



Organoleptic evaluation of elite clones of potato for semi-arid agro-ecology of Haryana

Satyender Kumar Yadav* and Sushma Arya

Potato Technology Centre, Karnal, India 132001

International Potato Centre, New Delhi 110001

*Corresponding author: satyender.yadav@rediffmail.com

ABSTRACT

Collaborative studies were conducted at Karnal, Sirsa and Mahendergarh in Haryana during 2018-19 to identify suitable varieties for semi-arid, agro-ecology of Haryana. International Potato Centre (CIP). The experiments with 7 most promising clones from International Potato Centre (CP 4388 7003, CP 4393 7008, CP 4395 7010, CP 4397 7011, CP 4404 7015, CP 4406 7017, CP 4197 7019) were conducted in three districts of Haryana (Karnal, Sirsa and Mahendergarh). The experiments were laid out in randomized block design with three replications at each location. Sowing was done in October, 2018 at Karnal and in November, 2018 at Mahendergarh and Sirsa. Spacing was 60 cm x 20 cm. Dehaulming of potato crop was done at 90 days after sowing. Organoleptic evaluation of different clones based on appearance, taste and texture was done in participatory mode with farmers and stakeholders. The clone CP 4404 7015 was adjudged the best clone for its appearance; however, CP 4397 7011, CP 4406 7017 and CP 4393 7008 were also preferred by stakeholders. CP 4404 7015 and CP 4393 7008 were found better in taste; however, CP 4397 7011 and CP 4395 7010 were also preferred. Clones CP 4404 7015 and CP 4397 7011 were adjudged best in texture, however CP 4406 7017, CP 4393 7008 and CP 4388 7003 also had location specific preference. Overall, clones CP 4404 7015 and CP 4397 7011 were found best in organoleptic parameters, which were also good for processing. Similarly, clones CP 4393 7008 and CP 4406 7017 were also found acceptable on different organoleptic characters. These new elite clones of potato could help in increasing farmers' income due to their acceptable organoleptic characters.

Keywords: Potato, Clones, Organoleptic evaluation, Taste, Texture, Appearance

Received 11.01.2020

Revised 21.02.2020

Accepted 10.03.2020

INTRODUCTION

Potato is an important food crop of the world. In India, it is cultivated on an area of 2.14 million ha with production of 51.3 million tons [5], which is second only to China. Due to flexibility in planting and harvesting time, it can fit in with various intensive cropping systems without putting extra pressure on scarce land and water resources. Production of potato in the country has to be increased to 122 million tons and the productivity to 35 tons per hectare by 2050 to meet the needs of the increasing population [2]. To meet this production target, there is need for seed potato production under climate change scenario, development of climate smart cultivars for the changed climate and increase in productivity and income of farmers by making available the quality seed of elite clones with acceptable organoleptic characteristics. Some of the good clones are available with short duration and heat tolerance characteristics; however, their marketability will depend on their acceptability on organoleptic characteristics. Hence, studies were undertaken at Potato Technology Centre, Shamgarh, Karnal, India in collaboration with International Potato Centre (CIP) and Central Potato Research Institute (CPRI) to identify suitable clones with acceptable organoleptic characteristics for semi-arid agro-ecology of Haryana for creating better income opportunities for the farmers. Genetic resources exchanged from CIP were evaluated for this study. Experiments were planned at PTC, Shamgarh, Karnal and organoleptic evaluation of potato clones was done in farmer participatory mode for selection of climate smart varieties with acceptable organoleptic parameters.

MATERIALS AND METHODS

Different clones from CIP were planted during 2018-19 at three places at Potato Technology Centre (PTC), Shamgarh, Karnal, IDHC, Sundrah, Mahendergarh, Mangiana Farm, Sirsa. Seven most promising CIP clones (CP 4388 7003, CP 4393 7008, CP 4395 7010, CP 4397 7011, CP 4404 7015, CP 4406 7017, CP 4197 7019) at three districts of Haryana (Karnal, Sirsa and Mahendergarh) were laid out to explore the location specific clones. The experiments were laid out in randomized block design with three replications at each location. Sowing was done in October, 2018 at Karnal, and in November, 2018 at Mahendergarh and Sirsa. Spacing was 60 cm x 20 cm with use of whole tubers as seed. The gross plot size was 2.4 m x 3.0 m. Dehauling of potato crop was done at 90 DAS, and tubers were excavated 2 weeks after dehauling.

