



## Apical Potato Cutting for Seed Production

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### Introduction:

Shortage of quality seed potatoes is a major and a key problem in developing nations. Only about 11 % of the world's potato crop is grown from quality and certified seed. Due to this shortage, many a times the potato production often occurs or continues to occur with the degenerated seed material. Degeneration occurs due to successive accumulation of pathogens and pests (viruses, bacteria, fungi and mycoplasma) in the propagation material over a period given the repetitive cycle of vegetative propagation. Thus, it indicates using of apical cutting of potato for seed potato production.

A novel low-cost and farmer-friendly technology called Apical Rooted Cutting (ARC) has recently been standardized by CPRI, Shimla, for hi-tech seed production in potato. The apical rooted cutting involves raising in vitro plantlets in nursery and then transplanting of rooted cuttings in glass/net-house. Rather than allowing tissue culture plantlets to mature and produce mini-tubers, multiple cuttings are produced from an individual plantlet. This technology can be used for production of quality planting

material at low cost in seed deficit areas. The everlasting shortage of seed potatoes can also be partly overcome through ARC on account of its faster rate of multiplication.

Apical potato cutting (APC) is a technique used in seed potato production that involves cutting the apical (top) portion of a potato tuber to produce multiple seed pieces. This method is advantageous for multiplying disease-free seed potatoes, especially in developing regions where high-quality seed tubers are scarce. Tubers from clones were grown in pots to produce plantlets in a screen house for a period of 6 weeks. At five to six leaf stage, apical stems were cut from the plantlets with a sterile surgical blade. The apical stem cutting consisted of at least one axial bud and two leaves. The apical stem cuttings were dipped in 1 % indole butyric acid and then rooted in wooden trays, 50 x 50 x 5 cm, containing well drained rooting substrate sand of less than 1 mm grain size for a period of three weeks and were spaced at a square spacing of 5 x 5 cm. The apical stem cuttings were supplied with the nutrient solution at the time they were being rooted.

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The apical stem cuttings were uprooted and washed with clean water to remove the sand that stuck on their roots. The uprooted cuttings were wrapped with a thin sponge around the plant crown and transplanted into the holes of the Styrofoam in the greenhouse. Black plastics were covered in each of the planting holes of the Styrofoam so as to avoid light penetrating into the spraying unit for efficient tuberisation of potato. Stem cuttings generally implies that the mother plant has developed compound leaves, physiologically older. Normally mother plants for stem cuttings originate from a tuber, develop compound leaves and sprouts and shoots are taken as cuttings. Stem cuttings originating from mother plants with fully developed compound leaves generally yield 2-3 tubers per stem.

The benefits of Apical Potato Cutting involves the maximizes seed utilization as by cutting the apical portion of the potato, one can produce more seed pieces from a single tuber, increasing the number of plants that can be grown from a limited amount of seed stock. APC can help in the production of disease-free seed potatoes, especially when combined with tissue culture techniques to ensure the initial stock is pathogen-free. This method reduces the cost of seed potatoes by increasing the multiplication rate, making it a cost-effective solution for farmers. APC allows for rapid

multiplication of seed potatoes, which is particularly beneficial in regions with limited access to certified seed tubers. The apical portion tends to produce more vigorous and uniform sprouts, leading to uniform plant growth and development. Apical cuts often have a higher sprouting rate compared to basal or middle cuts, resulting in better seedling establishment. Plants grown from apical cuts may mature earlier, providing an earlier harvest and reducing the risk of late-season diseases.

Apical potato cutting is a valuable technique for seed potato production, offering several benefits, including increased seed multiplication, disease control, and cost-effectiveness. When implemented correctly, it can significantly enhance seed availability and quality, contributing to improved potato yields and sustainability in potato farming. Proper training, disease management, and attention to varietal responses are key to successful implementation of this technique.