constitutes 1.0%. In addition, potato tubers contain fiber, vitamins, and glycoalkaloids in small quantities. Most European varieties, introduced earlier in India, performed poorly because conditions in India are entirely different from those prevalent in temperate countries. A need was, therefore, felt that potato cultivation in India cannot depend on exotic varieties and technologies and the country must have its own research and development programme for potatoes. Before recommendation of any variety/crop suitable for the region, it is pertinent to evaluate genotypes, giving emphasis on the aspects of genotypic suitability and yield (Kanaujia and Manjai Phom 2016). Potato is known as a protective food because it contains lysine, which is one of the important amino acids. Potato contains water (74.7-75%), sugar and starch (22.9%), fat (0.1%), minerals &vitamins (0.6%) & protein (1.21-2%) (Nandekar *et al.,* 2009). Phenolics and flavonoids, such as flavonols, anthocyanins, and carotenoids, are major phytochemical compounds available in potatoes. Among these phytochemicals, phenols impart organoleptic properties as well as health benefits. (Brown *et al.,* 2005). ICAR CPRI, Shimla, has developed many cultivars of medium maturity durations (90–100 days) for region-specific and national needs for table and processing purposes since its inception, viz. Kufri Jyoti, Kufri Bahar, Kufri Pushkar, and Kufri Badshah, which are the most popular in the country and MP also. In recent years, there are also some important medium maturing varieties with specific characters *viz,* Kufri Garima (heat tolerant), Kufri Neelkanth with high antioxidant.t (anthocyanins> 100µg/100g fresh wt. & carotenoids~200 µg/100g fresh wt.), Kufri Himalini (resistant to late blight), Kufri Mohan and Kufri Ganga (High yielder) have been released for cultivation in the country which are also adaptable for Madhya Pradesh region. Hence, with an increase in demand for cultivars with higher yield and high quality, there is a need to test the new varieties to meet the present increasing demand with the increase in population.

MATERIAL AND METHODS

Field experiments were conducted during 2019–20 and 2020–21 at the Research Farm of ICAR-CPRS Maharajpura, Gwalior (M.P.) under the All India Coordinated Research Project during the Rabi season in a random block design with three replications. Treatment consists of 11 advanced potato hybrids Columba, MCIP/12-185, MS/12-2116, MS/10-1529, PS/06-88, P-12, MS/8-1148, PS/6-39, P-28, MS/9-2196, J/7-37 and 10 control varieties K. Bahar, K. Khyati, K. Lalima, K. Pukhraj, K. Pushakr, K. Lalit, K. Garima, K. Mohan, K. Ganga, K. Neelkanth. Planting was done on 30th October in 2019-20 and 4th November in 2020-21. The experimental field was well drained with loamy soil. Well sprouted seed tubers weighing 35-45 g were planted at a spacing of 60cm×20cm in a plot of 3 m × 3 m. Half of the N (90 kg/ha), full P (80 kg/ha), and full K (120 kg/ha) were applied during planting. The remaining half of nitrogen (90 kg/ha) was applied at the time of earthing up (after 35 DAP). N was applied through ammonium sulphate at the time of planting and through urea at the time of earthting up. P and K were applied through single-superphosphate and murate of potash. Haulm killing was done at 75, 90, and senescence. Yield parameters' like total tuber yield were harvested at 75 DAP, 90 DAP, and senescence. Harvesting was done 15 days later, after the skin had set in both seasons. The dry matter content was determined according to Elfinesh *et al.* (2011). Randomly selected, five whole tubers were cut down into small slices (1-2 mm) from each of the treatments and mixed thoroughly. The dry weight of samples was then determined by drying them at 70°C for 72 hr in a forced air oven. From which the dry matter percentage was calculated with the following formula:

$$\text{Tuber dry matter (\%)} = \frac{\text{Weight of oven dried tuber}}{\text{Fresh weight of tuber}} \times 100$$

Total Starch Content (%) at 75 and 90 days after planting. Homogenize 100 mg of dry tuber tissue in 6.5 mL of 52% perchloric acid and 5 ml of distilled water. Incubate the samples for 24 hours at room temperature to get maximum starch hydrolysis. Centrifuge and retain the supernatant. Again, extract the residue with 5 ml of 52% perchloric acid. Centrifuge and pool the supernatants. Raise the volume to 5 ml with distilled water. Take a 25-ml sample and add 500-ml distilled water. Add 1 ml of freshly prepared anthrone solution. In a boiling water bath, heat for 8 minutes. cool at room temperature. Measure absorbance at 620 nm.