All the clones were taken up for organoleptic studies. From each clone, 8 medium size tubers were taken, and these were kept in polythene bags separately, tagged with their respective number (hiding the original name of the clones). The bags were tied properly with a string to avoid mixing with other clone when all the bags were kept for boiling. For boiling, a big utensil was filled with water and kept on fire to boil. All the bags were kept in this utensil. Time to time, the potatoes were checked by inserting a knife in the potato if the potatoes are boiled properly. Care was taken that the tubers were neither uncooked nor over cooked. Once the potatoes were cooked properly, these were removed from the fire. The bags were taken out and each bag was kept in front of a plate, hiding the original number below the plate and an arbitrary number was marked on the plate.

Out of 8 tubers, 2 tubers were kept as such on one side of the plate and the rest of the 5 tubers were peeled and cut into small pieces for tasting. Volunteer farmers/ stakeholders were involved in organoleptic evaluation of the clones. The information was filled up on a prescribed form, by the participants. The opinion of the participants about the appearance of the whole tuber was carefully noted down and then they were asked to feel the texture of boiled cut potato pieces with their fingers. The participants were then asked to eat the potato and give their opinion regarding how it tasted. The characteristics of the clones were compared by plotting the graphs separately for each location.

RESULTS AND DISCUSSION

Appearance:

At Karnal, the CIP clone CP 4404 7015 was ranked at number one in the appearance by the stakeholders because of its shining red coloured skin and large sized uniform tuber shape (Fig. 1). However, clones CP 4406 7017, and CP 4393 7008 found at rank number 2 and 3, respectively. The clone CP 4406 7017 had large tuber of bright yellow skin colour. At Sirsa again, the CIP clone CP 4404 7015 was ranked at number one in appearance by the stakeholders; however, CP 4397 7011 was ranked at number 2 which had a light-yellow smooth uniform skin without any spot with elongated uniform shape) and CP 4393 7008 was found at rank 3 with uniformity of tuber size and shape. At Mahendergarh, the CIP clone CP 4404 7015 was ranked at number one in appearance despite small size of tubers but the skin had bright pinkish shine, followed by CP 4397 7011 at rank 2 and CP 4406 7017 at rank 3.

Based on observations from all the locations, it may be concluded that the clone CP 4404 7015 was adjudged the best clone for its appearance. However, CP 4397 7011, CP 4406 7017 and CP 4393 7008 were also preferred by stakeholders.

Taste:

At Karnal, the potato clone CP 4393 7008 was ranked number one in taste, due to its mild flavour and perfect taste (Fig. 2). However, the clones CP 4404 7015 and CP 4395 7010 were ranked at number 2 and 3, respectively in taste, due to their high dry matter. At Sirsa, the clone CP 4404 7015 was ranked number one in taste, followed by CP 4393 7008 and CP 4397 7011 number 2 and 3, respectively. At Mahendergarh, the clone CP 4404 7015 was ranked number one in taste. However, CP 4393 7008 and CP 4397 7011 were ranked in succession. Based on data from all the locations, CP 4404 7015 and CP 4393 7008 were found better in taste; however, CP 4397 7011 and CP 4395 7010 were also scored high in taste. CP 4197 7019 was not inferior in taste.

Texture:

At Karnal, clone CP 4404 7015 was ranked number one in texture by stakeholders due to its mealy texture (Fig. 3). However, CP 4397 7011 & CP 4406 7017 were ranked number 2 and 3 in texture, respectively. At Sirsa, the clone CP 4397 7011 was ranked number 1 in texture, CP 4404 7015 stood at number 2 and CP 4393 7008 was ranked number 3. At Mahendergarh, the clone CP 4404 7015 was ranked number one in texture by stakeholders and CP 4397 7011 and CP 4388 7003 were ranked in succession. Based on data from all the locations, clones CP 4404 7015 and CP 4397 7011 were adjudged best in texture, however CP 4406 7017, CP 4393 7008 and CP 4388 7003 had area specific preference.

