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**COMPARISON OF PRODUCTION SYSTEMS FOR  
POTATO (*Solanum tuberosum* L.) MINITUBER  
PRODUCTION WITH DIFFERENT CULTIVARS**

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## ABSTRACT

The purpose of these studies is to determine the effect of different production systems (Aeroponic (AP), Deep flow (DF), Nutrition film technique (NFT) and Bark ) on production of first generation (prebasic) potato (*Solanum tuberosum* L.) minitubers with different cultivars (Russet Burbank, Rua, Kenebec, Atlantic and Diésrée). Prebasic tubers usually multiplied in a greenhouse in a bark medium. Replacing the bark based system by a highly intensive aeroponic system is viable. The aeroponic system significantly produced higher tuber numbers per plant and produced a higher percentage (82%) of 1–2g size tuber than other systems evaluated.

In aeroponic and deep flow systems, the time to tuberization is higher. When tuberization is delayed, stolons grow continuously in the deep flow and aeroponic systems. In hydroponic systems a developing stolons did not encounter sufficient mechanical resistance to limit growth, they grew extremely vigorously and very wide of diameter (1.92- 2.42 mm). When roots and stolons filled the aeroponic and deep flow containers some root rustication occurred then tubers were initiated.

Acid treatment efficiently synchronised tuberization in the aeroponic systems, tubers were visible four days after acid treatment. Optimum acid treatment depends on the specific cultivar or stage of stolon development. Rua produced the highest yield per plant and highest tuber number per plant. The pH and treatment time significantly affected the tuber number per plant. Acid treatment at pH 3.5 produced the highest tuber number (19.8) per plant.

Minitubers show a dormant period immediately after they are harvested. Application of GA is a useful method to break minituber dormancy. Fifty percentage of the GA treated tubers sprouted within 20 days after treatment, while untreated control took 37 days. Overall, sprouting was highest for 100 ppm treatment, but was not significantly different

from 30 ppm. The highest and lowest sprouting cultivars were Russet Burbank and Atlantic respectively.

Potato cuttings can be propagated in an aeroponic system. Application of IBA treatment at 0.1 to 0.3% significantly induced root formation and root growth. About 80% of the IBA treated cuttings rooted and produced longer roots than untreated cuttings.

From these studies we found the aeroponic system to be suitable for minituber production as well as the propagation of potato cuttings. Production of high tuber number per plant in aeroponic systems will reduce the production cost and reduce the number of field multiplications required before final cropping.

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