Reducing sugar (mg/100 g) at 75 and 90 days after planting. Weigh 100 mg of the sample and extract the sugars with hot 80% ethanol twice, using 5 ml each time. Collect the supernatant and evaporate it by keeping it in an oven dry at 60ºC. Dissolve the sugar in 1 ml of distilled water. Pipette out 50 µl of the extract into a test tube and equilize the volume with distilled water in all the tubes. Add 50µl of DNS reagent. Heat the contents in a boiling water bath for 6–10 minutes. Cool and read the intensity of the dark red colour at 600 nm. Run a series of standards using glucose (100 mg) and plot a graph.

Protein content at 75 and 90 days after planting. Take a 1 g dry sample and add 5 ml of 0.1 N sodium hydroxide. Vortex and centrifuge (10000 rpm, 10 minutes), collect the supernatant, and raise the volume to 5 ml with 0.1 N sodium hydroxide. Add 1 ml of 15% trichloroacetic acid. Incubate the sample at 4 °C for 24 h. Centrifuge the sample at 5000 rpm for 20 minutes, then discard the supernatant. Dissolve the residue in 5 mL of 0.1 sodium hydroxide.

Total soluble solids (°Brix) at 75 and 90 days after planting. Total soluble solids of the fresh potato tuber were measured at room temperature with the help of a hand refractometer and ranged from 0-32 percent.

Total phenols (mg/100 g) at 75 and 90 days after planting. Grind 100 mg of tissue in 10 ml of 80% ethanol. Centrifuge at 10,000 rpm for 20 min. Collect the supernatant and re-extract the residue with 5 mL of 80% ethanol. Centrifuge and pool the supernatant. Evaporate the supernatant to dryness. Dissolve the residue in 1 ml distilled water. Mix 50µl aliquot with 50µl F-C phenol reagent. Incubate for 3 minutes, and then add 200 l of 35% sodium carbonate. Then vortex mix and raise the volume to 1 ml with distilled water. Heat the samples in a boiling water bath for 1 minute and cool the samples to room temperature. Measure the absorbance at 650 nm.

Total free amino acids (mg/100 g) at 60 and 75 days after planting. Weigh 100 mg of the sample and extract the sugars with hot 80% ethanol twice, using 5 ml each time. Collect the supernatant and evaporate it by keeping it on a oven dry at 60ºC. Dissolve the sugar in 1 mL of distilled water. Take a sample aliquot of 100 l. Add 500µl of ninhydrin solution and make up the volume to 1 ml with distilled water. Heat the samples in a boiling water bath for 20 minutes and cool the samples to room temperature. Add 2.5 ml of diluent and mix properly. After 15 minutes, measure the absorbance of the blue colour at 570 nm. Take 50µl, 100µl, 150µl, 200µl, and 250µl of standard and make the volume 1 ml with 1 ml of proline standard solution. Add 500 µl of ninhydrin solution, boil for 15 minutes, and take readings at 570 nm. Cultivars were evaluated for reducing sugars, phenols, and protein, and starch, total soluble solid and total free amino acids by the standard procedure (CPRI Bulletin 2 bio-chemistry). Data were pooled and analysed statistically, and means were separated according to the least significant differences (LSD) at the 0.05 level of probability.

RESULT AND DISCUSSION

A. Quality Parameters

Dry matter. Dry matter content is one of the most important parameters in the processing industry, as it determines the yield and texture of the processed product. High dry matter and low sugar content in potatoes are ideal for chipping, and they have been associated with yield, crispness, mealiness, and reduced oil uptake in fried products (Grewal and Uppal 1989). For 75 days, maximum crop dry matter content (%) was recorded in hybrid P-12 (19.71%), which was at par with controls K. Neelkanth (18.99%), hybrid P-28 (18.57%), hybrid PS/06-88 (18.45%), control Kufri Garima (18.38%), control K. Lalima (18.29%), hybrid MCIP/12-185 (18.20%), hybrid MS/8-1148 (17.57%), hybrid MCIP/12-185 (17.51%), and K. Pukhraj (17.23%), while the minimum dry matter content (%) was recorded in K. Pushakr (14.14%), followed by the hybrid J/7-37 (14.21%). For 90 days, maximum crop dry matter content was recorded for hybrid P-28 (22.20%), which was at par with hybrid PS/06-88 (22.05%), hybrid P-12 (21.95%), hybrid P-28 (21.51%), and control K. Lalima (21.05%), while the minimum crop dry matter content was recorded in control variety K. Ganga (17.05%), followed by hybrid Columba (17.22%). For senescence, significantly maximum dry matter content was recorded in hybrid PS/6-39 (25.07%), which was at par with two hybrids, PS/06-88 (23.26%), MS/8-1148 (23.90%), while minimum dry matter content was recorded in control K. Ganga (19.76%), followed by K. Neelkanth (20.14%). Dry matter content is subjected to the influence of both the environment and genotypes (Tai and Coleman 1999) (Table 1).