Selection of a promising clone was strongly related to participant's decision on its organoleptic acceptance and probable logical decision for future adoption of a genotype for commercial cultivation [6, 3, 8]. The organoleptic characteristics of potato vary with clone/ variety, location and environment [1, 4, 7, 8, 9].

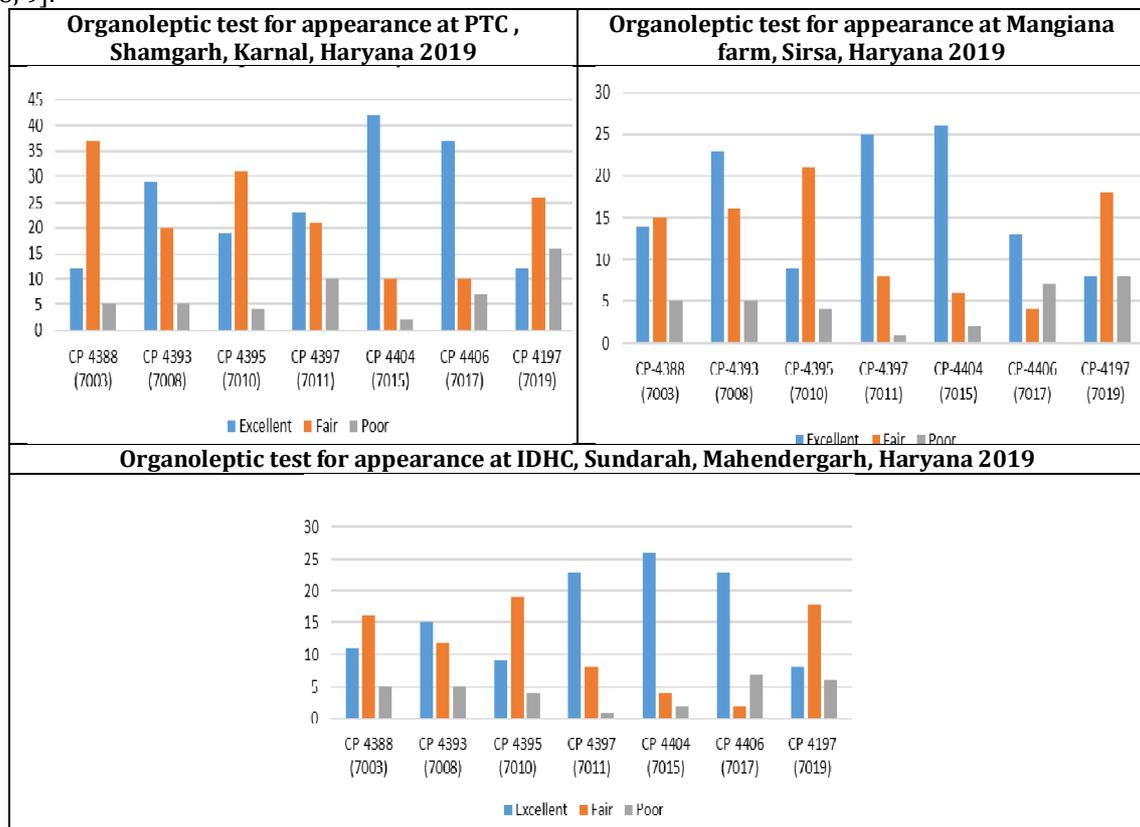
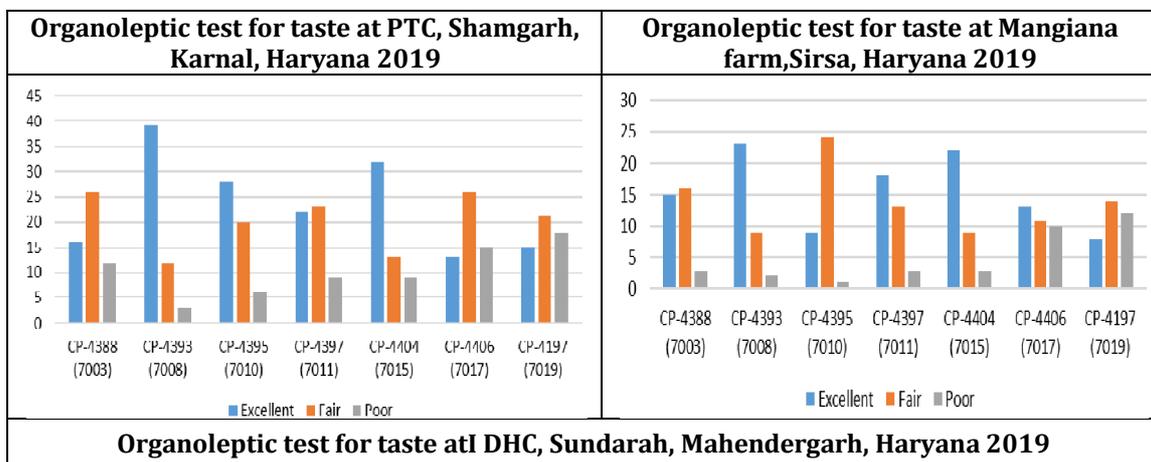


