



## Production Technology of Potato Using True Potato Seed

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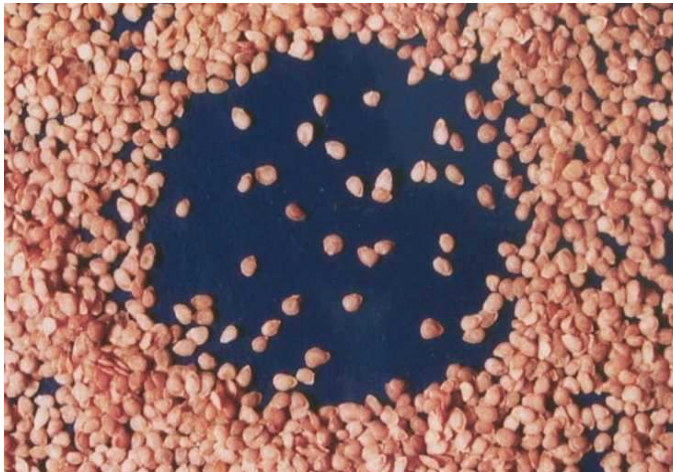
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True Potato Seed (TPS) is a botanical seed developed in the berry of the plant as a result of fertilization. The technology basically consists in production of TPS and raising commercial potato crop from it. TPS can be used as an alternative source to supplement healthy planting material in seed deficient states as well as to fit potato in different cropping systems because tuber seed of correct physiological age may not be available to farmers every time. It has been shown that the use of TPS seedling transplants and seedling-tubers as seed are economical and successful approaches to commercial potato production. TPS technology is likely to gain momentum in future particularly in the non-seed producing areas viz. Karnataka, Maharashtra, Madhya Pradesh, Orissa and the states of north-eastern region where good quality seed tubers are either not available or are too expensive.

### Introduction

Potato is traditionally grown vegetatively through seed tubers. This causes regular accumulation and increase of various tuber borne diseases in seed tubers and consequent reduction in crop yield. Therefore, to maintain high yields, the potato varieties released from time to time need constant support of a well developed disease free seed production programme. This, however, puts a limit to the amount of availability of good quality seed produced in the country and also pushes up the cost of seed tubers. To overcome these problems, a new potato production technology

making use of True Potato Seed (TPS), instead of tubers for raising the crop, has been developed by Central Potato Research Institute (CPRI), Shimla and International Potato Center. TPS could serve as a cheap and highly productive material for raising commercial potato crop, especially in areas where availability of good quality seed tubers at reasonable price is a major constraint in increasing potato production. The technology of potato production through TPS has been found suitable for adoption in all the potato growing areas of the country.



True Potato seed (TPS)



TPS in Potato fruit (Berry)

### Package of Practices for Production of Potato Using T.P.S.

The method suggests two stage programme for raising potato using TPS, *i. e.* -

- **Production of potato crop from transplanted seedling:** Initially TPS is sown in nursery for raising seedlings which are latter transplanted in properly prepared seed bed but the process becomes labour intensive and very expensive
- **Production of potato crop from seedling tubers:** The TPS was tested and tried at International Potato Centre and Central Potato Research Centre Institute (CPRI) Shimla and recommended ways for eliminating raising seedlings and then transplanting. Package of practices for production of potato using T.P.S. from both methods are given in table (2).

### Recommended varieties of TPS

1. H.P.S. 1/13
2. T.P.S.C. -3
3. 92 PT 27

Table 1. Comparisons of TPS and Seed tubers

Attributes	TPS	Seed Tuber
Labour requirement	High in initial phase of crop establishment	Low due to mechanization of cultivation
Disease/ pest situation	Free from major diseases/ nematodes and viruses	Once infested, may carry nematodes, viruses, viroides, fungi and bacteria
Seed requirement	50 – 200 g TPS /ha for seedling tubers or transplant respectively	2 – 4 tonnes /ha according to tuber size/ planting density
Crop maturity	Late and variable, and 15 - 20 days more than standard varieties	Early and uniform (75 -90days in new varieties )
Tuber uniformity	Low due to segregating populations	High due to vegetative propagation from a single clone
Cost of production	Low	High
Storage	Simple with low cost, as TPS can be stored for many years at room temperature with little loss in seed viability	Potato tubers for ware and seed uses, being perishable, need costly storage structures