B. Yield parameters

Total tuber yield (t/ha). For 75 days crops, significantly maximum total tuber yield was recorded under the control K. Neelkanth (42.38 t/ha), followed by hybrid MCIP/12-185 (38.18 t/ha), hybrid MCIP/12-185 (36.24 t/ha), control K. Khyati (34.63 t/ha), while minimum total tuber yield t/ha was recorded in hybrid Columba (26.82 t/ha). For 90 days crops, significantly maximum total tuber yield was recorded in control Kufri Lalit (49.13 t/ha), which was at par with control K. Neelkanth (47.55 t/ha), control Kufri Garima (46.84 t/ha), control K. Ganga (46.43 t/ha), while minimum total tuber yield was recorded in hybrid P-12 (34.58 t/ha). For senescence crops, a significant maximum total tuber yield was recorded in hybrid P-28 (70.03 t/ha), which was at par with hybrid MCIP/12-185 (67.59 t/ha), control K. Lalima (66.49 t/ha), and control K. Ganga (66.47 t/ha). while the minimum total tuber yield in hybrid MS/10-1529 is 44.74 t/ha. Preetham *et al.* (2018) found that tuber yield varies significantly depending on variety, location, and genotype × environmental interaction (Table 1).

C. Biochemical Parameters

Reducing sugar. Reducing the sugar (mg/100 g) content of the potato tuber is of great importance in terms of processing potato varieties, especially for cooking and fried products. Potatoes contain high reducing sugars, which make chips unacceptable for consumers owing to excessive darkening and the development of off-flavor (Marwaha 1999). At 75 DAP, control Kufri Lalit (183.67 mg/100) recorded a significantly low mean content of reducing sugar over all other hybrids and varieties, followed by control K. Pukhraj (186.17 mg/100). K. Lalit (183.67 mg/100), a potato harvested at 90 DAP, had significantly lower reducing sugar content than the others. Accumulation of reducing sugar is a genetic characteristic (Feltran *et al.,* 2004), but it is also influenced by several environmental factors. Potato varieties that are used in processing industries normally contain less reducing sugar (Wilde *et al.,* 2004) (Table 2).

Total soluble solids (°Brix). At 75 DAP hybrids, PS/6-39 (5.57 °Brix) recorded significantly higher total soluble solids than all other hybrids and varieties, which were followed by K. Ganga (5.57 °Brix). while the minimum total soluble solid was recorded in control K. Mohan (3.28 °Brix), followed by hybrid MCIP/12-185 (3.57 °Brix). At 90 DAP, the maximum total soluble solid (°Brix) was recorded in hybrid PS/6-39 (7.73 °Brix), while the minimum total soluble solid was recorded in control K. Bahar (3.88 °Brix). TSS variation varies according to genotype, as reported by Rahayu *et al.* (2017).

Phenols and total free amino acids (mg/100 g). Phenolic compound (mg/100g) has been associated with enzymatic discoloration of products, which is an undesirable trait and decreases the cooking quality of tubers. Some of the constituents like tyrosine and ortho-dihydric phenols present in tubers react with oxygen in the presence of the polyphenol oxidase enzyme, and the flesh of the tuber turns brown (Schaller and Amberger 1974). In the present study, Hybrid J/7-37 (91.00 mg/100) had significantly lower mean phenol content than all other hybrids and varieties when tubers were harvested at 75 DAP.

In potatoes harvested at 90 DAP, hybrid J/7-37 (99.00 mg/100) recorded significantly low phenol content, which was followed by control K. Bahar (101.33 mg/100g) over all others. Phenols have antioxidant properties; their higher level is considered desirable in table cultivars;. Therefore, for processing, low levels of total phenols are preferred (Marwaha 2001) (Table 2).