Fig. 1. Organoleptic test for appearance of potato clones at different locations in Haryana



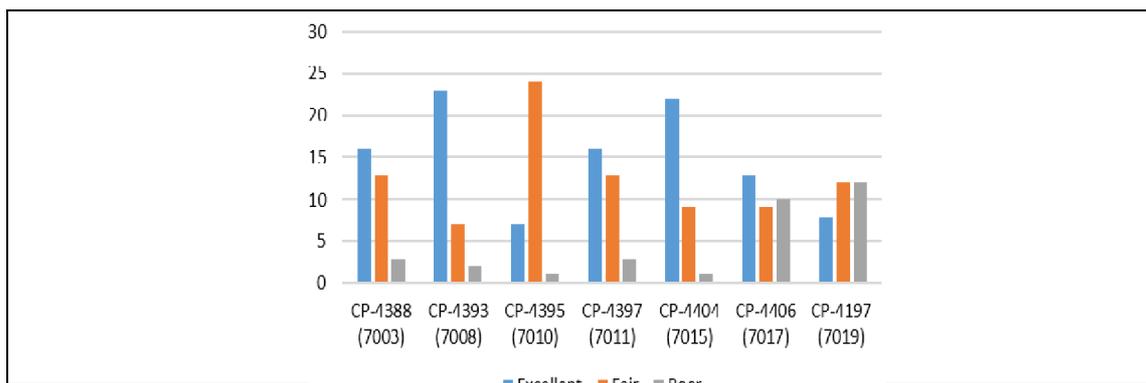


Fig. 2. Organoleptic test for taste of potato clones at different locations in Haryana