**Table 2. Production Technology for Production of Potato using TPS**

Crop from transplanted seedlings	Crop from seedling tubers/tuberlets
<p><b>1. Preparation of nursery beds</b> 150 g TPS and 75 m<sup>2</sup> area of nursery are required for planting 1 ha field</p>	<p><b>1. Seedling tuber production in the nursery</b></p> <ul style="list-style-type: none"> <li>• 50 g TPS and 375 m<sup>2</sup> nursery bed area are sufficient for production of seedling tubers enough for planting 1 ha field</li> </ul>
<p><b>2. Seedling raising</b></p> <ul style="list-style-type: none"> <li>• Sow the TPS at ½ cm depth</li> <li>• Irrigate seed beds thrice a day</li> <li>• Transplanting age of seedling is 20 – 25 days</li> </ul>	<ul style="list-style-type: none"> <li>• Sow 2-3 seeds @ 10 x 10 cm spacing at 0.5 cm depth</li> <li>• Follow all cultural operations as recommended</li> <li>• After attaining seedling height of about 15 cm, cover the lower most 3 internodes with additional substrate mix</li> <li>• Harvest the seedling tubers after about 15 days of haulm cutting</li> </ul>
<p><b>3. Field Preparations</b></p> <ul style="list-style-type: none"> <li>• As traditional method</li> <li>• Make 20 cm high ridges, 45-50 cm apart in east-west direction</li> </ul>	<ul style="list-style-type: none"> <li>• Make grading of the tubers in four grades &lt; 5g , 5-10 g, 10-20 g and &gt; 20g</li> <li>• Soak in 3% boric acid solution for 30 minutes then dry and store for using as seed in the season.</li> </ul> <p><b>2. Seedling tuber production in the field</b> Prepare the nursery beds and do all operations as the above method except row to row distance should be increased to 30 cm to facilitate earthing up of the plants</p>
<p><b>4. Seedling transplanting</b></p> <ul style="list-style-type: none"> <li>• Transplant the seedling @ 45-50 x 10 cm spacing</li> <li>• Irrigation and transplanting are successive operations</li> <li>• Do earthing up at 30-35 Days after transplanting</li> <li>• Do all subsequent cultural operations and take plant protection measures as per recommended cultivation in that region</li> </ul>	<p><b>3. Potato production in the field</b></p> <ul style="list-style-type: none"> <li>• Use the seedling tubers produced in previous crop season as seed for raising the crop</li> <li>• Spacing should be maintained 60 x 10 cm and 45-50 x 10 cm for mechanical and manual cultivation, respectively</li> <li>• Follow all the cultural and manorial practices for raising the crop as and when the crop is raised using seed tubers.</li> </ul>
<p><b>5. Adoption</b></p> <ul style="list-style-type: none"> <li>• Adopted in mild winter areas e.g. Assam, Bihar, Eastern UP, Gujarat, etc.</li> <li>• Commercial crop can be raised in the first year of the use of TPS</li> </ul>	<p><b>4. Adoption</b></p> <ul style="list-style-type: none"> <li>• Adopted in all potato growing regions</li> <li>• In the first year seedling tubers are produced. These tubers/ tuberlets are used as planting material for raising the commercial crop in the second year</li> </ul>
<p><b>6. Yield</b> Yield is comparatively less</p>	<p><b>5. Yield</b> Yield is higher</p>

### Constraints in TPS Utilization

TPS presents following disadvantages, which have been the major bottlenecks in adoption of TPS technology.

- Raising a crop from TPS requires more labour and greater skill. Therefore it has not been found more favourable by farmers.
- TPS produced crop takes about 20-25 days more for maturity compared to that from seed tubers.
- Potato seedlings are vulnerable to environmental stress and need more care/labour input especially during the initial phases of growth and establishment in transplanted crop.
- Crop from TPS populations are less uniform in plant type/maturity, tuber shape, size and dry matter
- Lack of awareness and package of practices
- Lack of Government policy and support
- Competition from traditional system

### Conclusion

The TPS is an alternative method to supply quality planting material and assured high yields with low inputs compare to tuber seed.

Although there are some bottlenecks hindering TPS adoption among farmers, those could be overcome by demonstrations on this technology. For the states like Meghalaya, Manipur, Arunachal Pradesh and Nagaland where potato is grown in two seasons, it is recommended for production of tuberlets in one/autumn season and utilization of the same as the disease free quality planting material in the subsequent summer/main-cropping season. Thus, it will avail on the one hand a seed material at cheaper rates and timely crop on the other.