Total free amino acids (mg/100g). The free amino acid content of the cultivars increased up to the last date of harvest. Potato harvested at 75 DAP found that hybrid P-12 (94.67) contains the mean lowest free amino acid content, which was followed by hybrid Columba (96.67) over other treatments. In potatoes harvested at 90 DAP, a significantly low amount of amino acid was observed in control K. Lalima (116.00 mg/100), which was followed by hybrid MS/8-1148 (83.67 mg/100) over others. Free amino acids (mg/100 g) react with reducing sugars at frying temperature to cause non-enzymatic browning or dark coloration of chips (Roe *et al.,* 1990) (Table 2).

Protein content (%). For 90 DAP, maximum protein content (%) was recorded in hybrid PS/06-88 (4.93%), which was at par with hybrid MS/10-1529 (4.85), hybrid PS/6-39 (4.65), and hybrid P-28 (4.50), while minimum protein content was recorded in hybrid MCIP/12-185 (3.97), followed by control K. Khyati (4.31). At 90 DAP, maximum protein content (%) was recorded in hybrid MS/12-2116 (5.56%), which was at par with control MS/10-1529 (5.43%), hybrid P-12 (5.38%), hybrid Columba (5.35%), hybrid PS/06-88 (5.33%), and hybrid MS/10-1529 (5.27%), while minimum protein content was recorded in control K Mohan (4.29%), which was followed by hybrid MS/9-2196 (4.42%). The statistical analysis for protein content of different potato varieties showed significant variation due to production practices, environmental conditions, and genetic factors (Collins *et al.,* 1982) (Table 2).

Starch content (%). The starch content of the cultivars increased up until the last date of harvest. Potatoes were harvested at 75 days after planting, where maximum starch content was recorded for control K. Lalit (74.41%), which was at par with control K. Mohan (73.57%), and control K. Bahar (73.34%), while minimum starch content was recorded for PS/06-88 (70.54%), followed by hybrid MS/8-1148 (70.74%). At 90 days after planting, maximum starch content was recorded for control K. Lalit (76.26%), which was at par with control K. Bahar (75.39%), control K. Neelkanth (75.09%), and control K. Khyati (75.14%), while minimum starch content was recorded for PS/06-88 (72.34%), followed by hybrid P-12 (72.68%). The starch content of tubers is affected by variety, location, climatic conditions, and fertilisation (Marecek *et al.,* 2013) (Table 2).

Table 1: Quality and Tuber yield Parameters of Different hybrids and Varieties.

Treatment	Dry matter content (%) at 75 DAP	Dry matter content (%) at 90 DAP	Dry matter content (%) at senescence	Total tuber yield t/ha 75 DAP	Total tuber yield t/ha 90 DAP	Total tuber yield t/ha senescence
Columba	16.11	17.22	22.05	25.66	36.07	50.48
MCIP/12-185	17.51	19.74	22.42	38.18	41.18	59.42
MS/12-2116	18.20	19.20	20.60	36.24	43.63	67.59
MS/10-1529	16.95	19.11	21.34	33.13	42.66	44.74
PS/06-88	18.45	22.05	23.26	30.50	39.66	57.06
P-12	19.71	21.95	23.90	35.61	34.58	52.46
MS/8-1148	17.65	18.67	20.73	33.05	40.83	61.29
PS/6-39	16.94	21.51	25.07	31.74	39.52	63.65
P-28	18.57	22.20	23.38	30.95	43.27	70.03
MS/9-2196	16.52	18.08	21.54	34.03	42.90	59.86
J/7-37	16.54	19.10	21.07	38.74	39.53	57.19
K. Bahar	17.95	20.27	23.35	31.90	37.75	59.53
K. Khyati	16.34	19.12	20.43	33.75	44.96	61.57
K. Lalima	18.29	21.05	22.98	33.53	40.70	66.49
K. Pukhraj	17.23	19.71	21.19	31.14	39.43	59.74
K. Pushakr	14.52	17.72	20.31	32.51	41.14	60.19
K. Lalit	16.95	20.16	22.92	33.00	49.13	54.77
K. Garima	18.38	19.15	21.28	33.96	46.84	58.80
K. Mohan	15.01	18.41	20.14	29.38	40.30	60.39
K. Ganga	14.99	17.05	19.76	32.53	46.43	66.47
K. Neelkanth	18.99	18.63	21.39	42.38	47.55	58.19
SE(m)±	**0.69**	**0.60**	**0.59**	**1.13**	**1.46**	**2.33**
CD (5%)	**1.94**	**1.69**	**1.67**	**3.18**	**4.10**	**6.55**

Table 2: Biochemical Parameters of Different hybrids and Varieties.