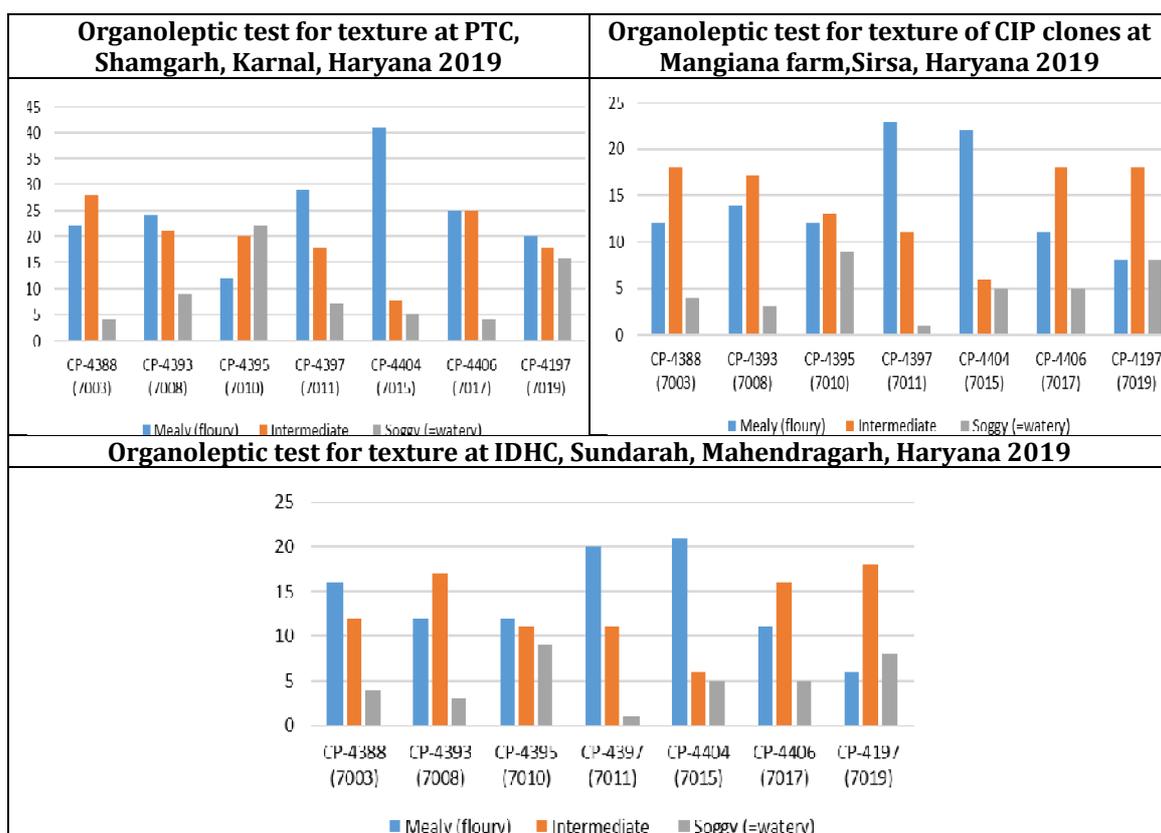


Fig. 3. Organoleptic test for texture of potato clones at different locations in Haryana

CONCLUSION

Among different elite clones CP 4404 7015 and CP 4397 7011 were found best in organoleptic parameters. These were also good for processing due to their high dry matter content. Thus making these clones promising for Haryana conditions. Similarly, clones CP 4393 7008 and CP 4406 7017 were also found acceptable on different organoleptic characters. Clone CP 4393 7008 is also having short duration maturity thus making it an acceptable clone for Haryana situations. These new elite clones of potato could help in increasing farmers’ income due to their acceptable organoleptic characters.

REFERENCES

1. Arya, S., Rawal, S., Luthra, S.K., Sharma, S.K., Sharma, N., Gupta, V.K. and Kadian, M.S. (2017). Participatory evaluation of advanced potato (*Solanum tuberosum*) clones for water stress tolerance. Indian J. Agric. Sci., 87(11): 1559-64.
2. CPRI. (2015). Vision 2050. ICAR-CPRI, Shimla. P 33.
3. Elnaz, T.A, Orang, E. and Simin, A. (2015). Organoleptic evaluation of potato after pre- drying, slices dimensions and Psyllium seed hydrocolloid- coating. Int. J. Farming Allied Sci., 4: 606-609.
4. Gupta, V.K, Luthra, S.K. and Singh, B.P. (2015). Storage behaviour and cooking quality of Indian potato varieties.

- J. Food Sci. Technol., 52: 4863–73.
5. IASRI. (2019). Agricultural Research Data Book 2019. ICAR-IASRI, New Delhi. pp 161.
 6. Jansky S.H. (2008). Genotypic and environmental contributions to baked potato flavour. *American J. Potato Res.*,85: 455–65.
 7. Khan, A., Erum, S., Riaz, N., Ghafoor, A. and Khan, F.A. (2019). Evaluation of potato genotypes for yield, baked and organoleptic quality. *Sarhad J. Agri.*, 35(4): 1215-1223.
 8. Ojinnaka, M.C. and Onwuka, G.I. (2011). Organoleptic assessment of the performance of some cultivars of *Ipomoea batatas* in the development of selected snack products. *Pakistan J. Nutrition*, 10: 935-939.
 9. Spear, R.R., Holden, Z.J., Ross, C.F., Weddell, B.J. and Pavek, M.J. (2018). Sensory evaluation of eleven baked russet-type potato varieties and clones. *American J. Potato Res.*95: 92-100.

CITATION OF THIS ARTICLE

S K Yadav and S Arya. Organoleptic evaluation of elite clones of potato for semi-arid agro-ecology of Haryana . *Bull. Env. Pharmacol. Life Sci.*, Vol 9[4] March 2020 : 91-95