Mini-Tuber Production of Important Potato (*Solanum tuberosum* L.) Cultivar Kufri Pukhraj

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Abstract - ***Commercial production of potato mini-tubers, cv Kufri Pukhraj, has been carried out in Centre for Plant Biotechnology lab and Vegetable Science Farm. According to protocols based on in vitro methods.***

Keywords - Mini-Tuber, Potato.

I. INTRODUCTION

Potato is belonging to the family Solanaceae and one of the world's most economically important tuber crop. It is the third most cultivated food crop in the world after wheat and rice. This crop gives an exceptionally high yield (up to 25-30 t/ha) and also produces more edible energy and protein per unit area and time than many other crops. It is being used as a staple food in many countries. Through Micro-propagation allows quick and round-the-year production of disease-free good quality seed and thus is a way out to supplement the ever increased demand of quality seed as mini-tuber. Keeping the above points in view, the present study has been designed.

II. OBJECTIVE

1. To develop efficient technique for Mini-tuber production in potato cv. Kufri Pukhraj.

III. MATERIAL AND METHODS

Commercial production of potato mini-tubers, cv Kufri Pukhraj, has been carried out in Centre for Plant Biotechnology lab and Vegetable Science Farm. According to protocols based on *in vitro* methods. Sprouts and Shoot tips were used as explants. Sterilization of explants were done using bavistin (0.2%) and streptocycline (0.4%) for 45 minutes followed by treatment with $HgCl_2$ (0.1%) for 60 seconds. Sterilized explants were inoculated on MS basal supplemented with various growth regulators and established successfully. The sprouted explants were further sub-cultured on MS media supplemented with various growth regulator alone and in combination for *in vitro* multiplication. Self rooted microplants were successfully hardened in green house using different types of potting mixture and finally transferred to field to produced mini-tuber in field. Cultivation period was 4 months in each year.

IV. RESULTS AND DISCUSSION

During the period, the number of mini-tubers produced/plant was 8-10 for cv. Kufri Pukhraj and maximum average weight was 3.7±1.46 g. The largest diameter of minitubers was 2.0±0.40 cm. Minituber behavior under field conditions was independent from the technique used for its production. Ali *et al* (1995) supported that *in vitro* culture nodal plant produced more minitubers. The terminal Node-5 cutting and WIP produced significantly larger minitubers >3.0 g as compared to single node cuttings. Greater numbers of minitubers were produced by the cvs Norchip, Red Pontiac and Conestoga as compared to cvs Eramosa. Total numbers of minitubers were 3 to 5 times higher from each *in vitro* plantlet that was sectioned into nodal cuttings. In an another research K. Grigoriadou and N. Leventakis (1999) developed large scale, commercial production of potato minitubers, cvs Spunta, Jaerla and Kennebec, has been carried out *in vitro*, according to protocols based on in vitro methods. Apical meristems were cultured on MS medium supplemented with 1 µM IBA, 20 g/l sucrose and 6 g/l agar (pH 5.8). Subculture was carried out every 15 days. Multiplication rate was 4–5 per cycle. Self-rooted microplants were transferred into screen houses (200 plants/m^2) in a mixture of peat and perlite 1:1 (v/v). The number of minitubers produced/plant was 2.07 for cv. Spunta, 1.85 for cv. Jaerla and 2.52 for cv. Kennebec and their average weights were 10.8 g, 10.9 g and 9.8 g, respectively. The percentage of minitubers<10 mm in diameter was 2%, 50.1% were 10–20 mm and 47.9% were>20 mm.

And Willemien J. M. Lommen (1994) studied behaviour of minitubers in five weight classes, having mid-point values between 0.19 and 3.00 g, during sprouting and emergence under controlled conditions. Lighter tubers took longer to produce sprouts of 2 mm, and their sprouts grew more slowly between 2 and 4 mm and 4 and 6 mm. The influence of tuber weight was less for heavier tubers and also decreased as the

sprouts grew longer. When tubers with sprouts of the same length were planted in pots, sprouts from lighter tubers took longer to emerge. Emergence was later and differences between weight classes were larger when tubers were planted deeper (6 or 9 cm) or when they had shorter sprouts at planting (2 or 4 mm). At emergence, plants from lighter tubers had thinner stems and lower stem and root weights, but higher stem weights proportional to tuber weights and higher shoot:root ratios.

AVERAGE SIZE AND WEIGHT OF MINITUBERS FROM THE FIELD

Sr. No.	Kufri Pukhraj	
	Minituber size diameter (cm.)	Weight (g)
1	2.0±0.40	3.7±1.46
2	1.8 ±0.41	3.6±1.98
3	1.2± 0.32	1.5± 0.75
4	1.1± 0.37	1.3± 0.77
5	1.0 ±0.29	1.0± 0.37
6	0.9 ±0.24	0.8± 0.30
7	0.8 ± 0.27	0.6± 0.24
8	0.8 ± 0.10	0.6 ±0.29
9	0.9 ± 0.37	0.8±0.47

V. CONCLUSION

Total numbers of minitubers were 3 to 5 times higher from each *in vitro* plantlet that was sectioned into nodal cuttings. So getting disease-free good quality seed and thus *in vitro* is a way out to supplement the ever increased demand of quality seed.

Fig 1 : Tissue culture raised plants in the field

Fig 2: Minitubers From Field

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