Treatment	Reducing sugar (mg/100g) at 75 DAP	Reducing sugar (mg/100g) at 90 DAP	Total soluble solids (°Brix) at 75 DAP	Total soluble solids (°Brix) at 90 DAP	Phenols (mg/100g) at 75 DAP	Phenols (mg/100g) at 90 DAP	Total free amino acid (mg/100g) at 75 DAP	Total free amino acid (mg/100g) at 90 DAP	Protein content (%) at 75 DAP	Protein content (%) at 90 DAP	Starch content (%) at 75 DAP	Starch content (%) at 90 DAP
Columba	205.67	223.17	4.82	6.72	101.00	104.00	98.00	100.33	4.41	5.35	72.63	74.84
MCIP/12-185	205.00	223.17	4.88	5.97	103.33	105.00	99.00	100.67	3.97	4.57	72.07	74.96
MS/12-2116	205.67	223.00	3.57	5.05	105.67	105.67	105.33	106.00	4.56	5.56	71.28	74.00
MS/10-1529	235.50	219.00	4.73	5.03	102.33	105.33	107.33	108.33	4.85	5.27	72.82	74.53
PS/06-88	219.67	213.00	5.41	6.25	101.33	103.00	112.67	113.33	4.93	5.33	70.54	72.34
P-12	246.67	254.33	5.35	5.65	101.00	105.67	114.33	115.00	4.38	5.38	71.69	72.68
MS/8-1148	242.50	244.50	5.40	6.02	104.33	106.83	94.67	83.67	4.44	4.65	70.74	73.95
PS/6-39	214.83	220.00	5.57	7.73	101.67	106.00	105.00	107.33	4.65	5.29	71.88	74.18
P-28	247.67	261.00	5.22	7.37	104.83	108.17	106.67	108.00	4.50	4.91	71.54	74.55
MS/9-2196	243.00	252.67	4.78	6.37	94.33	104.67	105.83	108.00	4.23	4.42	72.32	73.78
J/7-37	252.00	263.00	4.67	5.18	91.00	99.00	104.67	106.00	4.36	4.57	71.67	74.52
K. Bahar	222.67	241.50	3.63	3.88	93.17	101.33	100.67	102.00	4.45	4.56	73.34	75.39
K. Khyati	252.67	255.00	4.97	5.50	97.50	103.00	96.67	99.00	4.31	4.57	72.83	75.14
K. Lalima	215.17	215.17	4.60	6.52	94.67	103.33	115.17	116.00	4.52	4.73	72.88	74.80
K. Pukhraj	186.17	198.50	4.50	6.30	96.00	104.67	110.00	111.67	4.39	4.79	73.89	74.72
K. Pushakr	187.33	196.67	4.47	4.83	95.67	104.67	105.17	109.33	4.39	4.59	71.34	74.32
K.Lalit	183.67	189.00	4.73	5.65	102.33	106.67	105.50	106.67	4.34	4.61	74.41	76.26
K.Garima	203.67	207.67	4.75	6.33	105.83	107.33	111.33	112.33	4.33	4.61	71.41	74.06
K. Mohan	219.00	225.00	3.28	4.22	105.33	107.67	106.67	108.00	4.44	4.29	73.57	74.00
K. Ganga	215.83	220.17	5.44	5.62	108.00	108.33	105.83	107.17	4.36	4.56	71.08	74.55
K. Neelkanth	206.83	206.83	4.43	4.47	111.33	108.83	100.67	102.00	4.48	5.43	72.64	75.09
SE(m)±	**3.99**	**3.40**	**0.15**	**0.13**	**0.94**	**1.31**	**1.17**	**3.09**	**0.13**	**0.12**	**0.44**	**0.42**
CD (5%)	**11.23**	**9.56**	**0.42**	**0.37**	**2.65**	**3.68**	**3.30**	**8.70**	**0.36**	**0.34**	**1.24**	**1.18**

CONCLUSIONS

The result clearly indicates that hybrids J/7-37 (38.74 t/ha), MS/12-2116 (43.63 t/ha) and P-28 (70.03 t/ha) and among controls K. Neelkanth (42.38 t/ha), K. Lalit (49.13 t/ha) and K Lalima (66.49 t/ha) were most suitable medium duration for cooking and gives high yield in all three days of potato harvesting 75, 90 and at senescence. Most of these hybrids and varieties contain dry matter, starch, reducing sugars, total soluble solids, protein, phenols, and amino acids within acceptable limits, which are required for consumption purposes. This potato hybrid and variety will be especially useful for resource-poor farmers.

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